

Crucian Carp (*Carassius carassius*)

Ecological Risk Screening Summary

U.S. Fish and Wildlife Service, July 2025
Revised, September 2025
Web Version, 12/8/2025

Organism Type: Fish
Overall Risk Assessment Category: Uncertain



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1 Native Range and Status in the United States

Native Range

From Froese and Pauly (2025):

“Eurasia: North, Baltic, White, Barents, Black and Caspian Sea basins; Aegean Sea basin only in Maritza drainage; eastward to Kolyma drainage (Siberia); westward to Rhine and eastern drainages of England. Absent from North Sea basin in Sweden and Norway. In Baltic basin north to about 66°N.”

From Godard and Copp (2012):

“*C. carassius* is [...] widely distributed [...] with its native distribution encompassing much of north and central Europe stretching from the fresh waters of the North Sea and Baltic Sea basins across northern parts of France and Germany to the Alps and throughout the Danube basin, then eastwards to Siberia (Lelek, 1987).”

Godard and Copp (2012) lists *Carassius carassius* as native to Armenia, Azerbaijan, Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, Czechia, Denmark, Estonia, Finland, Germany, Hungary, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Montenegro, Netherlands, North Macedonia, Norway, Poland, Romania, Russia, Serbia, Slovakia, Slovenia, Sweden, Switzerland, Turkey, Ukraine, and the United Kingdom.

From Froese and Pauly (2025):

“Present in Neusiedler See [Austria; Wolfram-Wais et al. 1999].”

Mamilov et al. (2025) report *C. carassius* as native to the Black Irtysh basin in Kazakhstan.

Status in the United States

From Schofield et al. (2025):

“There are no recent reports of crucian carp in the U.S. An earlier report that either the crucian carp or a hybrid (with goldfish) had been introduced into Texas (Howells [1992]; Fuller et al. 1999) is now considered unlikely. The introduction and status of this species remains uncertain.”

Schofield et al. (2025) also report a failed introduction to Chicago, Illinois, in 1910.

This species or its hybrids may be available in trade in the United States. For example:

From Smart Fish Aquarium (2025):

“Common Carp

\$5.00 [...]

Hybrid F1 Carp (*Carassius Carassius* × *Cyprinus Carpio Carpio*) is a freshwater hybrid species that is a cross between Common Carp and Crucian Carp.”

From J&J Aquafarms (2025):

“Crucian Carp 2-3”

Carassius gibelio / *Carassius carassius*

\$3.50 each

\$325 /100

Inquire for availability.. [sic] Related to (and often cross bred with) the Common carp [...]

Regulations

Carassius carassius has been listed as an injurious wildlife species under the Lacey Act (18.U.S.C.42(a)(1)) by the U.S. Fish and Wildlife Service (USFWS 2016).

Carassius carassius is regulated in Alabama (ADCNR 2022), Connecticut (Connecticut DEEP 2020), Hawaii (HDOA 2019), Kansas (KDWP 2023), Minnesota (Minnesota DNR 2024), Nevada (Nevada Board of Wildlife Commissioners 2022), New Mexico (NMDGF 2023), North Carolina (North Carolina DEQ 2022), and Ohio (ODNR 2022). It is regulated at the family level (Cyprinidae) in Alaska (ADFG 2023), Louisiana (Louisiana Revised Statutes 2022), and Utah (Utah DWR 2023). Please refer 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

Schofield et al. (2025) identify stocking as the potential pathway for the introduction in Illinois.

Remarks

This ERSS was previously published in March 2019. Revisions were completed to incorporate new information and conform to updated standards.

From Godard and Copp (2012):

“There is well-documented evidence of hybridization between *C. carassius* and *C. auratus* (Hänfling et al., 2005) [...]”

From Freyhof (2024):

“The Crucian Carp has a wide distribution but there is a gradual and continuing extirpation in many water bodies, especially in the Danube River drainage and central Europe. These declines are not strong enough to qualify the species for Near Threatened or a threatened category, and it is therefore assessed [by the IUCN] as Least Concern.”

There is conflicting information in the literature on the native and introduced status of *Carassius carassius* in several countries. Effort was made in this ERSS to be as comprehensive and accurate as possible in describing the distribution of *C. carassius* by examining multiple sources, emphasizing more recent sources when possible, but some conflicting information could not be resolved.

Froese and Pauly (2025) report *C. carassius* as native to Japan, South Korea, and Taiwan, citing FAO (1997). However, no recent studies were found to corroborate this information, so these reports may be a result of changing taxonomic understanding of the genus *Carassius*. According to Fricke et al. (2025), numerous taxa within the genus have been considered at times to be

subspecies of *Carassius carassius* but are now synonymized with *Carassius auratus*, which is native to East Asia.

From Froese and Pauly (2025):

“Reports [from Australia] may have referred to incorrectly identified goldfish [Brumley 1991].”

From Japoshvili et al. (2013):

“In Georgia, crucian carp *Carassius carassius* (Linnaeus, 1758) was known from only one locality after Kessler’s record (1877–1878) with no new findings until 1985. Since then *C. carassius* rapidly and simultaneously invaded almost all water bodies of Georgia. In 2004, it was for the first time noted that this invasive *Carassius* sp. could not be a *C. Carassius* [sic], but was a form of *Carassius gibelio* (Bloch, 1792).”

From Godard and Copp (2012):

“[...] Innal (2011) reviews the three *Carassius* species present in Turkey, where [...] *C. carassius* was previously considered to be non-native (Innal and Erk’akan, 2006) but has since been classed as native (Innal, 2011). It has been shown that *C. carassius* is translocated within its native range, e.g. Slovenia (Povž and Sket, 1990) and the United Kingdom for angling amenity (Sayer et al., 2011) [...]”

From Tesfaye et al. (2025):

“A study was conducted in January 2022 to validate the species of fish previously identified in the literature as *Carassius carassius*, purportedly present in Lake Ziway, Ethiopia. Ten individuals of the genus *Carassius* were collected from local fishermen, and morphological and genetic analyses, including CT scanning and mitochondrial gene sequencing, were performed to identify the established *Carassius* species in the lake. Our findings confirm the presence of *Carassius cuvieri*, a species endemic to Lake Biwa, Japan, within Lake Ziway, Ethiopia. Further investigations are needed to confirm the possible presence of other *Carassius* species previously reported in the region [...]”

