

# Alligator gar (*Atractosteus spatula*)

## Ecological Risk Screening Summary

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## 1 Native Range and Status in the United States

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### Native Range

From Froese and Pauly (2017):

“North America: ranges from Mississippi River basin from southwestern Ohio and southern Illinois in USA south to Gulf of Mexico; Gulf of Mexico Coastal Plain from Enconfina River in Florida, USA to Veracruz, Mexico.”

### Status in the United States

Native populations exist in the United States.

From NatureServe (2017):

“This gar is uncommon to rare throughout most of the range, except locally in swamps and bayous of the south-central United States (Page and Burr 2011). [...] Now the species is extirpated or very rare in most of the northern part of the range north of the Gulf Coastal Plain.”

From Fuller (2017):

“A single Alligator Gar measuring 145.5 cm TL and weighing 18.6 kg was reported from Clifton Court Forebay, a water storage reservoir located at the head of the California Aqueduct, near Byron in Contra Costa County, **California**, on 17 September 1991 (Raquel 1992). Another specimen was collected in July 2010 in Lake Wateree, **South Carolina** (R. Stroud, pers.comm.).”

“This species is becoming fairly common in the aquarium trade (P. Fuller, pers. observation).”

## Means of Introduction into the United States

From Fuller (2017):

“The introduction of the California individual was attributed to release by an aquarium hobbyist (Raquel 1992). It is probably that the South Carolina specimen was also an aquarium release.”

## Remarks

From Hassan-Williams and Bonner (2013):

“Listed as Vulnerable by the American Fisheries Society; categories of threats: present or threatened destruction, modification, or reduction of habitat or range; and over-exploitation for commercial, recreational, scientific, or educational purposes including intentional eradication or indirect impacts of fishing (Jelks et al. 2008). Vulnerable in southern US (Warren et al. 2000). Some states are listing alligator gar as a game fish to regulate harvest.”

## 2 Biology and Ecology

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### Taxonomic Hierarchy and Taxonomic Standing

From ITIS (2017):

“Kingdom Animalia  
Subkingdom Bilateria  
Infrakingdom Deuterostomia  
Phylum Chordata  
Subphylum Vertebrata  
Infraphylum Gnathostomata  
Superclass Actinopterygii  
Class Holostei  
Order Lepisosteiformes

Family Lepisosteidae  
Genus *Atractosteus*  
Species *Atractosteus spatula* (Lacepède, 1803)”

“Current Standing: valid”

## **Size, Weight, and Age Range**

From Froese and Pauly (2017):

“Max length : 305 cm OT male/unsexed; [McClanes 1974]; common length : 200 cm TL male/unsexed; [Wiley 1978]; max. published weight: 137.0 kg [Stone 2007]”

## **Environment**

From Froese and Pauly (2017):

“Freshwater; brackish; demersal; depth range 0 - ? m [Florida Museum of Natural History 2005].”

## **Climate/Range**

From Froese and Pauly (2017):

“Subtropical, preferred ?; 44°N - 20°N, 101°W - 82°W [Florida Museum of Natural History 2005]”

From Fuller (2017):

“The California specimen was recorded in water with a temperature of 25°C [...]”

## **Distribution Outside the United States**

Native

From Froese and Pauly (2017):

“North America: [...] Gulf of Mexico Coastal Plain from Enconfina River in Florida, USA to Veracruz, Mexico.”

Introduced

From Muchlisin (2012):

“In April 2011, one specimen of alligator gar fish, *A. spatula*, was caught by a fisher using a hook baited with shrimp in a coastal pond in the city of Meulaboh [Indonesia], and the specimen was deposited at the Laboratory of Ichthyology, Syiah Kuala University.”

From Esmaeili et al. (2017):

“A single specimen of the Alligator gar, *Atractosteus spatula* [...] was caught by local fishermen in March 2015 from Marivan (Zarivar) Lake, a Tigris River tributary of Iran (35°32'53.32"N, 46°7'19.08"E).”

