U.S. Fish & Wildlife Service

# Wels Catfish (*Silurus glanis*)
## Ecological Risk Screening Summary

**U.S. Fish and Wildlife Service, December 2023**
**Revised, April 2024**
**Web Version, 7/21/2026**

Organism Type: Fish
Overall Risk Assessment Category: High

Photo: Dieter Florian. Licensed under Creative Commons BY-SA 3.0 DE. Available: https://commons.wikimedia.org/wiki/File:Silurus_glanis_02.jpg (July 2026).

# 1 Native Range and Status in the United States

## Native Range

From Fusaro et al. (2024):

"*Silurus glanis*'s native distribution extends from Germany eastwards through to Poland, up to Southern Sweden and down to Southern Turkey and north Iran stretching through the Baltic States to Russia (Greenhalgh 1999) and to the Aral Sea of Kazakhstan and Uzbekistan (Phillips and Rix 1988, Copp et al. 2009)."

From Froese and Pauly (2024):

"Europe and Asia. North, Baltic, Black, Caspian and Aral Sea basins, as far north as southern Sweden and Finland; Aegean Sea basin in Maritza and from Struma to Sperchios drainages [Greece]; Turkey. Absent from the rest of Mediterranean basin."

According to Froese and Pauly (2024), *Silurus glanis* is native to the following countries: Afghanistan, Albania, Armenia, Austria, Azerbaijan, Belarus, Bulgaria, Czechia, Estonia, Georgia, Germany, Greece, Hungary, Iran, Kazakhstan, Latvia, Lithuania, Moldova, Poland, Romania, Russia, Serbia, Slovakia, Slovenia, Sweden, Switzerland, Turkey, Turkmenistan, Ukraine, and Uzbekistan.

## Status in the United States
No records of *Silurus glanis* in the wild in the United States were found.

From Fusaro et al. (2024):

"The import and sale of *S. glanis* to the United States was banned under the Lacey Act in 2016, however several hobbyist forums had posts seeking this fish since 2016, and one post indicated they had a specimen for sale in California, United States. […] Due to the previous legality of their trade and extensive life span, an unknown number of specimens may still exist in the United States."

### Regulations
From Fusaro et al. (2024):

"Federally banned in the **United States** from import and trade under the Lacey Act. In **Indiana** (312 IAC 9-6-7), **Michigan** (Part 413 of Act 451), **Minnesota** (§ 84D.07), and **Ohio** (OAC 1501:31-19-01) *Silurus glanis* is prohibited, making it illegal to import, propagate, sell, buy, barter, trade, loan, or release into public or private waters in these states."

*Silurus glanis* is also regulated in Alabama (ADCNR 2022), Georgia (State of Georgia 2023), Illinois (Illinois DNR 2015), Kansas (KDWP 2023), and Texas (TPWD 2022). Please refer back to state agency regulatory documents for details on the regulations, including restrictions on activities involving this species. While effort was made to find all applicable regulations, this list may not be comprehensive. Notably, it does not include regulations that do not explicitly name this species or its genus or family, for example, when omitted from a list of authorized species with blanket regulation for all unnamed species.

## Means of Introductions within the United States
No records of *Silurus glanis* in the wild in the United States were found.

## Remarks
This ERSS was previously published in September 2014. Revisions were completed to incorporate new information and conform to updated standards.

# 2 Biology and Ecology

## Taxonomic Hierarchy and Taxonomic Standing
From ITIS (2024):

Kingdom Animalia
  Subkingdom Bilateria
    Infrakingdom Deuterostomia
      Phylum Chordata
        Subphylum Vertebrata
          Infraphylum Gnathostomata
            Superclass Actinopterygii
              Class Teleostei
                Superorder Ostariophysi
                  Order Siluriformes
                    Family Siluridae
                      Genus *Silurus* Linnaeus, 1758
                        Species *Silurus glanis* Linnaeus, 1758

According to Fricke et al. (2024), *Silurus glanis* Linnaeus 1758 is the current valid name for this species.

## Size, Weight, and Age Range
From Froese and Pauly (2024):

"Maturity: $L_m$ [length at maturity] 87.5, range 86 - 108 cm
Max length: 273 cm TL [total length] male/unsexed; [Boulêtreau and Santoul 2016]; max. published weight: 130.0 kg [Boulêtreau and Santoul 2016]; max. reported age: 80 years [Kottelat and Freyhof 2007]."

## Environment
From Froese and Pauly (2024):

"Freshwater; brackish; benthopelagic; non-migratory; depth range 0 - 30 m [Frimodt 1995]."

From Fusaro et al. (2024):

"*Silurus glanis* occupies water temperatures from 0° to at least 30°C, though success may be limited in lower water temperatures (David 2006; Britton et al. 2007). Physiological optimum is between 25° and 27°C when the most activity occurs (Copp et al. 2009) and its relocation and home range size increases with higher water temperatures (Danek et al. 2016). Therefore, warmer water temperatures would benefit this species (David 2006). High levels of hemoglobin also make *S. glanis* relatively tolerant of pollution (Lelek 1987) and prolonged periods of hypoxia (Massabuau and Forgue 1995). *Silurus glanis* regularly tolerates dissolved oxygen levels of 3.0 to 3.5 mg/L and can withstand low levels of salinity (Copp et al. 2009). Further, they can inhabit eutrophic and turbid waters (Castaldelli et al. 2013)."

From Rees (2020):

"Study results indicated high mortality rates of *S. glanis* fry when exposed to water temperatures less than 13ºC during the winter and this may restrain *S. glanis* establishment success into northern hemispheres (David, 2006; Copp et al. 2009; Muscalu et al. 2010; Cucherousset & Villéger, 2015)."

## Climate

From Froese and Pauly (2024):

"Temperate; […] 62°N - 36°N, 0°E - 80°E."

## Distribution Outside the United States

### Native

From Fusaro et al. (2024):

"*Silurus glanis*'s native distribution extends from Germany eastwards through to Poland, up to Southern Sweden, and down to Southern Turkey and north Iran stretching through the Baltic States to Russia (Greenhalgh 1999) and to the Aral Sea of Kazakhstan and Uzbekistan (Phillips and Rix 1988, Copp et al. 2009)."

