Utah Chub (*Gila atraria*)

Ecological Risk Screening Summary

U.S. Fish and Wildlife Service, November 2024
Revised, December 2024
Web Version, 7/2/2025

Organism Type: Fish
Overall Risk Assessment Category: Uncertain



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1 Native Range and Status in the United States

Native Range

From Fuller and Nico (2024):

"Upper Snake River system, Wyoming and Idaho, and Lake Bonneville basin (including Great Salt Lake drainage and Sevier River system), southeastern Idaho and Utah (Page and Burr 1991)."

Status in the United States

From Fuller and Nico (2024):

"**Native Range:** Upper Snake River system, Wyoming and Idaho, and Lake Bonneville basin (including Great Salt Lake drainage and Sevier River system), southeastern Idaho and Utah (Page and Burr 1991)."

"**Status:** Established in Colorado, Idaho, Nevada, Montana, Utah, Wyoming, and apparently Oregon. It is considered rare or incidental in the Green and Yampa rivers in Colorado, and in the Dolores, Green, and Price rivers in Utah. It is abundant in Flaming Gorge Reservoir in Utah and Wyoming (Tyus et al. 1982)."

According to Fuller and Nico (2024), *Gila atraria* is also established outside its native range in Arizona.

No records of *Gila atraria* in trade in the United States were found.

Regulations

Gila atraria is regulated in Utah (Utah DWR 2023). It is regulated at the genus level (*Gila*) in New Mexico (NMDGF 2023). 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

From Fuller and Nico (2024):

"Many introductions have been the result of bait bucket releases (Holden and Stalnaker 1975, Simpson and Wallace 1978, Sigler and Sigler 1987). Hubbs et al. (1974) found evidence that the species may have been introduced to certain sites in the Great Basin by early Mormon settlers. These researchers also speculated that Native Americans may have brought Utah Chubs into Shoshone Spring. The species may have been introduced to Murphy Spring, in Steptoe Valley, as forage for sportfish, although its establishment may have resulted from bait bucket releases (Hubbs et al. 1974). In some areas the species has become widespread because of natural dispersal from original points of introduction (e.g., Madison and Missouri rivers in Montana). Holden (1991) stated that it first appeared in Flaming Gorge Reservoir on the Wyoming-Utah border in 1964."

Remarks

From Fuller and Nico (2024):

"Hubbs et al. (1974) detailed the introduction history of Utah Chub in parts of the Great Basin of western North America. Tyus et al. (1982) gave a distribution map of this species in the upper Colorado basin. There is some uncertainty concerning the exact natural range of this species. For

instance, Hubbs et al. (1974) stated that it might be theorized that an ancient outlet into the Bonneville system (where Utah Chub is native), or some other stream connection, could have led to the spread of this species into Spring Valley; however, they noted that there is no definitive evidence of such a discharge, and no other indication of the occurrence of Bonneville fishes in Spring Valley. Most authors (e.g., Lee et al. 1980 et seq.; Sigler and Sigler 1987, 1996) have concluded that the Utah Chub is native to the Snake River above Shoshone Falls but not below. Simpson and Wallace (1978) noted that the native range of Utah Chub in Henrys Fork of the Snake River was restricted to below Mesa Falls; however, the fish was later introduced to Island park Reservoir and several small reservoirs in the area. Many western states have outlawed the use of live fish as bait to prevent the spread of this and other bait fish (Sigler and Sigler 1987)."

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 Cypriniformes
Superfamily Cyprinoidea
Family Leuciscidae
Subfamily Laviniinae
Genus *Gila*
Species *Gila atraria* (Girard, 1856)

According to Fricke et al. (2024) *Gila atraria* (Girard 1856) is the current valid name for this species.

The following synonyms of *Gila atraria* from Fricke et al (2024) were used to search for information for this report: *Hybopsis bivittatus* (Cope, 1872), *Hybopsis timpanogensis* (Cope, 1874), *Myloleucus parovanus* (Cope, 1874), *Myloleucus pulverulentus* (Cope, 1872), *Protoporus domninus* (Cope, 1872), *Siboma atraria longiceps* (Cope, 1875), *Squalius cruoreus* (Jordan & Gilbert, 1881), *Squalius rhomaleus* (Jordan & Gilbert, 1881), *Tigoma squamata* (Gill, 1861).

Size, Weight, and Age Range

From Fuller and Nico (2024):

"Size: 56 cm"

From Froese and Pauly (2024):

“max. reported age: 12 years [Roth et al. 2020].”

Environment

From Froese and Pauly (2024):

“Freshwater; benthopelagic.”

“Occurs in lakes, quiet pools of headwaters, creeks and small to medium rivers. Often found in vegetation over mud or sand [Page and Burr 2011].”