“[...] a few notable sightings of alligator gar have been reported outside North America including Turkmenistan (Salnikov 2010), Hong Kong, Singapore, and India.”

From Mutlak et al. (2017):

“The first record of a single specimen of alligator gar, *Atractosteus spatula* (Lacepède, 1803), native to North America, is reported from the inland waters of Iraq. [...] The fish examined was an immature male, with gonad weight of 85.9 g.”

From Chong et al. (2010):

“Exotic freshwater fishes in Malaysia [...] *Atractosteus spatula*”

## **Means of Introduction Outside the United States**

From Muchlisin (2012):

“This fish [collected in Meulaboh, Indonesia] was probably released incidentally from the aquarium during the tsunami in December 2004.”

From Esmaeili et al. (2017):

“It might have been released by local people [in Iran]. It is known that these fishes are kept in aquaria all over the world including Iran, being sold in pet shops. It is also known that aquarists frequently get rid of unwanted fish by releasing them into open water bodies.”

From Mutlak et al. (2017):

“Aquarium trade pathway is the suspected factor for the presence of this species in the Iraqi freshwater area.”

From Chong et al. (2010):

“[...] released into the inland waters [of Malaysia] by pet owners.”

## **Short Description**

From Froese and Pauly (2017):

“Large size and broad, short snout. Light dorsal stripe. Dark olivaceous brown above and white to yellowish beneath. Dark brown blotches on all fins [Bigelow et al. 1963].”

## Biology

From Froese and Pauly (2017):

“Adults inhabit sluggish pools and backwaters of large rivers, swamps, bayous, and lakes. Rarely enter brackish and marine waters [Page and Burr 1991]. Feed on blue crabs, turtles, waterfowl or other birds and small mammals [Etnier and Starnes 1993].”

From NatureServe (2017):

“Spawning occurs April to June in Louisiana (Suttkus 1963), possibly January to September in Oklahoma-Texas (Echelle and Riggs 1972). Seasonal variation in ovarian weight indicated peak spawning in July-August in northeastern Mexico (Garcia de Leon et al. 2001). In Alabama, females mature at age 11 and live to age 50; males mature at age 6 and live to age 26 (Irwin, cited by Boschung and Mayden 2004).”

“Spawning occurs over vegetation in warm shallow water (e.g., see Garcia de Leon et al. 2001). Spawning may occur in an impoundment (Lake Texoma) in Oklahoma (Boschung and Mayden 2004, Miller and Robison 2004). Young may float at the surface among twigs and leaves (Boschung and Mayden 2004).”

## Human Uses

From Froese and Pauly (2017):

“Fisheries: minor commercial; gamefish: yes; aquarium: public aquariums.”

“Marketed fresh [Bigelow et al. 1963].”

From NatureServe (2017):

“[...] Hoese and Moore (1998) stated that this gar is [...] common as a market fish in Louisiana. It is numerous enough to support a fishery in a reservoir in Tamaulipas, Mexico (Garcia de Leon et al. 2001).”

## Diseases

From Hassan-Williams and Bonner (2013):

“Cestoda: *Proteocephalus ambloplitis*. Trematoda: *Clinostomum*, *Rhipidocotyle lepisostei*. Nemata: *Contraecaecum spiculigerum*, *Dechelyne lepisosteus* (Wardle 1990; Mayberry et al. 2000), and Crustacea: *Ergalis versicolor* (Hoffman 1967).”

From Tkach et al. (2008):

“*Macroderoides texanus* n. sp. is described based on 16 specimens collected from the intestine of the North American alligator gar, *Atractosteus spatula*.”

No OIE-reportable diseases have been documented for this species.

## **Threat to Humans**

From Froese and Pauly (2017):

“Harmless”

From Mutlak et al. (2017):

“The eggs of alligator gar are poisonous, but their consumption by people is unlikely (Boschung and Mayden 2004, Goddard 2009). Additionally, this fish could damage fishing nets due to the shape of its head and the sharp teeth.”