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According to Froese and Pauly (2024), *Silurus glanis* is native to the following countries: Afghanistan, Albania, Armenia, Austria, Azerbaijan, Belarus, Bulgaria, Czechia, Estonia, Georgia, Germany, Greece, Hungary, Iran, Kazakhstan, Latvia, Lithuania, Moldova, Poland, Romania, Russia, Serbia, Slovakia, Slovenia, Sweden, Switzerland, Turkey, Turkmenistan, Ukraine, and Uzbekistan.

### Introduced

From Rees (2024):

"[…] the wels catfish has become established in Bosnia-Herzegovina, Spain, Denmark and Tunisia […] It is also established in Italy, Syria, Portugal, Croatia, Turkey, the UK, France, the

Netherlands and China […] It has been introduced but not established in Cyprus, Belgium and Algeria (Froese and Pauly, 2012).”

From Froese and Pauly (2026):

“Introduced [to Spain] in the 1980s. […] Presently confined at Rio Ebro. Also [Elvira 1998]”

“Known from the Tagus river basin [Portugal] [Pérez-Bote et al. 2005].”

“Found in Ili City, Xinjiang in China [Institute of Hydrobiology 1993]. Also [Robins et al. 1991].”

According to Froese and Pauly (2026), *S. glanis* has also been introduced in Kazakhstan with unknown establishment.

## Means of Introduction Outside the United States

From Fusaro et al. (2024):

“This species has been introduced to many European countries, including France, Italy, the Netherlands, Spain and the United Kingdom due to its popularity among anglers (Banarescu 1989; Krieg et al. 2000; Britton et al. 2007; Carol et al. 2007, 2009; Copp et al. 2009; Alp et al. 2011). This includes intentional, unauthorized introductions. *Silurus glanis* is farmed in Austria, Bulgaria, Croatia, Czech Republic, France, Hungary, Greece, Macedonia, Poland, and Romania (Linhart et al. 2002).”

“This species has spread rapidly through human introductions, but slowly via natural dispersal (Copp et al. 2009). Introductions of *S. glanis* in Europe are facilitated by illegal stockings and natural dispersal intensified by climate change (Cerri et al. 2018; Rees 2020).”

From Rees (2024):

“Migration to European rivers including the Danube, Dnieper and Volga was via the Caspian, Black and Aral seas.”

“In April 2012, accidental flooding from licensed lakes containing wels catfish into flood valleys of the River Colne and Chelmer in East Anglia [United Kingdom] were being investigated.”

“Concerns about accidental unregulated spread (flooding enabling spread from angling waters to watercourses and rivers) and intentional unregulated releases (for angling) imply that *S. glanis* introductions need to be investigated, particularly as angling and dispersal are cited as the main introduction routes for introduced fish in the [United Kingdom] (Copp et al. 2009; Rees, 2010; Hickley and Chare, 2004).”

## Short Description
From Froese and Pauly (2024):

"Dorsal spines (total): 1; Dorsal soft rays (total): 4-5; Anal spines: 1; Anal soft rays: 83 - 95. Distinguished from all other freshwater fishes in Europe by the following unique characters: two pairs of mental barbels; and anal fin with 83-91½ rays. Differs further from the following combination of features: body naked; large, depressed head; dorsal fin with 2-4½ rays; caudal fin rounded or truncate; no adipose fin; and anal rays almost touching caudal [Kottelat and Freyhof 2007]. Caudal fin with 17 rays [Spillman 1961]."

From Fusaro et al. (2024):

"*Silurus glanis* is distinguishable by its large, scaleless, slime covered body, and six barbels - two of which are long and on the side of the mouth and the other four are on the lower jaw. It has a tiny dorsal fin, one anal spine, and paired pelvic and pectoral fins. Body is typically dark greenish-black with yellowish sides that results in a mottled pattern. The head is large and eyes are proportionally small (Kottelat and Freyhof 2007)."

## Biology
From Fusaro et al. (2024):

"Eggs are large, between 1 to 3 mm in diameter (Copp et al. 2009)."

"Individuals are usually strongly associated with areas with a high density of woody debris, boulders, low flow and tree roots (Abdullayev et al. 1976). The species, therefore, appears to prefer large water bodies with cryptic habitat (Britton et al. 2007). *Silurus glanis* has thrived in degraded habitat (Italy), such as canals that were eutrophic and turbid, without morphological complexity, and with sparse vegetation (Castaldelli et al. 2013). They also prefer artificially heated habitats (e.g., nuclear power plant discharge water) (Capra et al. 2018). This species is normally encountered throughout their native range in large rivers, lakes, and coastal areas of low salinity (<15 ppm), and primarily occupies highly productive, weedy lakes, and slow, deep lowland rivers. This species is known to shift during their first year of life from shoreline into mid channel habitats (Wolter and Vilcinskas 1996; Wolter and Freyhof 2004), which are important for reproduction and habitat partitioning between different age groups (Wolter and Bischoff 2001). During winter, it is relatively inactive and resides in deep holes, dens and crevices in the riverbed; in lakes, it lies in the lower third of the water column or on soft mud (Lelek et al. 1964; Lelek 1987; Copp et al. 2009)."

"*Silurus glanis* has well-developed non-visual sensors that make it well adapted to waters with low visibility (Copp et al. 2009), giving it a high degree of plasticity in various light regimes (Placinta et al. 2020)."

"*Silurus glanis* feeds primarily at night, and it is well documented that *S. glanis* takes advantage of its diet plasticity and ability to prey upon the most abundant available species of a suitable size within its habitat (Carol 2009; Syväranta et al. 2010; Martino et al. 2011; Castaldelli et al. 2013). Trophic position increases with size, with the largest individuals acting as apex predators

(Rees 2020). Its preference is for shrimp and crayfish in rivers, and shrimp and fish in streams, with largest specimens feeding primarily on fish(Ferreira et al. 2019). The fast growth and large size of *S. glanis* makes them unlikely prey for other piscivores (Copp et al. 2009)."

"Males and females mature at 2–3 years and 1–2 kg. Mating pairs spawn in April to June (up through September in northern latitudes > 41°N) at temperatures between 18 to 22°C. Spawning occurs in shallower waters, including drainage channels and floodplains (Kottelat and Freyhof 2007; Copp et al. 2009; Rees 2020). Eggs are laid in nests made of plant material and are defended by males until larvae emerge after 2–3 days (Kottelat and Freyhof 2007). Total fecundity can range from 30,000 to 300,000 eggs per female, and average relative fecundity ranges between 13,000 and 20,000 eggs per kilogram [Yazici et al. 2018; Yesilcicek and Kalayci 2020]. Adults are known to live upwards of 80 years (Kottelat and Freyhof 2007)."