From Schofield et al. (2025):

“Because of this species' similarity to goldfish, and because of possible hybridization, characters may overlap and positive identification may be difficult. Similar to the goldfish, the crucian carp is known to hybridize with the common carp *Cyprinus carpio* (Berg 1964; Muus and Dahlstrom 1978; Wheeler 1978). Eddy and Underhill (1974) reported that both the goldfish and the crucian carp had been introduced into the United States, but they provided no additional details concerning the latter species. Welcomme (1988) reported that *C. carassius* was established in Chicago in the 1900s but later died out; however, he did not provide documentation for that record and we have found no additional information to support it.”

“There is some confusion in the literature surrounding the use of the names crucian carp and Prussian carp. Lever (1996) listed Prussian Carp as an alternative or local vernacular name sometimes used for the crucian carp; however, Berg (1964) and most others use the name Prussian carp for *Carassius auratus gibelio*. In the 1800s Baird witnessed fish taken out of the Hudson River, New York; Baird later wrote that these fish appeared to be "hybrids between goldfish and the Prussian carp" (Redding 1884). In that instance it is not certain as to which species Baird is referring to in using the term Prussian carp. Cole (1905) quoted from one of Baird's reports, in which Prussian carp is treated as synonymous with *Cyprinus Carassius* (= *Carassius carassius*?).”

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2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From ITIS (2025):

Kingdom Animalia
Subkingdom Bilateria
Infrakingdom Deuterostomia
Phylum Chordata
Subphylum Vertebrata
Infraphylum Gnathostomata
Superclass Actinopterygii
Class Teleostei
Superorder Ostariophysi
Order Cypriniformes
Superfamily Cyprinoidea
Family Cyprinidae
Genus *Carassius*
Species *Carassius carassius* (Linnaeus, 1758)

According to Fricke et al. (2025), *Carassius carassius* (Linnaeus 1758) is the current valid name for this species.

Size, Weight, and Age Range

From Froese and Pauly (2025):

“Max length : 64.0 cm TL [total length] male/unsexed; [Koli 1990]; common length : 15.0 cm TL male/unsexed; [Muus and Dahlstrom 1968]; max. published weight: 3.0 kg [Muus and Dahlstrom 1968]; max. reported age: 10 years [Kottelat and Freyhof 2007]”

From Schofield et al. (2025):

“To about 50 cm and 5 kg (Berg 1964; Wheeler 1978).”

Environment

From Froese and Pauly (2025):

“Freshwater; brackish; demersal; potamodromous [Riede 2004]; depth range 5 - ? m [Allardi and Keith 1991]. [...] 2°C - 22°C [Riehl and Baensch 1991; assumed to represent recommended aquarium water temperatures]”

“Can survive at high temperatures and at very low oxygen concentrations during summer and under ice cover [Kottelat and Freyhof 2007]. Tolerates cold, organic pollutants, and low oxygen levels in the water [Billard 1997].”

From Schofield et al. (2025):

“Survival has been documented at water temperatures below 0°C, and individuals may even survive for a few days with a frozen integument (Szczerbowski and Szczerbowski, 2001). The ability to use anaerobic metabolism allows crucian carp to survive for several months in anoxic water at low temperatures, for example, in lakes frozen over with ice (Holopainen and Hyvärinen, [1985]; Piironen and Holopainen, 1986).”

Climate

From Froese and Pauly (2025):

“[...] Temperate; [...] 69°N - 35°N, 10°W - 169°E”

Distribution Outside the United States

Native

From Froese and Pauly (2025):

“Eurasia: North, Baltic, White, Barents, Black and Caspian Sea basins; Aegean Sea basin only in Maritza drainage; eastward to Kolyma drainage (Siberia); westward to Rhine and eastern drainages of England. Absent from North Sea basin in Sweden and Norway. In Baltic basin north to about 66°N.”

From Godard and Copp (2012):

“*C. carassius* is [...] widely distributed [...] with its native distribution encompassing much of north and central Europe stretching from the fresh waters of the North Sea and Baltic Sea basins across northern parts of France and Germany to the Alps and throughout the Danube basin, then eastwards to Siberia (Lelek, 1987).”

Godard and Copp (2012) list *Carassius carassius* as native to Armenia, Azerbaijan, Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, Czechia, Denmark, Estonia, Finland, Germany, Hungary, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Montenegro, Netherlands, North

Macedonia, Norway, Poland, Romania, Russia, Serbia, Slovakia, Slovenia, Sweden, Switzerland, Turkey, Ukraine, and the United Kingdom.

From Froese and Pauly (2025):

“Present in Neusiedler See [Austria; Wolfram-Wais et al. 1999].”

Mamilov et al. (2025) report *C. carassius* as native to the Black Irtysh basin in Kazakhstan.

Introduced

From Freyhof (2024):

“It has been introduced to areas outside its native range in Croatia west of the Danube River, northern Italy and France west of the Rhine River.”

“In addition, there is strong molecular evidence that this species was introduced to Great Britain during the 15th century, despite it often being cited as native to southeastern England and introduced elsewhere on the island.”

From Fraser and Adams (1997):

“During a sampling visit to Loch Rannoch [in Scotland] [...] a single crucian carp *Carassius carassius* was caught. Although crucian carp has been recorded previously in Scotland (other than Loch Lomond, to which it has been recently introduced (Adams and Mitchell, 1992)) it occurs only in a localized area in West Galloway in which at least four populations are known to exist (Anon, 1997). Loch Rannoch is therefore the most northerly site in Scotland where it has been recorded from the wild.”

“Evidence from Loch Lomond suggests that crucian carp may be reproducing successfully there (Adams, 1994).”

From Khelifi et al. (2019):

“*C. carassius* is an exotic fish species introduced in Algeria in 2006 (Kara 2012). [...] A total of 333 specimens [collected from Beni Haroun Dam, northeastern Algeria] were investigated consisting of 227 females and 106 males.”

From Jan et al. (2023):

“*Carassius carassius* [...] was introduced into Dal Lake in Kashmir, India between 1956 and 1958 (Shafi, 2012). It is one of the most abundant cyprinids in Dal Lake Kashmir and it has adapted to a wide range of habitats to cope with abiotic environmental challenges such as low oxygen levels and water temperature variations (Holopainen and [Hyvärinen], 1985).”

From Froese and Pauly (2025):

“Unsuccessfully introduced [to Kenya; Lever 1996].”

“Naturally reproducing in Ooty Lake at Nilgiris [southern India].”

“Populations established in quiet, slow flowing waters of the Central part of the country [of Chile].”