## **3 Impacts of Introductions**

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From Fuller (2017):

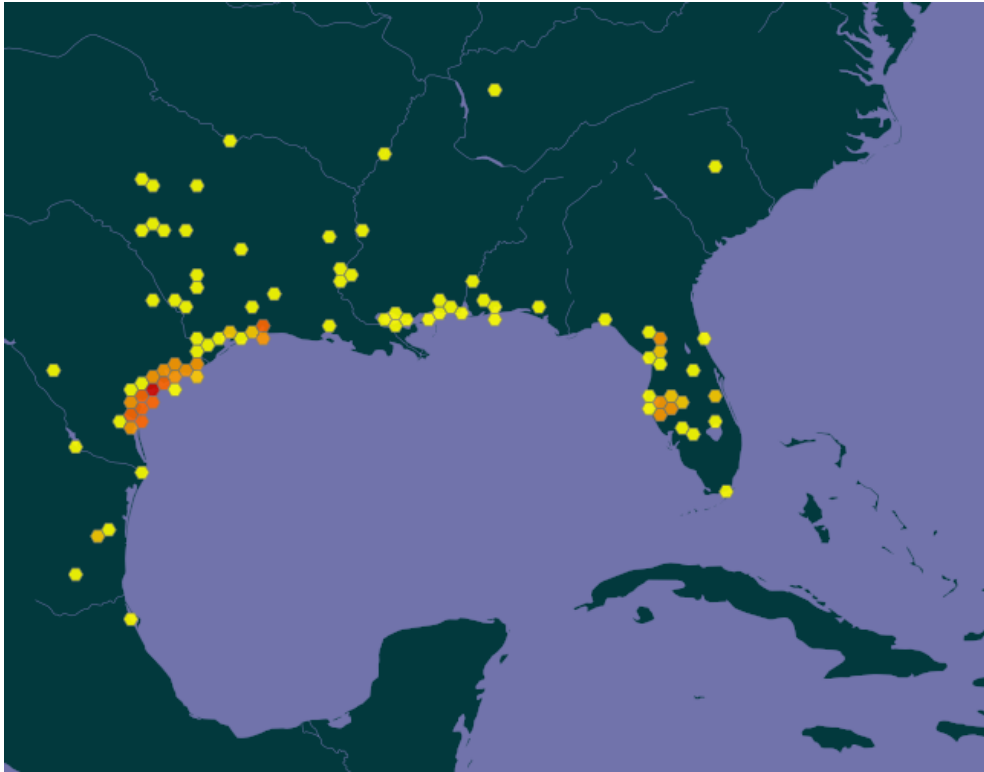
“Impact of Introduction: Unknown.”

From Mutlak et al. (2017):

“There has been no published information about established population alligator gar [*sic*] outside its native America.”

## 4 Global Distribution

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**Figure 1.** Known global established locations of *A. spatula*. Map from GBIF (2017). Points in central Mexico and the northern and western U.S. were excluded from this map and from the climate matching analysis because they do not represent known established populations. The points shown in South Carolina and peninsular Florida were also excluded from the climate matching analysis because they do not represent documented established populations (Fuller 2017).