## Human Uses

From Fusaro et al. (2024):

"Its aquaculture production has increased from 600 tonnes in 1993 to 2,000 tonnes in 2002 in ten European countries (Linhart et al. 2002; Copp et al. 2009). Fast and efficient growth, ease of breeding and rearing, and recent genome manipulation makes *S. glanis* ideal for commercial aquaculture (Copp et al. 2009; Cucherousset et al. 2018). *Silurus glanis* is considered a delicacy in some countries (Hungary, Poland, Slovakia, Lithuania), where it is exploited for its flesh (tender white meat), skin (for leather and glue production), and eggs (for caviar) (Copp et al. 2009). The flesh of *S. glanis* is highly nutritious in regard to fatty acid composition (Saliu et al. 2017; Linhartova et al. 2018) and protein quality (Pyz-Lukasik and Paszkiewicz 2018). The popularity of *S. glanis* relates to the large sizes they can reach; they are perceived as an attractive big-game species by many United Kingdom anglers (Hickley and Chare 2004). They are also a prized pet species, with specimens in the United States advertised for thousands of dollars."

"*Silurus glanis* has value as a research and medicinal subject. Its environmental resilience and longevity make it useful for modeling the effects of parasites [Dezfuli et al. 2017] and contamination of hexachlorobenzene and hexachlorobutadiene (Dosis et al. 2017). Further, *S. glanis* is an important model for investigating evolutionary dynamics of fish chromosomes (Ditcharoen et al. 2019)."

From Froese and Pauly (2024):

"Fisheries: commercial; aquaculture: commercial; gamefish: yes."

From Rees (2024):

"*S. glanis* is a popular fish among anglers because of its large size and relatively frequent capture. The introduction of *S. glanis* in angling clubs is likely to increase revenue to local communities and generate business. The species is popular with anglers, and a minority of anglers are in favour of releasing it into to [sic] rivers, while others are content that it remains in licensed lakes. The sheer size of this fish has also attracted scuba-divers to some lakes where it has been introduced in the Netherlands (and probably elsewhere), which also generates local revenue."

## Diseases

***Silurus glanis* has been documented as susceptible to spring viraemia of carp virus, a disease listed by the World Organisation for Animal Health (2024).**

From Rees (2024):

"Wels catfish are carriers of viral pathogens, namely spring viraemia of carp (SVC) and European sheatfish virus (ESV), which may adversely impact native fish including salmonids and amphibians."

From Copp et al. (2009):

"A number of bacterial species, which are ubiquitous in the aquatic environment, have been identified as causes of morbidity and mortality in farmed *S. glanis*. An example would be outbreaks in YoY [young-of-year] *S. glanis* of *Flexibacter columnaris* (Farkas and Oláh 1980) and of *Vibrio* spp. in week old farmed fish (Farkas and Malik 1986). Other reports from aquaculture include systemic amoebiasis infections (Nash et al. 1988) with *Aeromonas* species (Farkas and Oláh 1982); flavobacterium species (Farkas 1985), a pasteurella-like bacterium (Farkas and Oláh 1984) and *Edwardsiella tarda* (Caruso et al. 2002)."

"At least 52 species of parasitic fauna have been identified in *S. glanis* […], though this is probably an under-estimate because some studies, in particular those from Iran, are difficult to access."

"No records of *S. glanis* mortality attributed to parasites were found in the literature, but this may be due to […] problems with detecting mortality incidents in wild fish populations."

## Threat to Humans

From Froese and Pauly (2024):

"Potential pest"

# 3 Impacts of Introductions

The following information pertains to ***actual, documented*** impacts of introductions.

From Encina et al. (2023):

"We can conclude that *S. glanis* has currently established in the Torrejón reservoir [Central Spain] leading to the decrease of the Iberian barbel population, the only autochthonous species that persisted in the reservoir and dominated the fish community before the appearance of European catfish."

From Carol et al. (2009):

“In early stage invasion sites (Sau and Susqueda reservoirs [Spain]), catfish mainly consumed fish because of a high abundance of small cyprinid species, such as roach and bleak (Carol et al. 2006). In contrast, crayfish was the main prey of catfish in advanced stage invasion sites (Ebro reservoirs [Spain]) and the ontogenetic shift to piscivory was delayed until the catfish grew larger. Accordingly, these advanced stage invasion reservoirs had size structures dominated by larger sizes of common carp. Although further data are needed to see how frequent these patterns are, our results strongly suggest that at the early stages of invasion, catfish grow faster and are in better condition because they prey more on fish. As invasion proceeds, however, the catfish reduce fish numbers, particularly of smaller fish, indirectly favouring crayfish and eventually resulting in their own reduced growth rates.”

“We also found that waterbird abundance, made up mostly of anatids which were largely dominated in abundance by the mallards *Anas plathyrhynchos*, varied significantly with the invasion sequence (no catfish, early, and late invasion stages) and this was not due to correlation or confounding with abiotic factors (e.g. reservoir size, altitude or trophic state). Among 22 reservoirs, the two with advance-stage invasions (Riba-roja and Flix [Spain]) were the first and eighth reservoirs with the lowest abundance of waterbirds, despite the Riba-roja being the one with the largest surface area and Flix having more extensive reed beds (an excellent habitat for waterbirds) compared to most other reservoirs. The anatids of the reservoirs are particularly dominated in number by the mallard *Anas plathyrhynchos*, which is mostly sedentary in this region. Anecdotal local information suggests that ducks in these reservoirs sometimes detect and escape from approaching catfish and thus learn to avoid them. Therefore, the significantly lower abundance of waterbirds in reservoirs with catfish could be due to either a direct ecological impact by catfish and/or to avoidance behaviour by waterbirds to reduce predation risk.”

From Rodriguez-Labajos et al. (2009):

“Wels catfish causes ecological impacts due to alterations of the trophic chain and physicochemical modifications of the water contents. Such changes, in turn, affect the cultural use of the original status of the ecosystems. Anglers opposing to the invasive species point out to the loss of traditional fishing practices and the displacement of other introduced species employed for angling (black bass, common carp).”