Froese and Pauly (2025) also report *Carassius carassius* as introduced and established in Cyprus, Israel, the Philippines, Spain, and Turkey; introduced and probably established in Greece and Sri Lanka; introduced and probably not established in Thailand; and introduced with unknown status in China, Iran, and Nepal.

Means of Introduction Outside the United States

From Goddard and Copp (2012):

“The physical similarity between *C. carassius* and *C. gibelio* and the natural brown variety of *C. auratus* results in these species being introduced accidentally either in mixed consignments or as mis-identified consignments (Wheeler, 2000; Hickley and Chare, 2004; Innal and Erk’akan, 2006). Therefore, the two main introduction pathways are via fish stocking (for angling) and transfers of ornamental fish.”

“It has been shown that *C. carassius* is translocated within its native range, e.g. Slovenia (Povž and Sket, 1990) and the United Kingdom for angling amenity (Sayer et al., 2011) [...]”

“It has been intentionally introduced for angling.”

Short Description

From Schofield et al. (2025):

“Dorsal rays iii-iv (14-21); Anal rays ii-iii (5-8); Pharyngeal teeth in one row (0,4-4,0); Gill rakers 22-33; lateral line scales 28-37. Dorsal and anal fins have a serrated, spinelike ray. Typically, individuals are deep-bodied and laterally compressed; however, a slender ‘shallow-body’ variety also exists. The body is golden copper, darker dorsally with reddish fins.”

From Froese and Pauly (2025):

“Diagnosed from its congeners in Europe by having the following characters: body golden-green shining color; last simple anal and dorsal rays weakly serrated; 23-33 gill rakers; lateral line with 31-36 scales; free edge of dorsal convex; anal fin usually with 6½ branched rays; and peritoneum white [Kottelat and Freyhof 2007]. Caudal fin with 18-20 rays [Spillman 1961]. No barbels. The third dorsal and anal-fin rays are strong and serrated posteriorly.”

From Godard and Copp (2012):

“It exhibits phenotypic plasticity under different environmental conditions (Robinson and Parsons, 2002).”

Biology

From Froese and Pauly (2025):

“Adults occur in shallow ponds, lakes rich in vegetation and slow moving rivers. They burrow in mud in the dry season or during winter [Allardi and Keith 1991]. Usually restricted to densely vegetated backwaters and oxbows of lowland rivers. Feeds all day but mainly at night on plankton, benthic invertebrates, plant materials and detritus. Usually does not occur in waters with rich ichthyofauna and abundant predatory species, but very abundant in the absence of other fish species. Spawns in dense submerged vegetation [Kottelat and Freyhof 2007].”

“Females spawn multiple times during the spawning period [Teletchea et al. 2009]. Reproduction in May-June in shallow water with dense vegetation, eggs 130000-250000/female adhere to plants, hatch after 4-8 days [Allardi and Keith 1991]. Individual female spawn with several males. Males follow ripe females, often with much splashing. Eggs are sticky and are attached to water plants [Kottelat and Freyhof 2007].”

From Godard and Copp (2012):

“*C. carassius* are batch spawners. Spawning normally occurs when water temperatures reach 17–20°C (Aho and Holopainen, 2000), so in Northern latitudes of its native range, this is usually about May. As a batch spawning species, the reproductive period can last between 30 and 60 days (Aho and Holopainen, 2000). The length of the reproductive period and number of batches per season is dependent on the water temperatures in the spring and early summer. The number of batches varies from one to three (Aho and Holopainen, 2000). In England, the youngest mature crucian females and males were age 1+ (mean ages at maturity = 1.5 years), the smallest mature crucian were female (Tarkan et al., 2009), with almost all fish mature at age 3+. Crucian carp may reach maturity without spawning taking place immediately but one or more years later (Copp et al., 2008).”

From Schofield et al. (2025):

“In their native range, feeding may stop for several months as the fish rest in a state of "suspended animation" during winter months when ponds become anoxic and covered with ice (Zhadin and Gerd, 1963; Penttinen and Holopainen, 1992).”

Human Uses

From Froese and Pauly (2025):

“Fisheries: highly commercial; aquaculture: commercial; gamefish: yes; aquarium: commercial; bait: occasionally”

From FAO (2025):

“Global production of farmed crucian carp was only 2977 tonnes in 1950 but had reached 1 702 778 tonnes by 2002, an increase of more than 572 times in 52 years. Crucian carp ranks 6th among all cultured freshwater fish globally and contributed 7.4 percent of the world freshwater aquaculture production in 2002.”

From Goddard and Copp (2012):

“*C. carassius* is largely marketed fresh and frozen, and eaten fried, broiled or baked (Frimodt, 1995).”

Diseases

***Carassius carassius* has been documented as susceptible to epizootic ulcerative syndrome (EUS) and spring viraemia of carp (SVC), diseases listed by the World Organisation for Animal Health (2025a). *C. carassius* may be susceptible to koi herpesvirus (KHV), also listed by the World Organisation for Animal Health (WOAH 2025a).**

From Oidtmann et al. (2008):

“Among European fish species, Crucian carp *Carassius carassius* is noted to be naturally susceptible [to epizootic ulcerative syndrome, EUS] (Miyazaki 1994, cited in Lilley et al. 2001) [...]”

From WOA (2025b):

“Species that fulfil the criteria for listing as susceptible to infection with KHV [koi herpesvirus] according to Chapter 1.5 of *Aquatic Animal Health Code (Aquatic Code)* [include] common carp hybrids (e.g. [...] *Cyprinus carpio* × *Carassius carassius*).”

“Species for which there is insufficient evidence to fulfil the criteria for listing as susceptible to infection with KHV according to Chapter 1.5 of the *Aquatic Code* [include] Crucian carp (*Carassius carassius*).”

From Godard and Copp (2012):

“Pathogens Carried: *Chilodonella*, *Epistylis*, *Gyrodactylus*, *Lernaea cyprinacea*, spring viraemia of carp virus, *Trichodina perforata*, *Trichodina reticulata*, *Trichodinella*, *Trichodinella subtilis*”

“Spring viremia of carp (SVC) is a viral disease of fish, primarily of common carp, although [sic] *C. carassius* is also susceptible to the disease in nature.”

“In a study investigating the significance of *Aeromonas hydrophila* in association with disease outbreaks in aquaculture production in the Zhejiang province of China, it was reported that *A. hydrophila* accounted for more than 50% of the isolated aeromonands [sic] isolated from

C. carassius and Wuchang bream (*Megalobrama amblycephala*) with haemorrhagic septicaemia (Nielsen et al., 2001).”

“*Dactylogyrus* can be a serious epizootic causing mortality in *C. carassius* (FishBase, 2004).”