Climate

From Froese and Pauly (2024):

“Temperate; 48°N - 38°N”

Distribution Outside the United States

Native

The native range of *Gila atraria* is wholly within the United States. See section 1 for a complete description of the native range.

Introduced

No records were found for introduction of *Gila atraria* in the wild outside the United States.

Means of Introduction Outside the United States

No records were found of introduction of *Gila atraria* in the wild outside the United States.

Short Description

From Froese and Pauly (2024):

“Dorsal soft rays (total): 9; Anal soft rays: 8 - 9. *Gila atraria* can be distinguished by the following characters: deep, compressed body; large eye; short, blunt snout; 45-65 scales on lateral line; dorsal fin usually with 9 rays; anal fin with 8 rays; pharyngeal teeth 2,5-4,2; olive-brown to blue-black above; yellow to brassy side; clear to olive-yellow fins; and large males with yellow to gold-fin bases, mouth and side of the head, may be gold overall [Page and Burr 2011].”

Biology

From Roth et al. (2020):

“Fecundity of Utah Chub in Henrys Lake increased with length and varied from 6,232 to 156,797eggs/female.”

From NatureServe (2024):

“Spawns spring and summer at temperatures in 50s and 60s F. Eggs hatch in 6-9 days at [water] temperatures in mid-60s F (Brown 1971). Males sexually mature in 2-3 years, females in 3-4+ years, depending on locality.”

From Roth et al. (2020):

“Utah Chub are broadcast spawners and typically spawn in shallow water (i.e., <0.1 m) during late spring and summer (Sigler and Sigler 1996).”

Human Uses

From Fuller and Nico (2024):

“Bait”

Diseases

No information was found associating *Gila atraria* with any diseases listed by the World Organisation of Animal Health (2024).

Poelen et al. (2014) lists the following as parasites of *Gila atraria*: *Proteocephalus torulosus*, *Crepidostomum farionis*, *Allocreadium*, *Plagioporus cooperi*, *Cryptobia atraria*, *Crepidostomum*, *Clinostomum marginatum*, *Plagioporus cooperi*, and *Neoechinorhynchus*.

Threat to Humans

No information was found on threats to humans from *Gila atraria*.

3 Impacts of Introductions

The following source discusses impacts of introduction of *Gila atraria* on another nonnative species.

From Teuscher and Luecke (1996):

“In Flaming Gorge Reservoir, Wyoming-Utah, kokanees *Oncorhynchus nerka* (lacustrine sockeye salmon) and Utah chub *Gila atraria* share similar food resources. Schneidervin (1985) reported that these species exhibited a 95% diet overlap with both preferring *Daphnia pulex*, but they provided little supporting evidence.”

“In conclusion, we were able to show that under certain conditions Utah chub depressed kokanee growth. The strength of this competition varied seasonally even at high densities of Utah chub. When water temperatures exceeded 18°C, Utah chub fed extensively and depressed zooplankton biomass, which resulted in reduced growth of kokanees.”

The following source discusses possible, probable, and suggested impacts of introduction of *Gila atraria*.

From Fuller and Nico (2024):

"Introduced populations often reach great abundance and become serious competitors with sport fish, especially trout (Sigler and Miller 1963). […] Hubbs et al. (1974) also noted that it has a tendency toward population explosion and habitat dominance in artificial impoundments. Utah Chub became a major management concern in Flaming Gorge Reservoir by the late 1960s, in part, because it appeared to compete with trout for planktonic foods and because the species established growth records of its own (Holden 1991). Introduced Utah Chub, along with other introduced species, may have replaced the relict dace *Relictus solitarius* at Murphy Spring, Nevada (Hubbs et al. 1974). Predation by, and hybridization with, the Utah Chub are considered some of the most serious hazards to the least chub *Iotichthys phlegethontis* in Utah (Sigler and Sigler 1987), a species proposed for federal listing as an endangered species (U.S. Fish and Wildlife Service 1997). Attempts at eradication have been largely unsuccessful and costly (Sigler and Sigler 1987)."

The species *Gila atraria* is regulated in Utah (Utah DWR 2023) and New Mexico (NMDGF 2023). See section 1.

4 History of Invasiveness

The History of Invasiveness for *Gila atraria* is classified as Data Deficient. *Gila atraria* has become established outside of its native range both intentionally and unintentionally as it is used as bait. There is no evidence of trade for *Gila atraria*. There are reports of negative impacts in areas where this species has become established, but the only report substantiated by specific evidence is of impacts to another introduced fish. Evidence supporting impacts to native species or details on economic losses due to sportfish impacts would be needed to justify a stronger conclusion about the species' invasiveness.