Rodriguez-Labajos et al. (2009) report the following effects of *S. glanis* on river ecosystem services:

“Noticeable loss of native fish species due to predation [Doadrio and Aldeguer 2007]”

“Food decreases for other fish species, including those with sportive interest (black bass, *Micropterus salmoides*) [Gran pesca 2005]”

“Indirect damage to stork broods due to the increase in traffic of anglers [La Malla 2005].”

"Abandonment of traditional fishing practices based on the exploitation of native fishes. Loss of local technological and organizational systems (the '*madrava*') [Boquera and Quiroga 2000]"

The following information pertains to ***potential*** impacts of introduction.

From Boulêtreau et al. (2011):

"Here [in the Rhône River, France], the observed aggregations of alien fish (*S. glanis*) potentially represent the highest biogeochemical hotspots ever reported for freshwater ecosystems, as our estimates correspond to 83–286 fold and 17–56 fold the maximal fish excretion values for phosphorus and nitrogen, respectively, reported in the literature [McIntyre et al. 2008; Schaus 1997]. Therefore, these aggregations can potentially have strong implications on ecosystem functioning since these fish may translocate nutrients from their feeding areas, concentrate locally these nutrients in the aggregation area and subsequently affect primary production and nutrient cycling. Therefore, this phenomenon represents another example of unexpected potential ecological impacts of alien species [Cucherousset and Olden 2011]."

From Copp et al. (2009):

"The potential impacts of *S. glanis* in its introduced European range include disease transmission, predation on native species and possibly the modification of food web structure in some regions."

"Indeed, studies of *S. glanis* in its native range have demonstrated the species to exert a relatively low (top-down) predatory pressure on zooplanktivorous fish species and the species is therefore unlikely to be an effective biomanipulation tool in the management of lakes suffering from eutrophication (Wysujack and Mehner 2005). This would suggest that *S. glanis* is unlikely to exert competitive pressure on native piscivorous fishes except in circumstances where other human impacts are already in force ([…] *S. glanis* is known to prey occasionally on native piscivorous species […]). Furthermore, in most parts of Europe, where fish species have evolved in the presence of native piscivorous fishes (e.g. *S. lucioperca*, *E. lucius*, and Eurasian perch [*Perca fluviatilis*, Percidae]), the potential predatory impact of *S. glanis* is likely to be low (Hickley and Chare 2004). The species' greatest potential impact as a predator may be in Iberia and other southern European countries where high endemism of small-bodied fish species combines with an absence of native piscivorous fishes. However, in light of the preponderance of non-native species in the diet of *S. glanis* in artificial water bodies (Carol 2007), any such predatory impact on native species is likely to be restricted to natural river stretches."

# 4 History of Invasiveness

The History of Invasiveness for *Silurus glanis* is classified as High. *Silurus glanis* has been introduced and become established outside of its native range in several countries in Europe, Asia, and Africa. In Europe, *S. glanis* is a species of high interest among anglers which has led to illegal stockings. There is evidence from peer-reviewed scientific studies that established populations have resulted in the decline of native fish and waterbird populations and reductions in traditional fishing practices.

# 5 Global Distribution

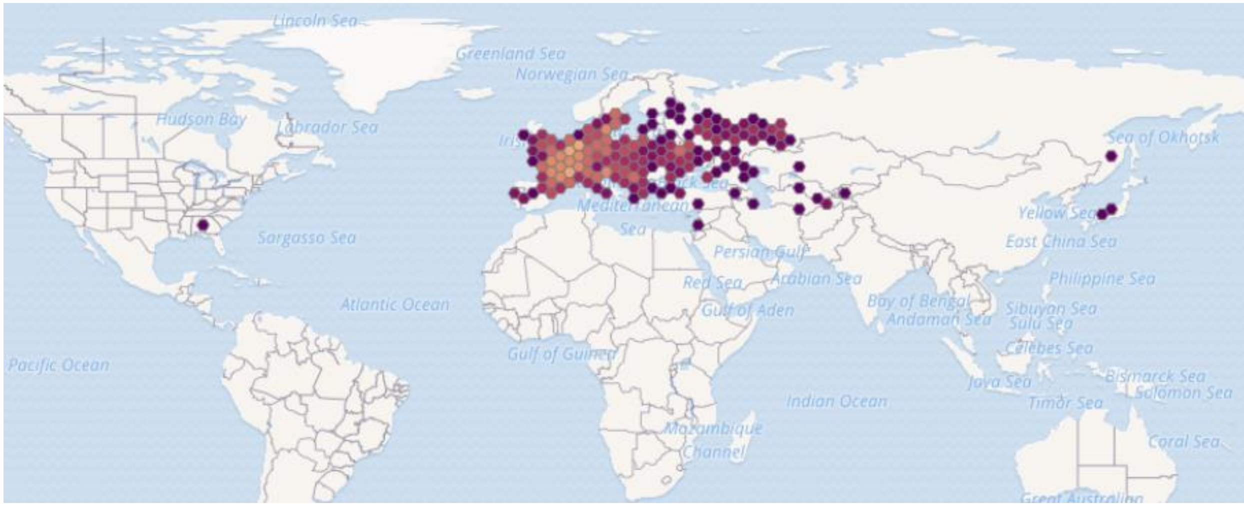


**Figure 1.** Reported global distribution of *Silurus glanis*. Map from GBIF Secretariat (2023). Observations are reported from Europe (all countries except Albania, Estonia, Norway, Ireland, and Liechtenstein), Asia (Armenia, Georgia, Iran, Israel, Japan, Kazakhstan, Russia, Tajikistan, Turkey, Turkmenistan, Uzbekistan), and North America (United States). The reported occurrences in the United States and Japan are preserved specimens and do not represent established populations; these occurrences were not used to select source points for the climate matching analysis. Additionally, points in Israel, eastern Russia, and Northern Ireland are not known to represent established populations and were not used to select source points for the climate matching analysis.

No georeferenced occurrences were available for the reported established population in China.

# 6 Distribution Within the United States

No records of *Silurus glanis* in the wild in the United States were found.