## 5 Distribution Within the United States

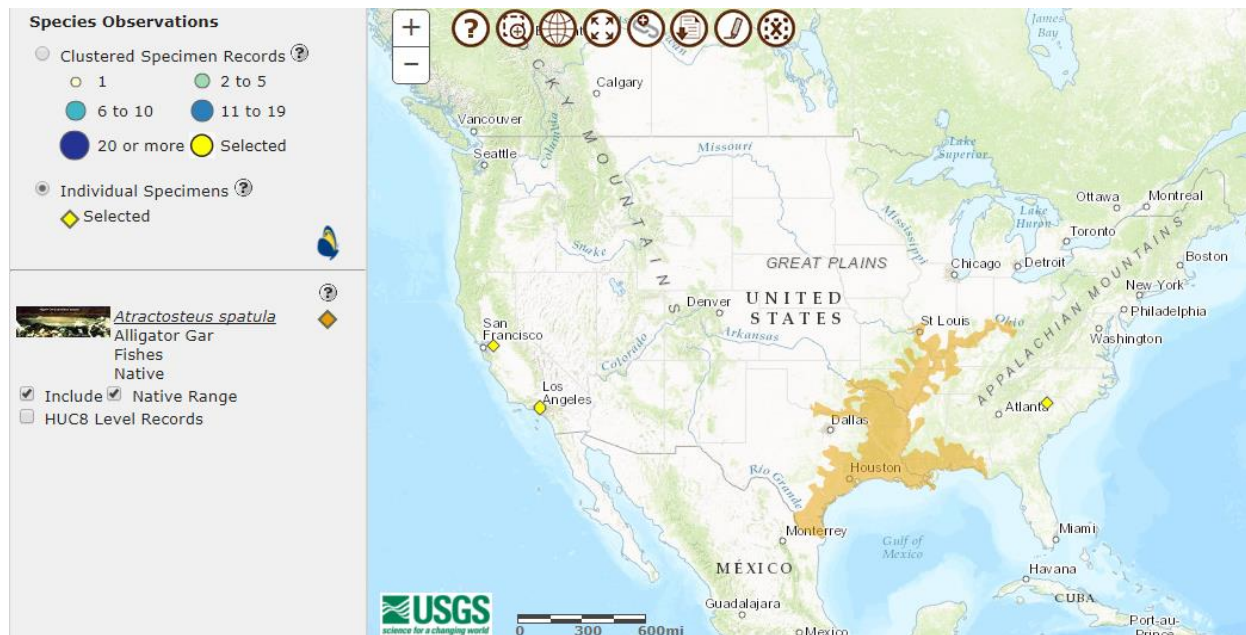


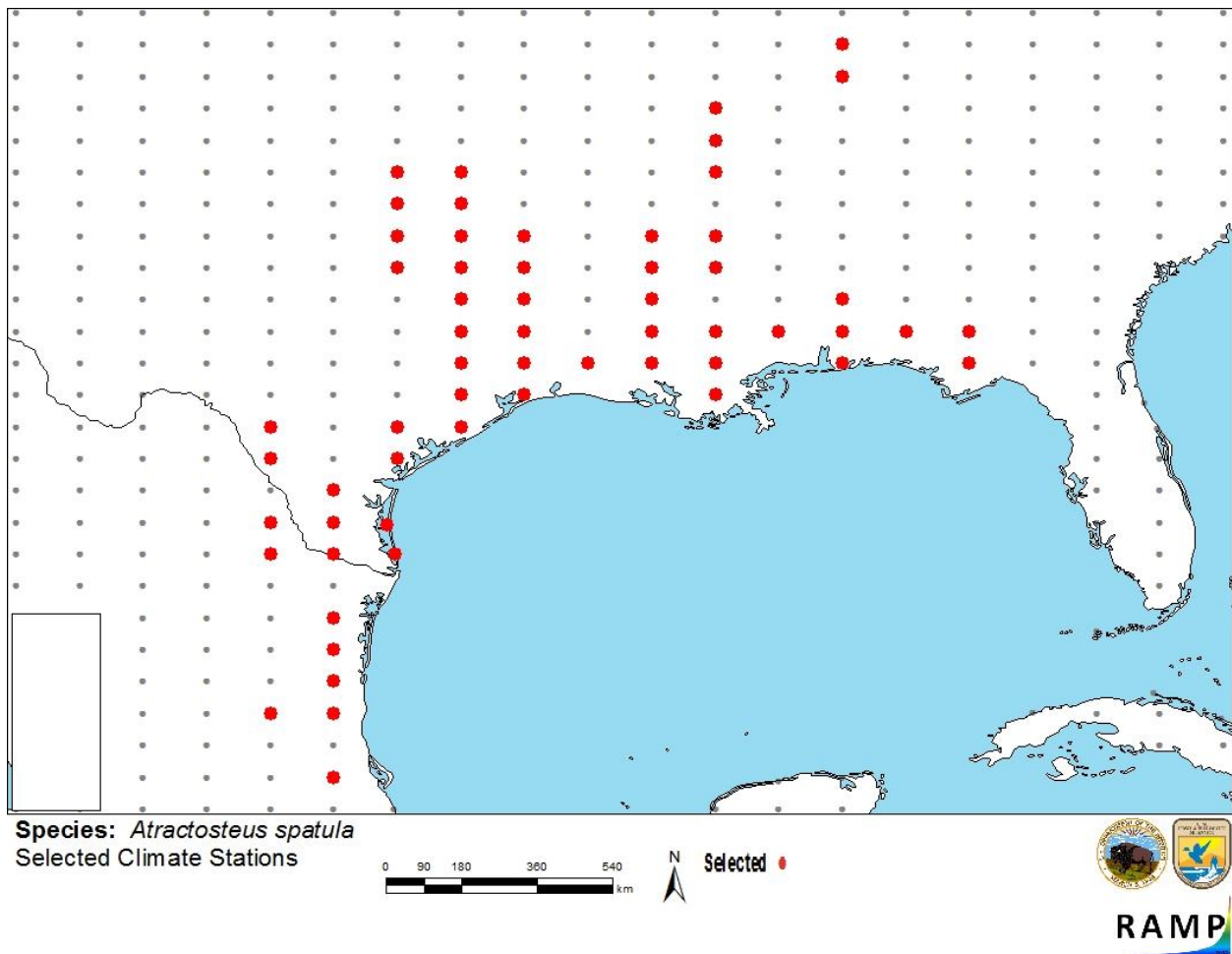
Figure 2. Known distribution of *A. spatula* in the United States. Map from Fuller (2017).