5 Global Distribution

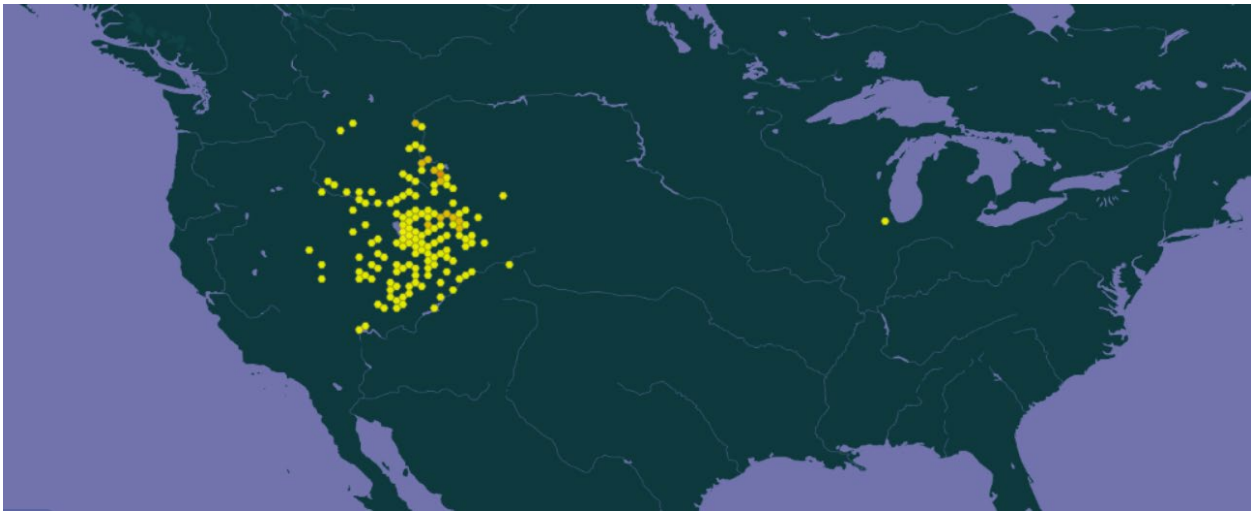

Figure 1. Reported global distribution of *Gila atraria*. Map from GBIF Secretariat (2024). Observations are reported from Utah, Wyoming, Colorado, Idaho, Montana, and Nevada in the United States. There are points in Illinois and eastern Wyoming that do not represent established populations and were not used in the climate match analysis.