# 7 Climate Matching

## Summary of Climate Matching Analysis

The climate match for *Silurus glanis* was high across much of the contiguous United States. The highest matches were found in the Great Basin, Great Lakes, Appalachian Mountains, and the Northeastern regions. Much of the Southeast and parts of the Northeast and Southwest had a medium climate match. Low matches were found along the coast of Washington, Oregon, and Northern California, as well as in southern Florida and parts of the Gulf Coast. The overall Climate 6 score (Sanders et al. 2023; 16 climate variables; Euclidean distance) for the contiguous United States was 0.921, indicating that Yes, there is establishment concern. The Climate 6 score is calculated as: (count of target points with scores ≥ 6)/(count of all target points). Establishment concern is warranted for Climate 6 scores greater than or equal to 0.002 based on an analysis of the establishment success of 356 non-native aquatic species introduced to the United States (USFWS 2024).

Projected climate matches in the contiguous United States under future climate scenarios are available for *Silurus glanis* (see Appendix). These projected climate matches are provided as additional context for the reader; future climate scenarios are not factored into the Overall Risk Assessment Category.

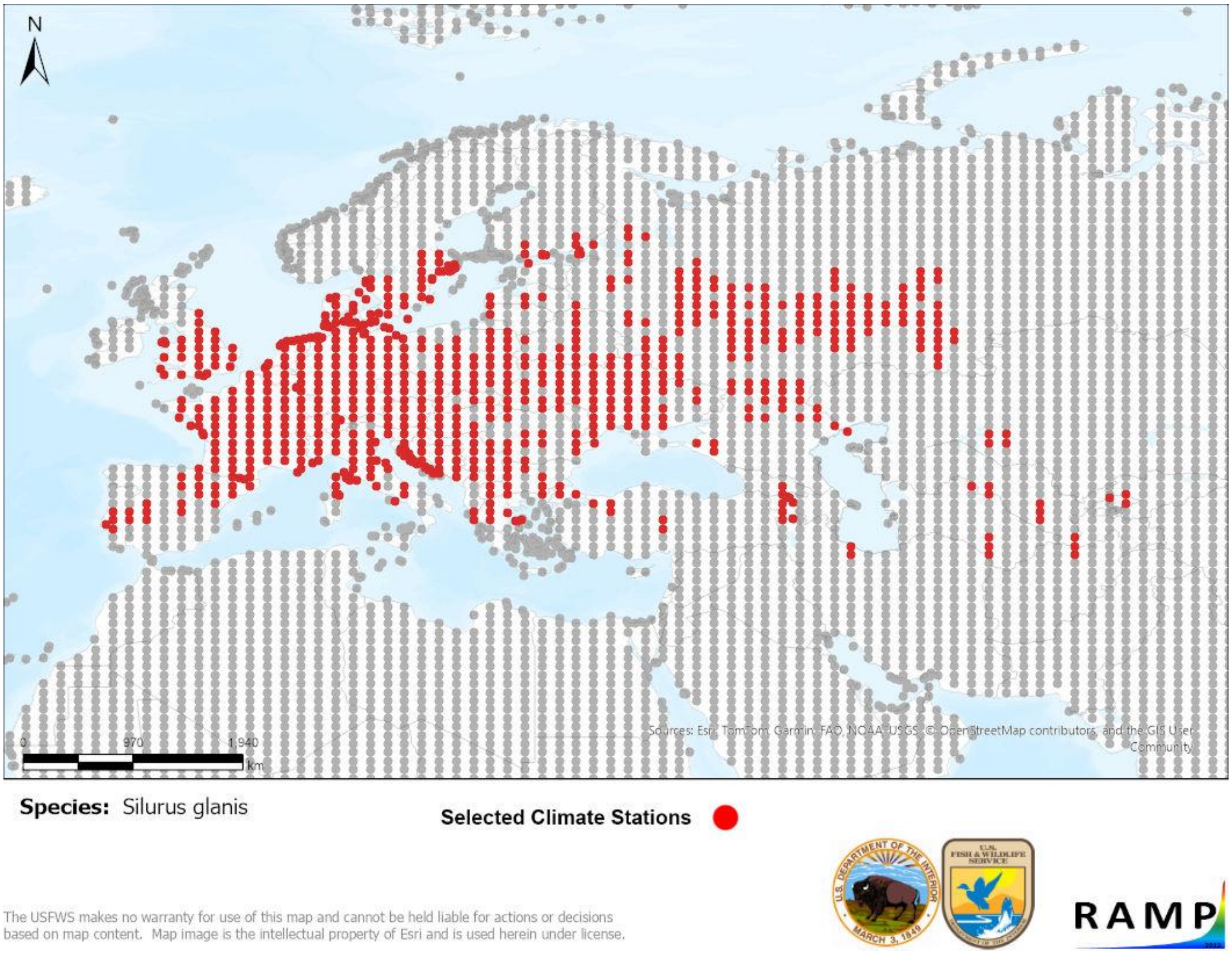


**Figure 2.** RAMP (Sanders et al. 2023) source map showing weather stations in Europe and Asia selected as source locations (red; Afghanistan, Armenia, Azerbaijan, Georgia, Iran, Kazakhstan, Kyrgyzstan, Russia, Tajikistan, Turkey, Turkmenistan, Uzbekistan, and all European countries except Albania, Ireland, and Norway) and non-source locations (gray) for *Silurus glanis* climate matching. Source locations from GBIF Secretariat (2023). Selected source locations are within 100 km of one or more species occurrences, and do not necessarily represent the locations of occurrences themselves.