## 6 Climate Matching

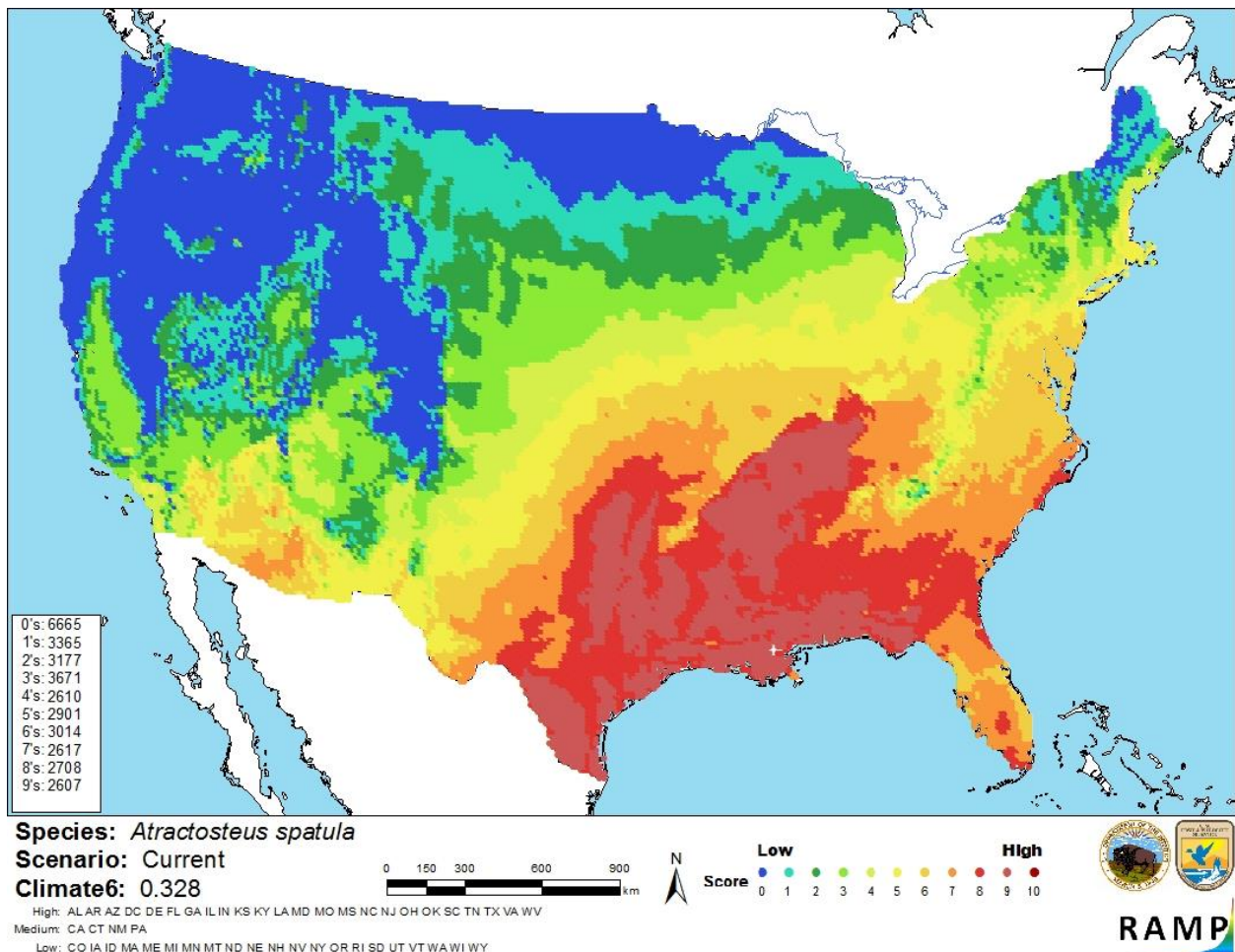
### Summary of Climate Matching Analysis