6 Distribution Within the United States

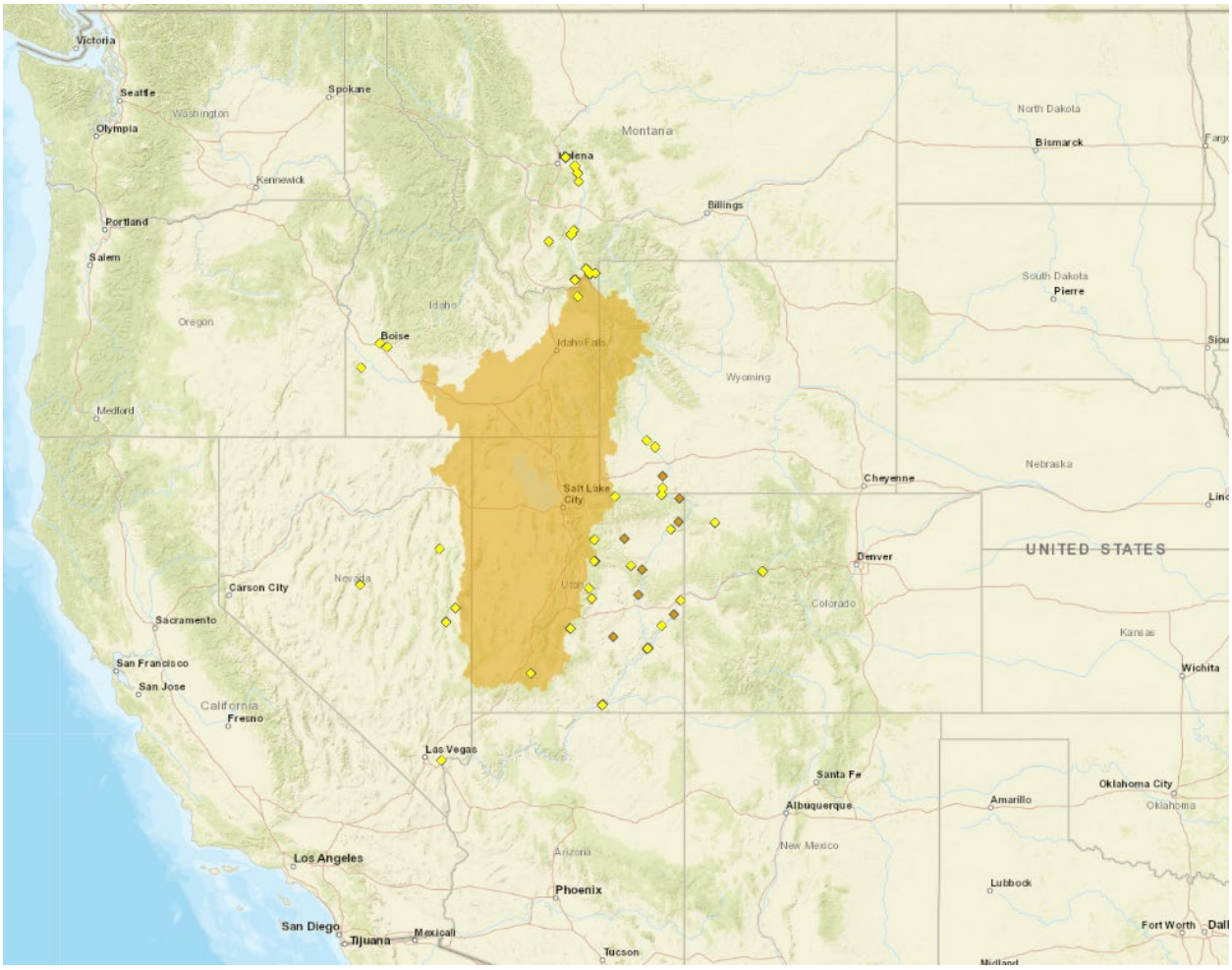

Figure 2. Reported distribution of *Gila atraria* in the United States. Map from Fuller and Nico (2024). Observations are reported from Utah, Wyoming, Colorado, Idaho, Montana, and Nevada. The orange diamonds represent populations that are not considered established; yellow diamonds represent established populations. The orange shading indicates the native range of this fish.

7 Climate Matching

Summary of Climate Matching Analysis

On average, the climate match for *Gila atraria* was high across portions of the Colorado Plateau, Great Basin, Northern Plains, and Southwest regions. Areas of low climate matches were observed in portions of the Gulf Coast, Northern Pacific Coast, along the Cascade-Sierra ranges, Southern Atlantic Coast, and Southern Florida regions. The overall Climate 6 score (Sanders et al. 2023; 16 climate variables; Euclidean distance) for the contiguous United States was 0.613, indicating that Yes, there is establishment concern for this species outside its native range. 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 *Gila atraria* (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.