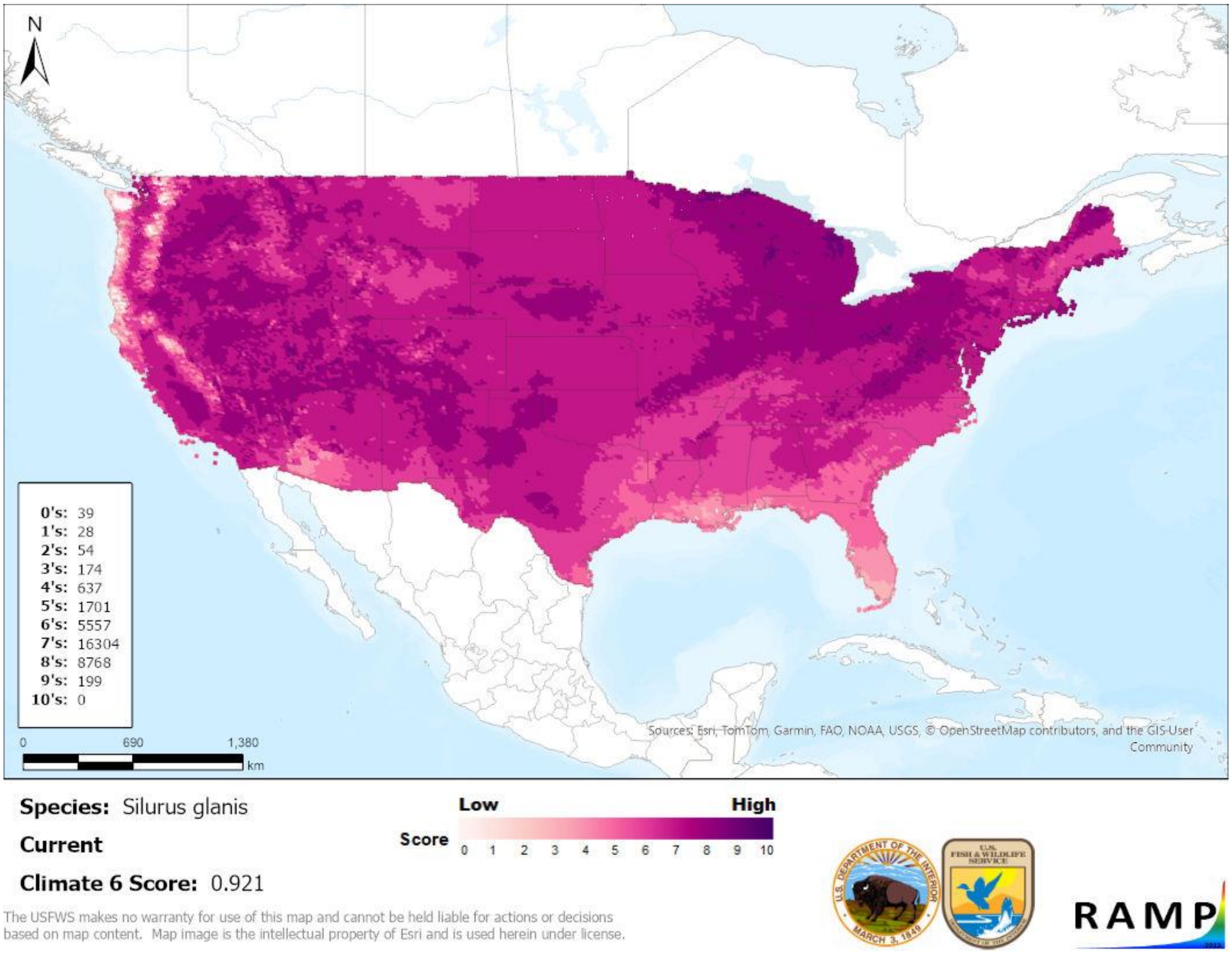


**Figure 3.** Map of RAMP (Sanders et al. 2023) climate matches for *Silurus glanis* in the contiguous United States based on source locations reported by GBIF Secretariat (2023). Counts of climate match scores are tabulated on the left. 0/Pale Pink = Lowest match, 10/Dark Purple = Highest match.

# 8 Certainty of Assessment

The Certainty of Assessment for *Silurus glanis* is classified as High. There is ample information on the biology, ecology, and distribution of *S. glanis*. The species is established in many countries outside of its native range. Evidence from peer-reviewed scientific studies demonstrates that established populations have resulted in the decline of native fish and waterbird populations and reductions in traditional fishing practices.

# 9 Risk Assessment

## Summary of Risk to the Contiguous United States

*Silurus glanis*, Wels Catfish, is a freshwater fish that is native to Europe and Asia. It has been introduced outside of its native range in Europe with many established nonnative populations, as well as to Africa (not established) and Asia (some established populations). In its native habitat, this species is typically found in large rivers, lakes, and coastal areas of low salinity. *S. glanis* is well adapted to water with low visibility and feeds primarily at night. The largest individuals are the apex predators within the trophic system. *S. glanis* has not been reported as introduced or established in the wild in the United States, and it is listed under the Lacey Act as a federally banned species, prohibited from import and trade. *S. glanis* possession, transport, or trade is also regulated in several U.S. states. The History of Invasiveness for *S. glanis* is classified as High due to evidence from peer-reviewed studies that this species has led to the decline of native fish and waterbird populations through predation and competition, as well as abandonment of traditional fishing practices. The climate matching analysis for the contiguous United States indicates establishment concern for this species. The highest climate matches were found in the Great Basin, Great Lakes, Appalachian Mountains, and the Northeastern regions, although most of the country had a high climate match. The Certainty of Assessment for this ERSS is classified as High due to the existence of high-quality research on impacts and established non-native populations. The Overall Risk Assessment Category for *Silurus glanis* in the contiguous United States is High.

## Assessment Elements

- **History of Invasiveness (see Section 4): High**
- **Establishment Concern (see Section 7): Yes**
- **Certainty of Assessment (see Section 8): High**
- **Remarks, Important additional information: Susceptible to spring viraemia of carp virus, a disease listed by the World Organisation for Animal Health (2024).**
- **Overall Risk Assessment Category: High**

# 10 Literature Cited

**Note: The following references were accessed for this ERSS. References cited within quoted text but not accessed are included below in section 11.**

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# Appendix

## Summary of Future Climate Matching Analysis

Future climate projections represent two Shared Socioeconomic Pathways (SSP) developed by the Intergovernmental Panel on Climate Change (IPCC 2021): SSP5, in which emissions triple by the end of the century; and SSP3, in which emissions double by the end of the century. Future climate matches were based on source locations reported by GBIF Secretariat (2023).