From Fichi et al. (2016):

“Herpesviral haematopoietic necrosis (HVHN) is a disease of the goldfish, *Carassius auratus* (L.), caused by Cyprinid herpesvirus-2 (CyHV-2) (Goodwin et al. 2009). [...] in 2011, CyHV-2 was detected in association with an *Aeromonas sobria* infection in a mass mortality of crucian carp, *Carassius carassius* L., in Italy – although it was not possible to confirm the role of CyHV-2 as causative agent (Fichi et al. 2013).”

“In the present short communication, we report on a new mass mortality event of crucian carp in Tuscany, Italy, where CyHV-2 was the only pathological agent to be identified in examined specimen.”

According to FAO (2025), diseases of *C. carassius* also include scale erecting disease caused by *Pseudomonas punctata f. ascitae*; stigmatosis caused by *Aeromonas punctata sub. punctata*; and saprolegniasis: dermatomycosis caused by *Saprolegnia* spp. or *Achlya* spp.

According to Froese and Pauly (2025), diseases of *Carassius carassius* also include Skin Flukes and Turbidity of the Skin.

According to Poelen et al. (2014), *C. carassius* is also a host for the pathogens *Aquabirnavirus salmonidae*, *Cathayacanthus exilis*, *Citrobacter freundii*, *Clinostomum complanatum*, *Clonorchis sinensis* (Chinese liver fluke), *Contracaecum rudolphii*, *Escherichia vulneris*, *Filamoeba sinensis*, *Flavobacterium psychrophilum*, *Khawia parva*, *Ligula intestinalis*, *Myxobolus lentisuturalis*, *M. muelleri*, *M. oviformis*, *M. wulii*, *Neogryporhynchus cheilancristrotus*, *Paradilepis scolecina*, *Philometroides sanguineus*, *Streptocara crassicauda*, *Thelohanellus hovorkai*, *Th. wuhanensis*, *Trypanosoma carassii*, *Valipora campylancristrota*, *Zschokkella nova*, Carp sprivivirus, Chinook salmon nidovirus 1, and Pike fry-like rhabdovirus.

Threat to Humans

From Froese and Pauly (2025):

“Potential pest [FAO 1997]”

3 Impacts of Introductions

From Jeffries et al. (2017):

“With regard to their [*C. carassius*] impact on native ecosystems [in England], to date there has been no attempt to assess this due to the assumption that they were native, however, available studies show that *C. carassius* are widely associated with species-rich, macrophyte-dominated ponds (Sayer et al., 2011), which are extremely important ecosystems for conservation (Oertli,

Joye, Castella, Cambin, & Lachavanne, 2002). There is no evidence that *C. carassius* negatively impact these habitats [...] and despite concerns that *C. carassius* may impact the threatened great crested newt (*Triturus cristatus*, Laurenti 1768), this does not seem to be the case in UK ponds, with *C. carassius* often co-existing with recruiting *T. cristatus* populations (Chan, [2011]).”

From Harper et al. (2021):

“Our findings indicate that the crucian carp can be an important driver of invertebrate community heterogeneity in ponds. Crucian carp had a negligible influence on alpha diversity and a positive influence on beta diversity of pond invertebrates. Alpha diversity in ponds with crucian carp was marginally reduced compared to alpha diversity in fishless ponds, but this difference was not significant across methods used at either taxonomic rank. Within the major invertebrate groups identified by all methods combined, species-level alpha diversity of Coleoptera and Mollusca was reduced in ponds containing crucian carp as opposed to fishless ponds. [...] Our results revealed crucian carp positively influence turnover and total beta diversity between ponds. Therefore, taxa in fishless ponds were replaced by different taxa in ponds with crucian carp, resulting in dissimilar community composition. Removal of top predators and dominant species, such as coleopterans, by crucian carp may allow other prey species to colonise, but further research is needed to test this hypothesis.”

“[...] all crucian carp ponds studied here were dominated by floating and/or submerged macrophyte beds as in Stefanoudis et al. (2017), and we observed no evidence for negative impacts on vegetation. Additionally, no impact of crucian carp on amphibian presence, oviposition, larval behaviour or recruitment success has been found (Chan, 2011; Harper, et al., [2019]; Jarvis, 2012). Despite its probable non-native status [in the United Kingdom], cumulative evidence suggests that the crucian carp does not have invasive potential.”

According to Froese and Pauly (2025), there are “probably some” adverse ecological interactions associated with *C. carassius* introduction to India. No further information on such impacts of introduction was found.

Carassius carassius is regulated in Alabama (ADCNR 2022), Connecticut (Connecticut DEEP 2020), Hawaii (HDOA 2019), Kansas (KDWP 2023), Minnesota (Minnesota DNR 2024), Nevada (Nevada Board of Wildlife Commissioners 2022), New Mexico (NMDGF 2023), North Carolina (North Carolina DEQ 2022), and Ohio (ODNR 2022). It is regulated at the family level (Cyprinidae) in Alaska (ADFG 2023), Louisiana (Louisiana Revised Statutes 2022), and Utah (Utah DWR 2023). See section 1.

4 History of Invasiveness

The History of Invasiveness for *Carassius carassius* is classified as Low. This species has been introduced and successfully established outside its native range. No clear, convincing, and reliable documentation of significant negative impacts of introduction was found, despite vague mention of negative impacts. However, multiple studies in the United Kingdom have documented a lack of negative impacts from *C. carassius*, finding beneficial effects on invertebrate diversity and no declines in macrophytes or amphibians associated with *C. carassius* presence.