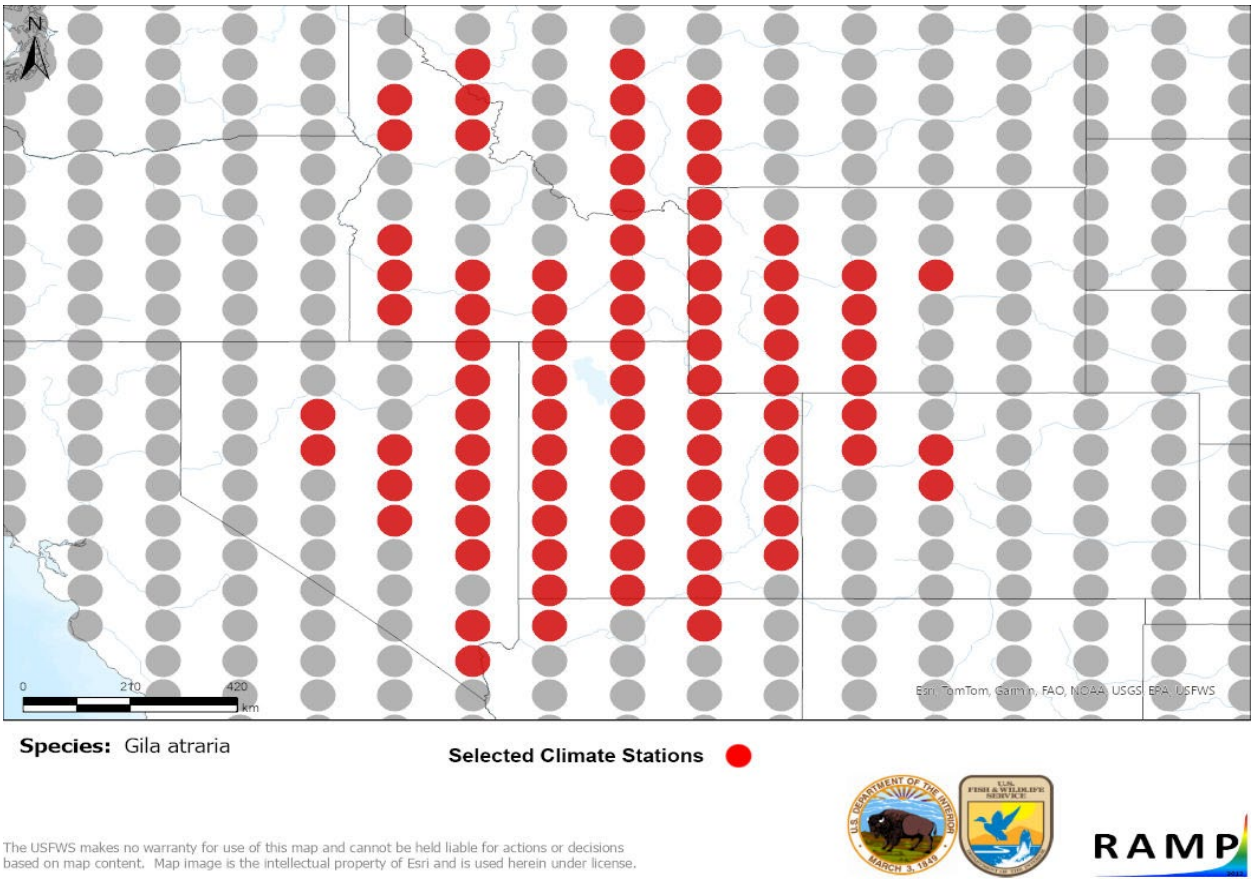

Figure 3. RAMP (Sanders et al. 2023) source map showing weather stations throughout the world selected as source locations (red; United States) and non-source locations (gray) for *Gila atraria* climate matching. Source locations from GBIF Secretariat (2024). Selected source locations are within 100 km of one or more species occurrences, and do not necessarily represent the locations of occurrences themselves.