Under the future climate scenarios (figure A1), on average, high climate match for *Silurus glanis* was projected to occur in the Colorado Plateau, Great Basin, and Great Lakes regions of the contiguous United States. Particularly in the Great Lakes region, the area of high climate match was smaller and further north under scenario SSP5, 2085 than under all other scenarios. Areas of low climate match were projected to occur in the Southern Florida region under all scenarios. The Climate 6 scores for the individual future scenario models (figure A2) ranged from a low of 0.369 (model: UKESM1-0-LL, SSP5, 2085) to a high of 0.875 (model: MPI-ESM1-2-HR, SSP3, 2055). All future scenario Climate 6 scores were above the Establishment Concern threshold, indicating that Yes, there is establishment concern for this species under future scenarios. The Climate 6 score for the current climate match (0.921, figure 3) falls above the range of scores for future projections. The time step and climate scenario with the most change relative to current conditions was SSP5, 2055, the most extreme climate change scenario. Under the 2055 time step, areas within the Southwest saw a moderate increase in the climate match relative to current conditions. No large increases were observed regardless of time step and climate scenarios. Under one or both SSPs at the 2085 time step, areas within the Appalachian Range, Gulf Coast, Mid-Atlantic, Southeast, and the Southern Plains saw a large decrease in the climate match relative to current conditions. Additionally, areas within California, Colorado Plateau, Great Basin, Great Lakes, Northeast, Northern Plains, Southern Atlantic Coast, Southern Florida, Southwest, and Western Mountains saw a moderate decrease in the climate match relative to current conditions. Additional very small areas of large or moderate change may be visible on the maps (figure A3).

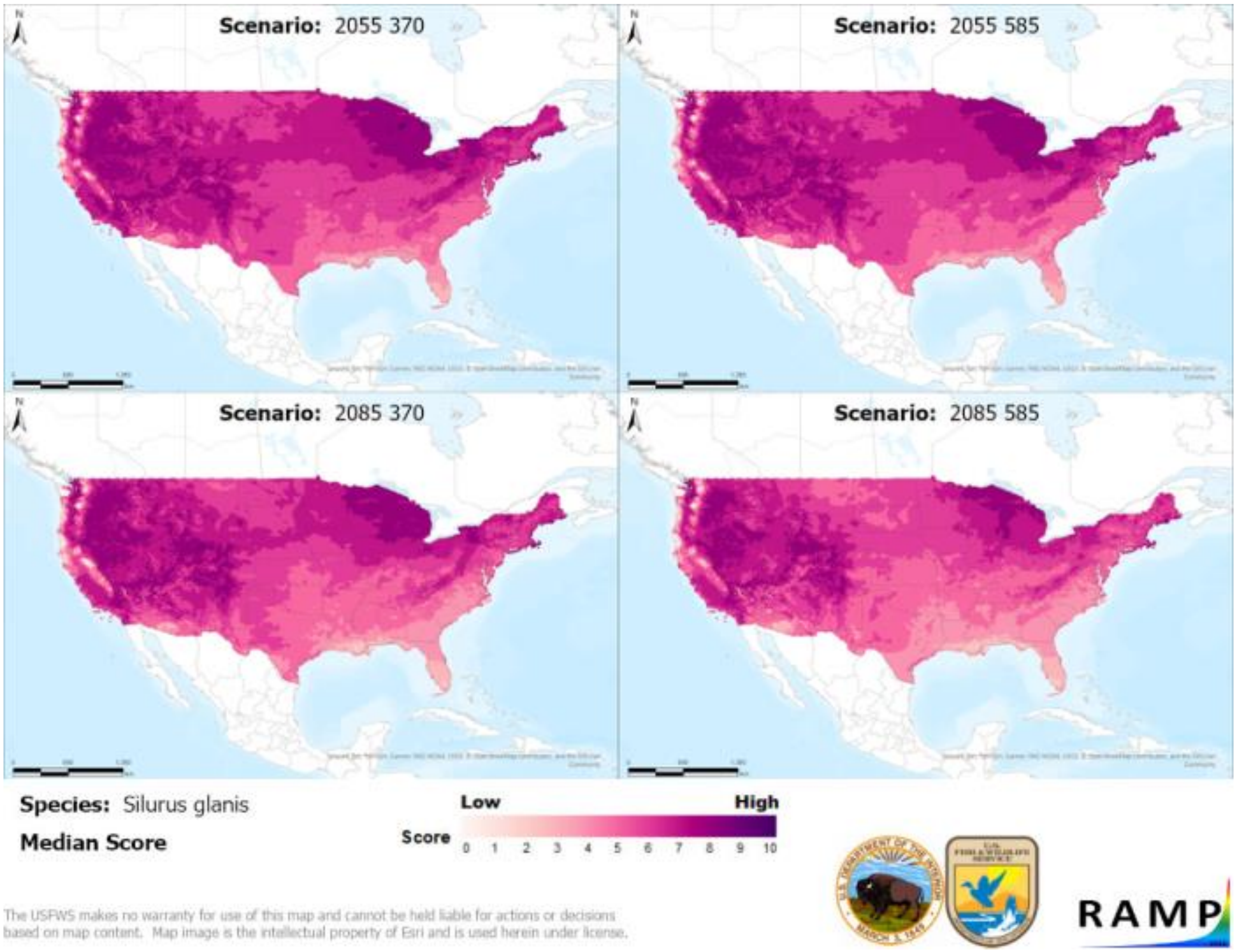


**Figure A1.** Maps of median RAMP (Sanders et al. 2023) climate matches projected under potential future climate conditions using five global climate models for *Silurus glanis* in the contiguous United States. Climate matching is based on source locations reported by GBIF Secretariat (2023). Shared Socioeconomic Pathways (SSPs) used (from left to right): SSP3, SSP5 (IPCC 2021). Time steps: 2055 (top row) and 2085 (bottom row). Climate source data from CHELSA (Karger et al. 2017, 2018); global climate models used: GFDL-ESM4, UKESM1-0-LL, MPI-ESM1-2-HR, IPSL-CM6A-LR, and MRI-ESM2-0. 0/Pale Pink = Lowest match, 10/Dark Purple = Highest match.