5 Global Distribution

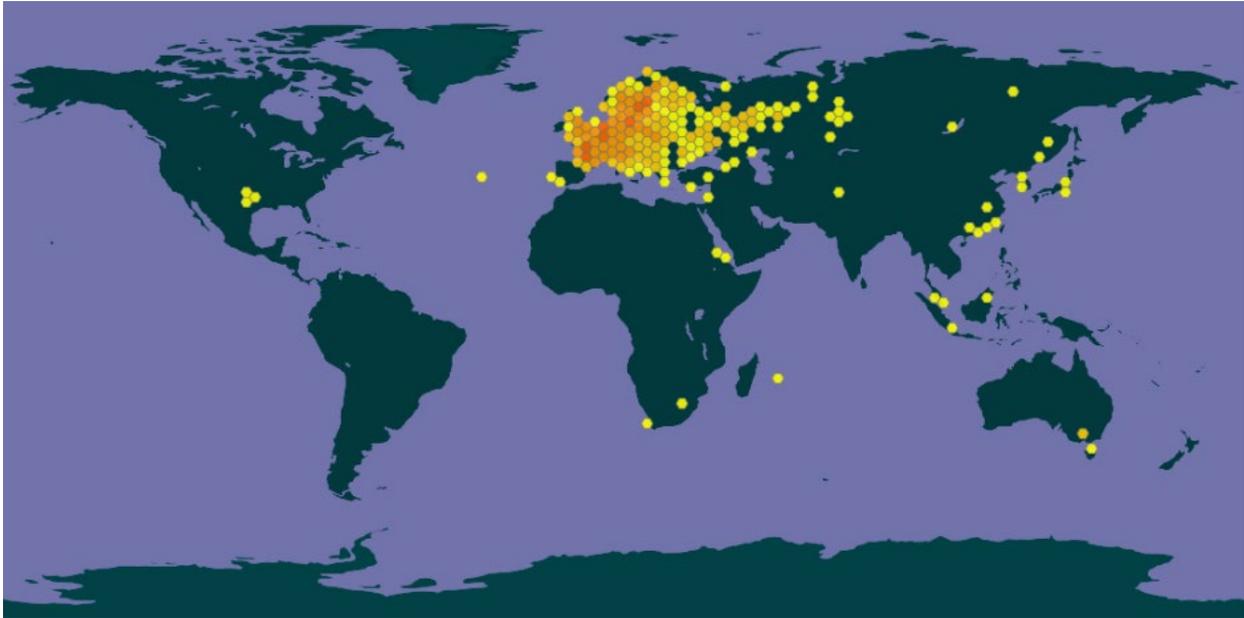


Figure 1. Reported global distribution of *Carassius carassius*. Map from GBIF Secretariat (2023). Occurrences are reported from Australia, Austria, the Azores, Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, China, Croatia, Czechia, Denmark, Eritrea, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Indonesia, Israel, Italy, Japan, Kazakhstan, Latvia, Lithuania, Luxembourg, Malaysia, Mauritius, the Netherlands, North Macedonia, Norway, Poland, Portugal, Romania, Russia, Serbia, Slovakia, Slovenia, South Africa, South Korea, Spain, Sweden, Switzerland, Turkey, Ukraine, United Kingdom, and the United States. Observations in the Azores, China, Eritrea, Greece, Indonesia, Malaysia, Mauritius, Portugal, southeastern Russia, South Africa, and the United States were not included in the climate matching due to a lack of confirmation of an established population occurring there. Observations in Australia, Georgia, Japan, and South Korea were not included in the climate matching analysis due to likely misidentification (see Remarks).

Additional observations used in the climate matching analysis were found in Khelifi et al. (2019; Algeria), Scasso and Campos (2000; Chile), and Froese and Pauly (2025; India).

No georeferenced occurrences were found for established populations of *C. carassius* in Armenia, Azerbaijan, Cyprus, Montenegro, the Philippines.

6 Distribution Within the United States



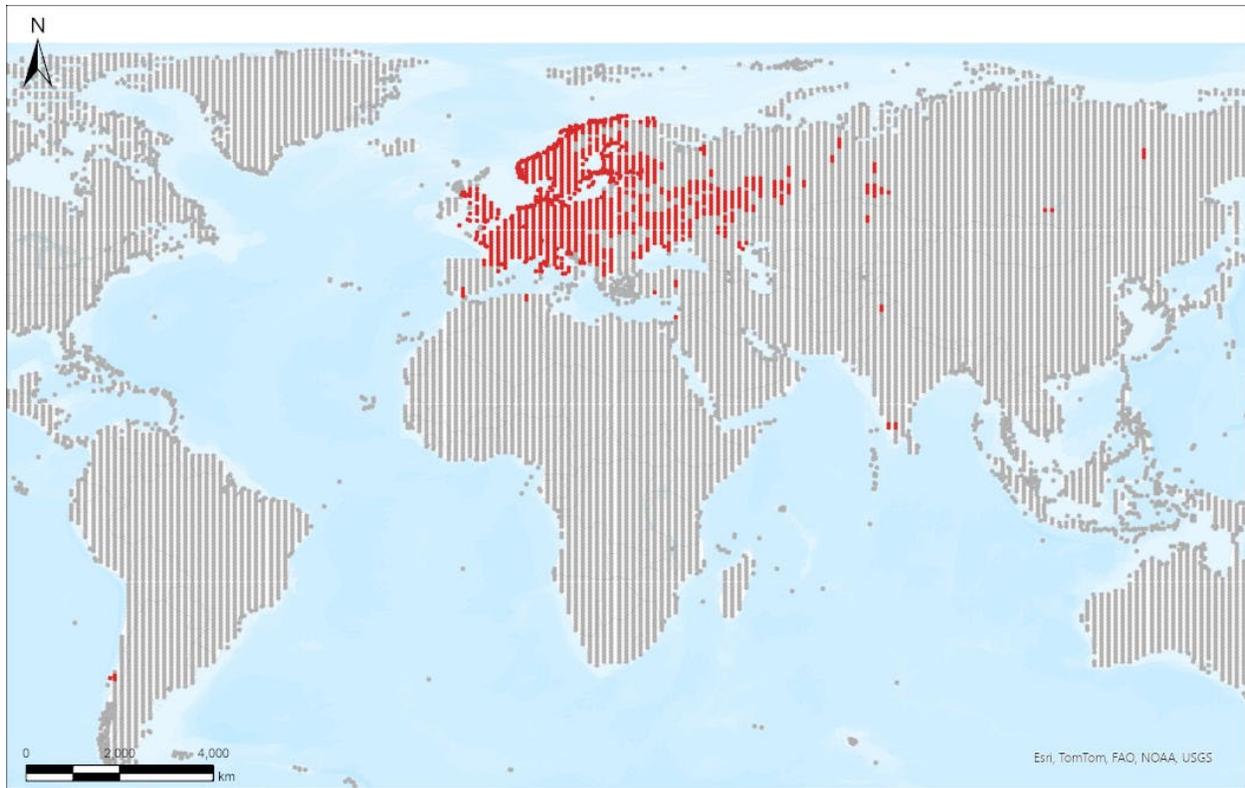
Figure 2. Reported distribution of *Carassius carassius* in the contiguous United States. Map from Schofield et al. (2025). The orange diamond near Chicago represents a nonnative observation that does not represent established populations; there are no established nonnative populations shown.