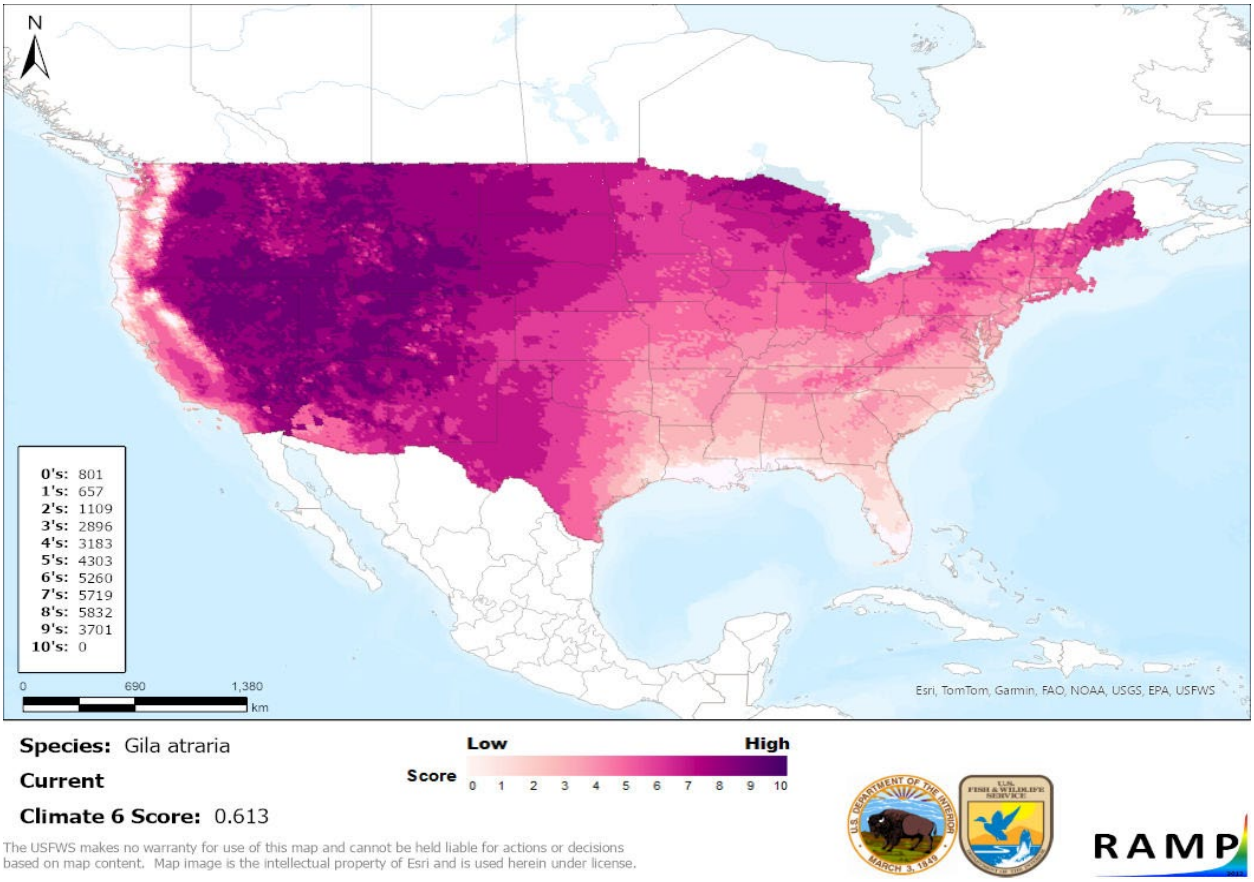

Figure 4. Map of RAMP (Sanders et al. 2023) climate matches for *Gila atraria* in the contiguous United States based on source locations reported by GBIF Secretariat (2024). Counts of climate match scores are tabulated on the left. 0/Pale Pink=Lowest match, 10/Dark Purple = Highest match.)

8 Certainty of Assessment

The Certainty of Assessment for *Gila atraria* is classified as Low. There is reasonably complete information about the biology, ecology, and distribution of this species. Introductions are well documented and impacts of introduction have been reported. However, the only impacts substantiated by evidence to date were to another introduced fish. More information on impacts to native species or on economic impacts is needed to increase the certainty of this assessment.

9 Risk Assessment

Summary of Risk to the Contiguous United States

Gila atraria, Utah Chub, is a fish that is native to Wyoming, Idaho, and Utah. This species is used as a bait fish which has helped it spread outside of its native range. This species is regulated in Utah and New Mexico. It has been shown to suppress the growth of introduced sportfish when it has become established outside of its native range. Introduced populations of *Gila atraria* may also threaten native species via hybridization and competition, but more evidence is needed to confirm these suggested impacts. The History of Invasiveness for *Gila atraria* is classified as Data Deficient. The climate matching analysis for the contiguous United States indicates

establishment concern for this species outside its native range. Areas of high match outside of its native range included the Northern Plains and Southwest. The Certainty of Assessment for this ERSS is classified as Low due to the limited information on impacts of introduction. The Overall Risk Assessment Category for *Gila atraria* in the contiguous United States is Uncertain.

Assessment Elements

- **History of Invasiveness (see Section 4): Data Deficient**
- **Establishment Concern (see Section 7): Yes**
- **Certainty of Assessment (see Section 8): Low**
- **Remarks, Important additional information: None**
- **Overall Risk Assessment Category: Uncertain**

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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11 Literature Cited in Quoted Material

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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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 (2024).

Under the future climate scenarios (figure A1), on average, high climate match for *Gila atraria* was projected to occur in the Colorado Plateau and Great Basin regions of the contiguous United States. Areas of low climate match were projected to occur in the Appalachian Range, Gulf Coast, Mid-Atlantic, Northern Pacific Coast, Southeast, Southern Atlantic Coast, and Southern Florida regions. An area of low match was consistently found along the Cascade-Sierra ranges. The Climate 6 scores for the individual future scenario models (figure A2) ranged from a low of 0.288 (model: UKESM1-0-LL, SSP5, 2085) to a high of 0.569 (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 outside the native range under future scenarios. The Climate 6 score for the current climate match (0.613, 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 Southwest saw a large increase in the climate match relative to current conditions. Under one or more time step and climate scenarios, areas within the Appalachian Range, Colorado Plateau, Great Lakes, Mid-Atlantic, Northeast, Southeast, and Southwest saw a large decrease in the climate match relative to current conditions. Additionally, areas within California, the Great Basin, Gulf Coast, Northern Pacific Coast, Northern Plains, Southern Atlantic Coast, Southern Plains, 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).