The climate match (Sanders et al. 2014; 16 climate variables; Euclidean distance) was high throughout the southeastern U.S. including peninsular Florida and Texas. Climate match was medium in parts of the Southwest as well as the Mid-Atlantic states, the southern Midwest, and the New England coast. Climate match was low in much of the West, northern New England, and the Upper Midwest and north-central U.S. states. Climate 6 score indicated a high climate match for the contiguous U.S. overall. Scores of 0.103 or greater are classified as high match; Climate 6 score for *A. spatula* was 0.328.





**Figure 3.** RAMP (Sanders et al. 2014) source map showing weather stations selected as source locations (red) and non-source locations (gray) for *A. spatula* climate matching. Source locations from GBIF (2017) and Fuller (2017).



**Figure 4.** Map of RAMP (Sanders et al. 2014) climate matches for *A. spatula* in the contiguous United States based on source locations reported by GBIF (2017) and Fuller (2017). 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
$0.000 \leq X \leq 0.005$	Low
$0.005 < X < 0.103$	Medium
$\geq 0.103$	High

## 7 Certainty of Assessment

The biology and ecology of *A. spatula* are well understood. *A. spatula* has been introduced outside of its native range in multiple locations in the U.S. and internationally; however, established populations or impacts from introduction have not been documented. The certainty of this assessment is low because of the lack of information on introductions.

## 8 Risk Assessment

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### Summary of Risk to the Contiguous United States

*Atractosteus spatula* is a large fish native to the Mississippi River basin and Gulf of Mexico coastal drainages in the U.S. and Mexico. It has become rare in much of its native range. Individuals have been collected in California and South Carolina, outside the native range, but no introduced established populations are known in the U.S. Several individuals have been collected in Asian countries, as well, but again no established populations have been documented. Impacts of introduction remain unknown. Aquarium releases appear to be the predominant pathway of introduction. Climate match to the contiguous U.S. is high. Without information on impacts of introductions, the overall risk posed by *A. spatula* is uncertain.

### Assessment Elements

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

## 9 References

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**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

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**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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