7 Climate Matching

Summary of Climate Matching Analysis

The climate match for *Carassius carassius* was high in most regions of the United States. The Gulf Coast and peninsular Florida into southern Georgia had a medium match, while southwestern Arizona, the Pacific Northwest coast in Washington and Oregon, and the Cascade Range had low match. The overall Climate 6 score (Sanders et al. 2023; 16 climate variables; Euclidean distance) for the contiguous United States was 0.906, indicating that Yes, there is establishment concern for this species. 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 nonnative aquatic species introduced to the United States (USFWS 2024).

Projected climate matches in the contiguous United States under future climate scenarios are available for *Carassius carassius* (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.



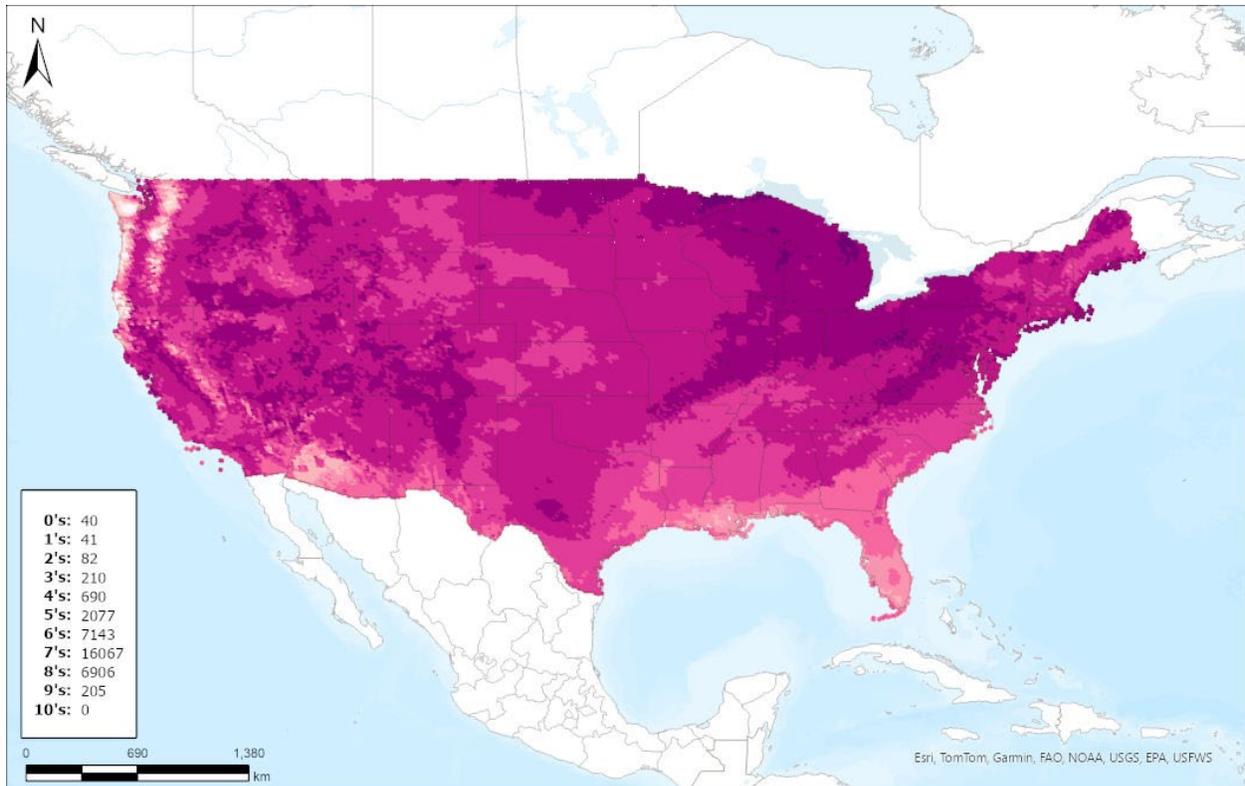
Species: *Carassius carassius*

Selected Climate Stations ●



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Figure 3. RAMP (Sanders et al. 2023) source map showing global weather stations selected as source locations (red; Algeria, Austria, Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, Chile, Croatia, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, India, Israel, Italy, Kazakhstan, Kosovo, Latvia, Lithuania, Luxembourg, Moldova, Montenegro, North Macedonia, Norway, Netherlands, Poland, Romania, Russia, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, United Kingdom) and non-source locations (gray) for *Carassius carassius* climate matching. Most source locations from GBIF Secretariat (2023), with additional source locations from Scasso and Campos (2000; Chile), Khelifi et al. (2019; Algeria), and Froese and Pauly (2025; India). Selected source locations are within 100 km of one or more species occurrences, and do not necessarily represent the locations of occurrences themselves.



Species: *Carassius carassius*

Current

Climate 6 Score: 0.906



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Figure 4. Map of RAMP (Sanders et al. 2023) climate matches for *Carassius carassius* in the contiguous United States based on source locations reported by GBIF Secretariat (2023), Scasso and Campos (2000), Khelifi et al. (2019), and Froese and Pauly (2025). 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 *Carassius carassius* is classified as Medium. There is information available on species distribution, biology, ecology, and impacts of introduction. However, there is conflicting information on the native status of *Carassius carassius* in several countries. Historical misidentifications of introduced *Carassius* species have been documented in the literature due to the similarity among species within the genus and the propensity for the species to hybridize. Furthermore, although multiple peer-reviewed studies have failed to find negative impacts of introduction from *C. carassius*, these studies have occurred in a single country and their generalizability is uncertain.