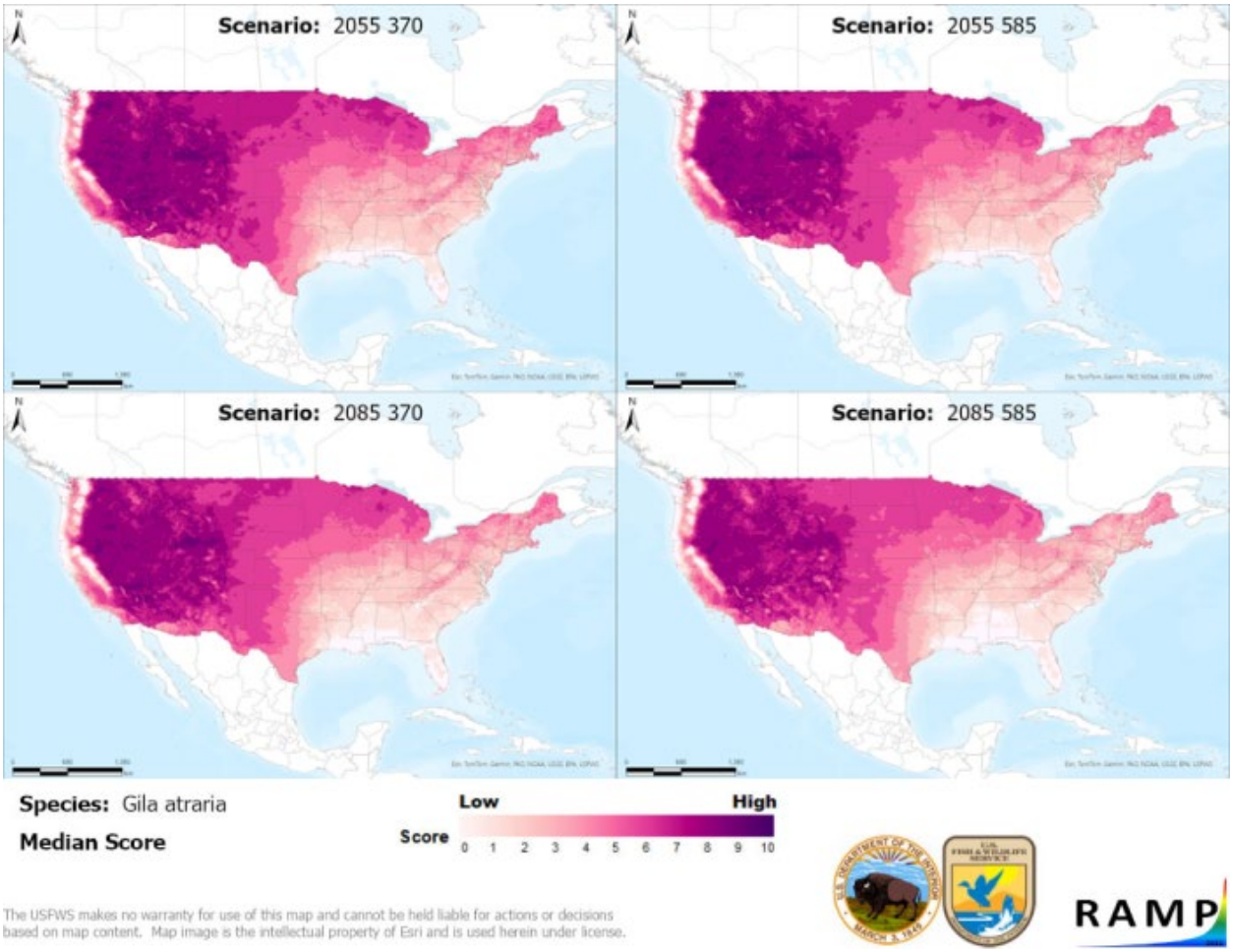

Figure A1. Maps of median RAMP (Sanders et al. 2023) climate matches projected under potential future climate conditions using five global climate models for *Gila atraria* in the contiguous United States. Climate matching is based on source locations reported by GBIF Secretariat (2024). Shared Socioeconomic 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.

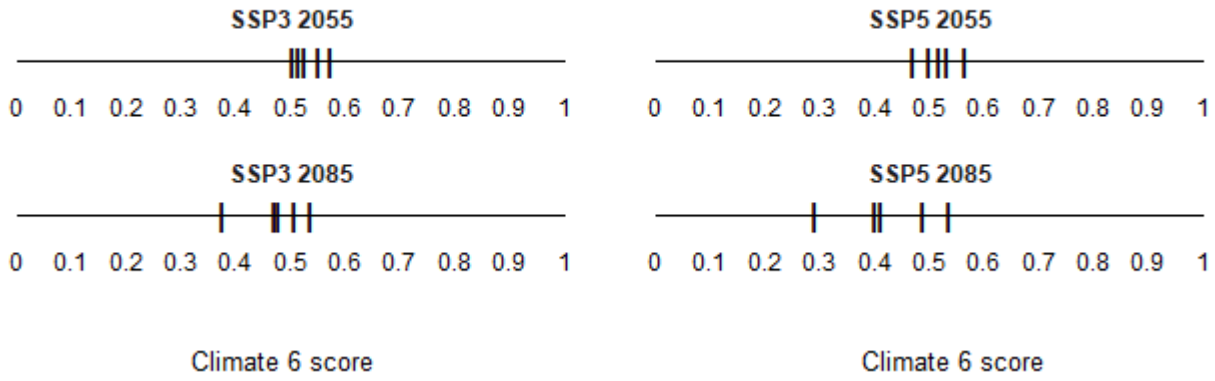

Figure A2. Comparison of projected future Climate 6 scores for *Gila atraria* in the contiguous United States for each of five global climate models under four combinations of Shared Socioeconomic Pathway (SSP) and time step. SSPs used (from left to right): SSP3, SSP5 (Karger et al. 2017, 2018; IPCC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