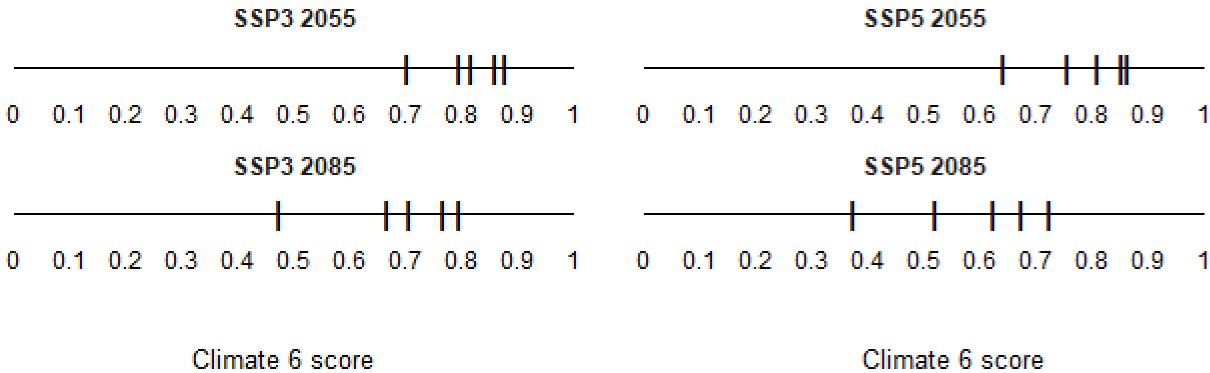


**Figure A2.** Comparison of projected future Climate 6 scores for *Silurus glanis* in the contiguous United States for each of five global climate models under four combinations of Shared Socioeconomic Pathway (SSP) and time step. SSPs used (from left to right): SSP3, SSP5 (Karger et al. 2017, 2018; IPCC 2021). Time steps: 2055 (top row) and 2085 (bottom row). Climate source data from CHELSA (Karger et al. 2017, 2018); global climate models used: GFDL-ESM4, UKESM1-0-LL, MPI-ESM1-2-HR, IPSL-CM6A-LR, and MRI-ESM2-0.

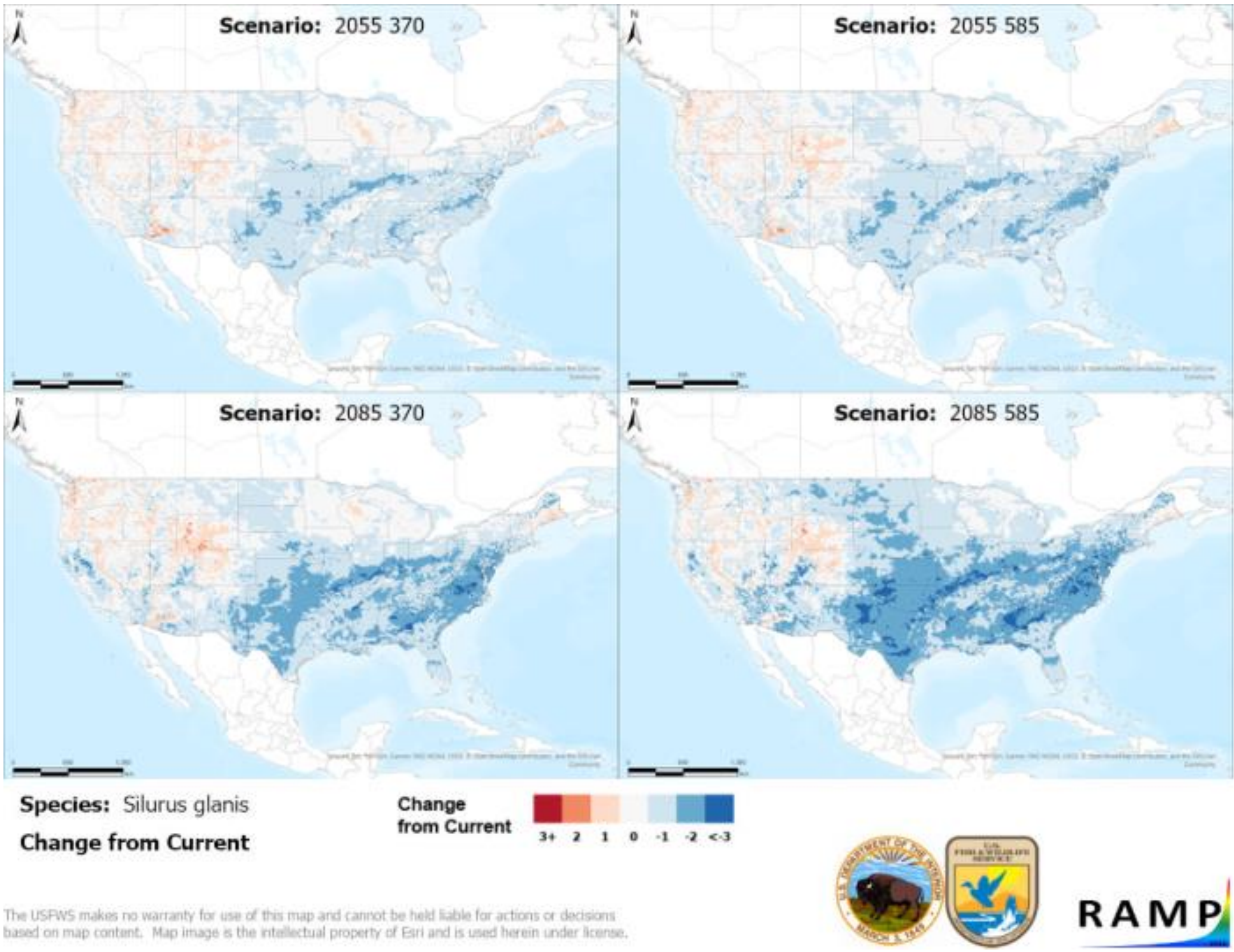


**Figure A3.** RAMP (Sanders et al. 2023) maps of the contiguous United States showing the difference between the current climate match target point score (figure 3) and the median target point score for future climate scenarios (figure A1) for *Silurus glanis* based on source locations reported by GBIF Secretariat (2023). Shared Socioeconomic Pathways (SSPs) used (from left to right): SSP3, SSP5 (IPCC 2021). Time steps: 2055 (top row) and 2085 (bottom row). Climate source data from CHELSA (Karger et al. 2017, 2018); global models used: GFDL-ESM4, UKESM1-0-LL, MPI-ESM1-2-HR, IPSL-CM6A-LR, and MRI-ESM2-0. Shades of blue indicate a lower target point score under future scenarios than under current conditions. Shades of red indicate a higher target point score under future scenarios than under current conditions. Darker shades indicate greater change.

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