9 Risk Assessment

Summary of Risk to the Contiguous United States

Carassius carassius, Crucian Carp, is a fish native to much of Europe and parts of Asia. It is tolerant of heat, cold, organic pollutants, and hypoxic conditions, and has established populations outside its native range in over a dozen countries. There have been a couple of reports of introductions to the contiguous United States, but there is doubt as to whether the species was correctly identified and no populations became established. *C. carassius* is morphologically similar to other *Carassius* species and known to hybridize with them as well as with common carp, *Cyprinus carpio*. The species is also documented as susceptible to at least two diseases listed by the World Organisation for Animal Health, along with numerous other parasites and pathogens. The History of Invasiveness for *Carassius carassius* is classified as Low due to multiple peer-reviewed studies from the United Kingdom finding no negative impacts of *C. carassius* introduction on invertebrate diversity, macrophyte presence, or amphibian populations. The climate matching analysis for the contiguous United States indicates establishment concern for this species. Most regions of the contiguous United States had a high climate match; low climate matches were found only in small areas of the Pacific Northwest and Southwest. The Certainty of Assessment for this ERSS is classified as Medium due to the history of misidentifications obscuring the true distribution of *C. carassius* and because all studies demonstrating no negative impacts of *C. carassius* introduction were done in a single country. The impacts of introduction of *C. carassius* have not been studied in many of its established locations. The Overall Risk Assessment Category for *Carassius carassius* in the contiguous United States is Uncertain.

Assessment Elements

- **History of Invasiveness (see Section 4): Low**
- **Establishment Concern (see Section 7): Yes**
- **Certainty of Assessment (see Section 8): Medium**
- **Remarks, Important additional information: Susceptible to epizootic ulcerative syndrome and spring viraemia of carp, and potentially susceptible to koi herpesvirus disease; all three diseases are listed by the World Organisation for Animal Health.**
- **Overall Risk Assessment Category: Uncertain**

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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), Scasso and Campos (2000), Khelifi et al. (2019), and Froese and Pauly (2025).

Under the future climate scenarios (figure A1), on average, high climate match for *Carassius carassius* was projected to occur in the Great Basin and Great Lakes regions of the contiguous United States. However, nearly all regions had areas of medium or high climate match under at least one scenario. Low climate match was concentrated in the Southeast, Southwest, and along the northern Pacific coast. The areas of low match expanded in extent in the southern areas from the 2055 time step to the 2085 time step. The Climate 6 scores for the individual future scenario models (figure A2) ranged from a low of 0.309 (model: UKESM1-0-LL, SSP5, 2085) to a high of 0.843 (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 (0.906, figure 4) 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, 2085, the most extreme climate change scenario. Under one or more time step and climate scenarios, areas within the Colorado Plateau and Southwest saw a moderate increase in the climate match relative to current conditions. The climate match peaked in the Southwest at the 2055 time step, while the climate match was higher at the 2085 time step for the Colorado Plateau. No large increases were observed regardless of time step and climate scenarios. Under one or more time step and climate scenarios, areas within the Appalachian Range, Colorado Plateau, Great Lakes, Mid-Atlantic, Southeast, and Southern Plains saw a large decrease in the climate match relative to current conditions. Additionally, areas within California, the Great Basin, Gulf Coast, Northeast, Northern Pacific Coast, Northern Plains, Southern Atlantic Coast, Southwest, and Western Mountains saw a moderate decrease in the climate match relative to current conditions. The shift to lower climate match was much more pronounced at the 2085 time step, and especially under SSP5. Additional, very small areas of large or moderate change may be visible on the maps (figure A3).

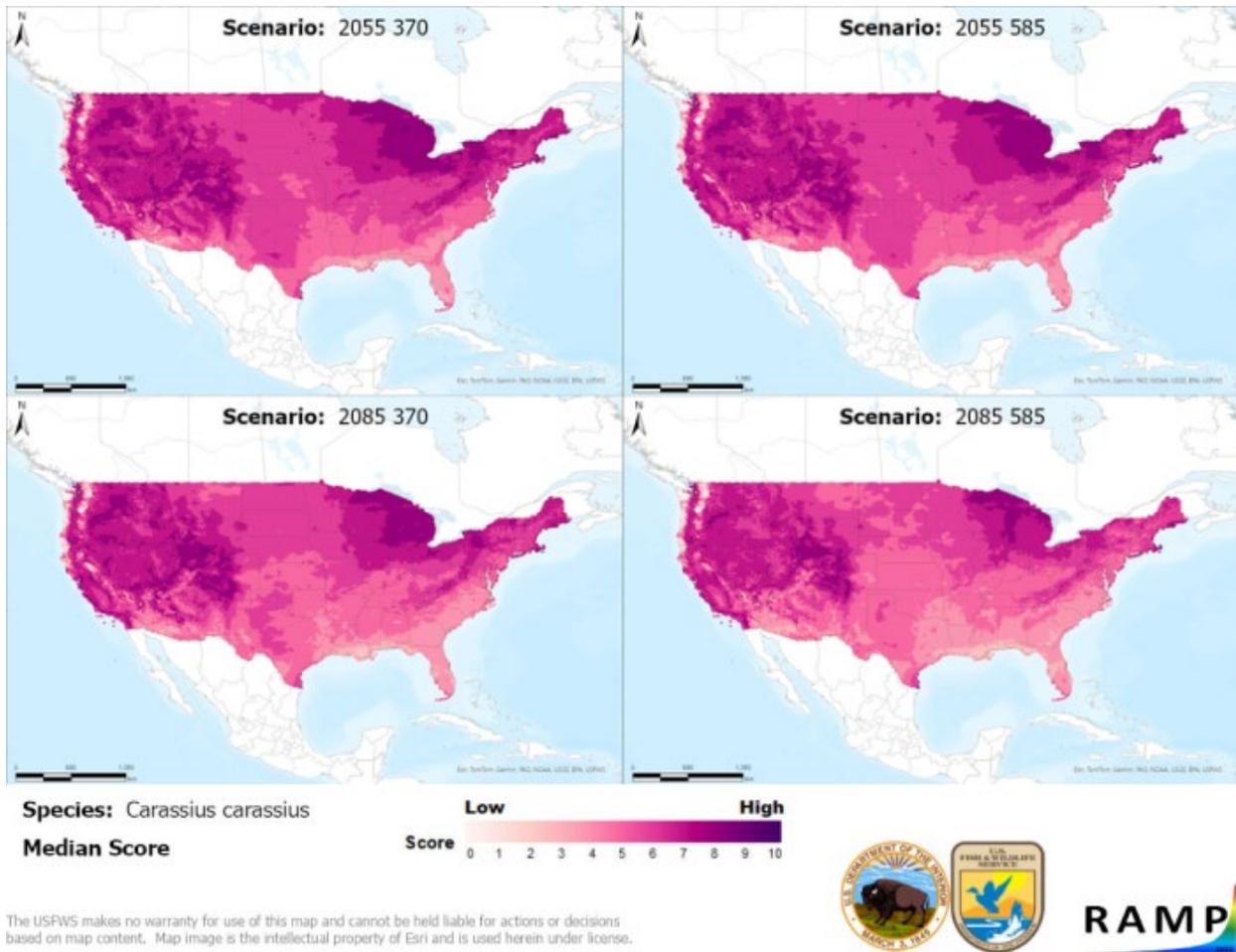


Figure A1. Maps of median RAMP (Sanders et al. 2023) climate matches projected under potential future climate conditions using five global climate models for *Carassius carassius* in the contiguous United States. Climate matching is based on source locations reported by GBIF Secretariat (2023), Scasso and Campos (2000), Khelifi et al. (2019), and Froese and Pauly (2025). 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.