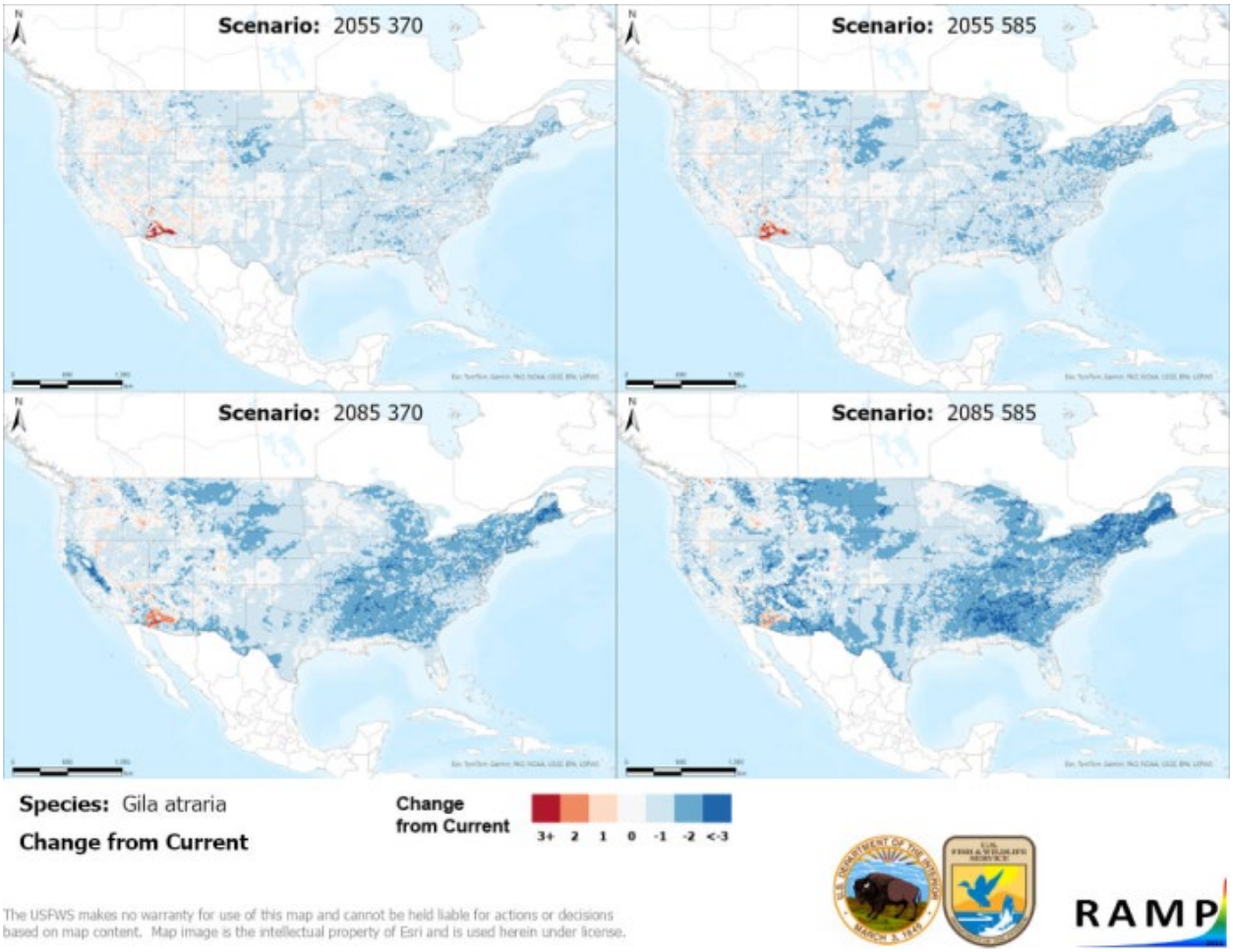

Figure A3. RAMP (Sanders et al. 2023) maps of the contiguous United States showing the difference between the current climate match target point score (figure 4) and the median target point score for future climate scenarios (figure A1) for *Gila atraria* based on source locations reported by GBIF Secretariat (2024). 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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