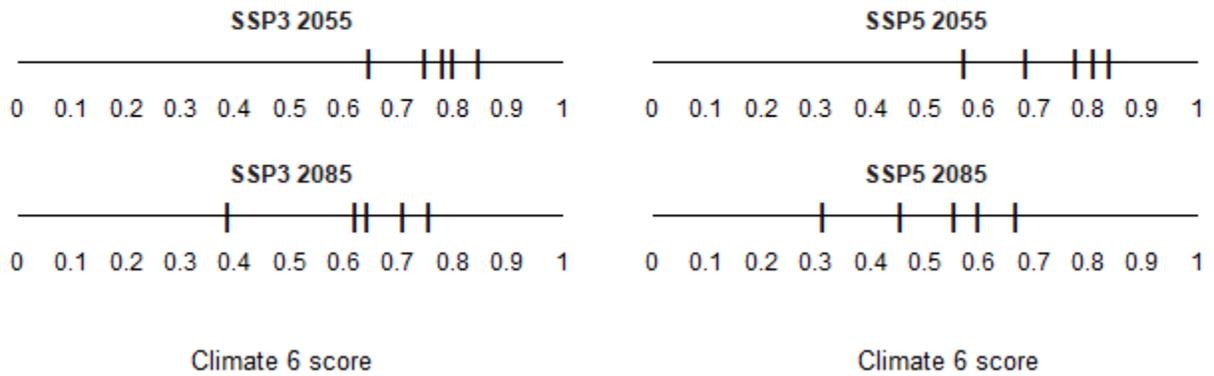
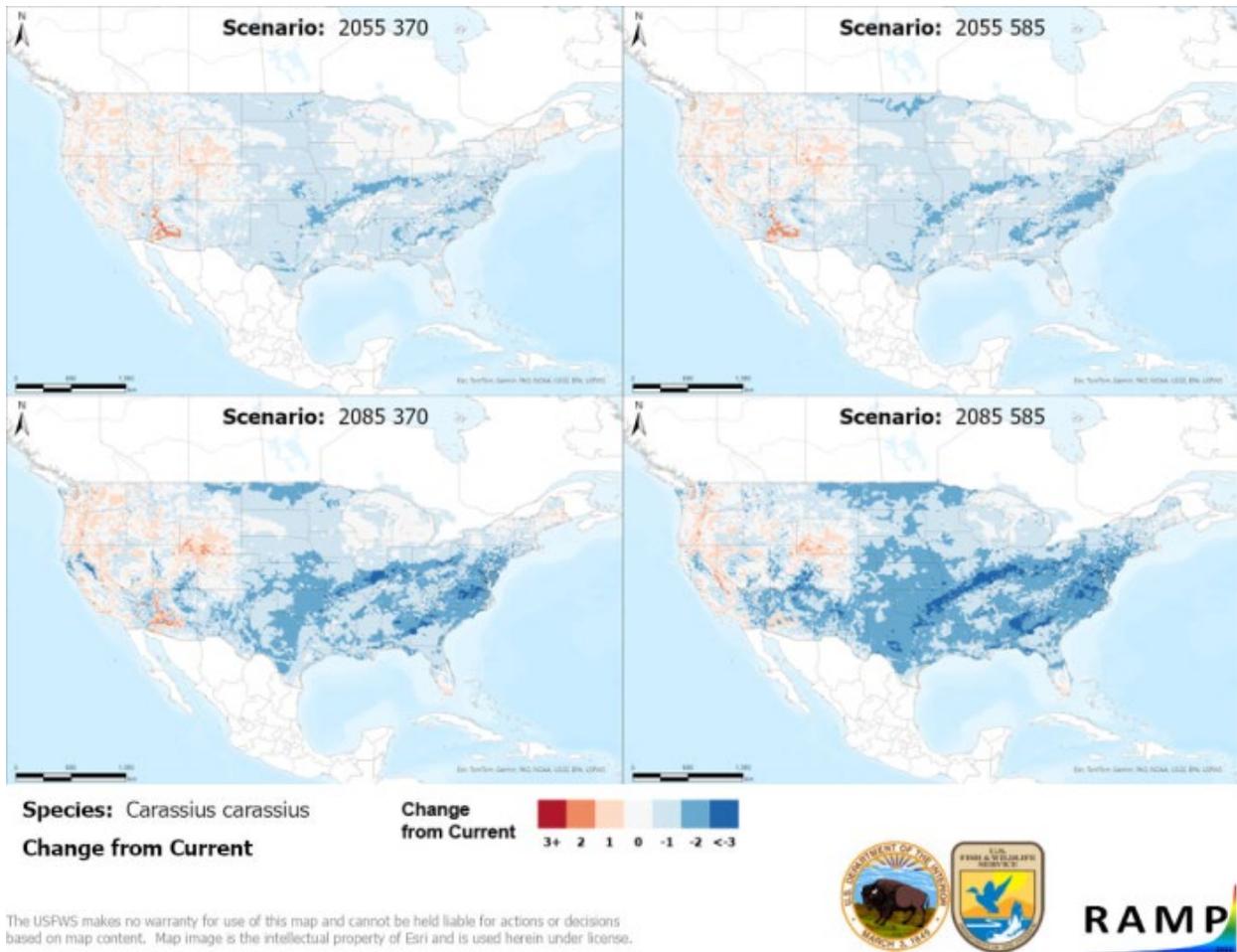


Figure A2. Comparison of projected future Climate 6 scores for *Carassius carassius* in the contiguous United States for each of five global climate models under four combinations of Shared Socioeconomic Pathway (SSP) and time step. SSPs used (from left to right): SSP3, SSP5 (Karger et al. 2017, 2018; 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.



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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 4) and the median target point score for future climate scenarios (figure A1) for *Carassius carassius* based on source locations reported by GBIF Secretariat (2023), Scasso and Campos (2000), Khelifi et al. (2019), and Froese and Pauly (2025). 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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