

Guppy (*Poecilia reticulata*)

Ecological Risk Screening Summary

U.S. Fish and Wildlife Service, February 2026

Revised, May 2026

Web Version, 6/8/2026

Organism Type: Fish

Overall Risk Assessment Category: High



Photo: Deacon et al. 2015. Licensed under [CC BY 4.0](https://creativecommons.org/licenses/by/4.0/). Available: https://commons.wikimedia.org/wiki/File:Trinidadian_guppy_%28Poecilia_reticulata%29_male_and_female.png (February 2026).

1 Native Range and Status in the United States

Native Range

From Fricke et al. (2026):

“Distribution: Northeastern South America: coastal drainages between the Orinoco delta (Venezuela) and the Essequibo River delta (Guyana), islands of Venezuela, Netherlands Antilles, and Trinidad and Tobago.”

Status in the United States

From Nico et al. (2026):

“Status: Locally established in warmwater sites in Hawaii (Devick 1991), Idaho (Courtenay et al. 1987), New Mexico (Sublette et al. 1990), Nevada (Courtenay and Deacon 1983), Texas (Hubbs et al. 1991), and Wyoming (Courtenay et al. 1987); reported from California (Shapovalov et al. 1981), Colorado (Zuckerman and Behnke 1986), Connecticut (Whitworth 1996), Missouri (Keevin 1978), Montana (Moyle 1976), and Wisconsin (Becker 1983). Considered established in Arizona by Minckley (1973); however, according to Courtenay and Meffe (1989), populations in Arizona and Florida do not appear to be self-sustaining. Although introduced widely in Texas, the only established population is found in the San Antonio River near Brackenridge Park (Hubbs et al. 1991).”

Additionally, Nico et al. (2026) report *Poecilia reticulata* as established in New York, Puerto Rico, Utah, U.S. Virgin Islands, and West Virginia. The established population in New York is located by a power station and the established population in West Virginia is in a thermal spring. Nico et al. (2026) report *P. reticulata* as introduced with unknown status in Alabama, Guam, Illinois, New Jersey, and Pennsylvania.

Froese and Pauly (2026) report *P. reticulata* as established with natural reproduction in Guam.

P. reticulata is in trade in the United States (e.g., Dan’s Fish 2026). Chapman et al. (1997) documented just under 4 million *P. reticulata* imported into the United States in October 1992 alone, more than double the volume of any other ornamental fish species imported during that time period.

From Chapman et al. (1997):

“Using import and export documents we report trends in total values for the U.S. [United States] trade in ornamental fish. Also, we determined the number and value of the most commonly imported ornamental fish [as of 1992]. [...] The two most popular ornamental fish species imported into the U.S. were the live bearer, guppy *Poecilia reticulata*, and the egg layer, neon tetra *Paracheirodon innesi*. These two species accounted for 37% of the total number of fish imported and were valued at approximately half a million dollars.”

Regulations

P. reticulata is regulated at the genus level (*Poecilia*) in Hawaii (HDOA 2019) and New Mexico (NMDGF 2010). 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 Nico et al. (2026):

“Most introductions probably are fish farm or aquarium releases (e.g., Zuckerman and Behnke 1986; Courtenay and Meffe 1989; Howells 1992; Dill and Cordone 1997). Some California introductions were made intentionally for mosquito control (Shapovalov et al. 1981; Dill and Cordone 1997).”

Remarks

This ERSS was previously published in April 2018. Revisions were completed to incorporate new information and conform to updated standards.

From GISD (2026):

“**Common name:** millions (English), guppil (Japanese), miljoonakala (Finnish), guppie (Afrikaans), Mexicano (Portuguese), miljoenvis (Afrikaans), guppy (English), million fish (English), lebistes (Portuguese), lareza tripikaloshe (Albanian), lepistes (Turkish), ikan seribu (Malay), hung dzoek ue (Cantonese), millionenfisch (German), poisson million (French), zivorodka duhov (Czech), Wilder Riesenguppy (German), queue de voile (French), Sardinita (Spanish), rainbow fish (English), sarapintado (Portuguese)”

From Nico et al. (2026):

“Some fish reported from the United States as *P. reticulata* actually may represent other species in the genus. In 1989, M. Rauchenberger (personal communication) examined the *P. reticulata* voucher specimens (UF 91918) taken from Kelly Warm Springs, Wyoming, in 1984 by Courtenay et al. (1987), but she could not confirm that identification and labeled them as *Poecilia* species. In light of the enormous numbers of guppies produced in aquaculture each year and its prevalence in pet stores and the aquarium hobby, it is surprising that so few established populations exist. The guppy is known to require warm water to thrive, which may explain its inability to establish throughout most of the continental U.S. [United States] but other factors, presently unknown, must limit its distribution in suitable locations such as southern Florida.”

Mention of commercial products in this Ecological Risk Screening Summary does not entail endorsement by the U.S. Federal Government.

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From ITIS (2026):

Kingdom Animalia
Subkingdom Bilateria
Infrakingdom Deuterostomia
Phylum Chordata

Subphylum Vertebrata
Infraphylum Gnathostomata
Superclass Actinopterygii
Class Teleostei
Superorder Acanthopterygii
Order Cyprinodontiformes
Suborder Cyprinodontoidae
Family Poeciliidae
Subfamily Poeciliinae
Genus *Poecilia*
Species *Poecilia reticulata* Peters, 1859

According to Fricke et al. (2026), *Poecilia reticulata* Peters 1859 is the current valid name for this species.

The following synonyms of *Poecilia reticulata* from Fricke et al. (2026) were used to search for information for this report: *Lebistes reticulatus* (Peters 1859), *Girardinus guppii* Günther 1866.

Size, Weight, and Age Range

From Froese and Pauly (2026):

“Max length : 5.0 cm SL [standard length] male/unsexed; [Kottelat and Freyhof 2007]; 6.0 cm SL (female); common length : 2.8 cm TL [total length] male/unsexed; [Hugg 1996]”

Environment

From Froese and Pauly (2026):

“Freshwater; brackish; benthopelagic; pH range: 7.0 - 8.0; dH range: 9 - 19; [...]”

“Found in various habitats, ranging from highly turbid water in ponds, canals and ditches at low elevations to pristine mountain streams at high elevations [Kenny 1995]. Occurs in wide variety of habitats with low predation pressure, usually in very small streams and densely vegetated lakes and springs [Kottelat and Freyhof 2007]. Has a wide salinity range but requires fairly warm temperatures (23-24 °C) and quiet vegetated water for survival [Skelton 1993; Allen et al. 2002; Louette 2004].”

From Jordan (2018):

“**Environmental Requirements:** *P. reticulata* can live and breed in pH of 5-9 and salinities ranging from 0 to 45 ppt. However, *P. reticulata* cannot tolerate water temperatures below 15°C, and is only found in temperate regions in artificially warmed water bodies, for example at cooling lakes of power stations. Critical thermal maxima ranging of 39-41°C and death points of 41-43°C were reported by Chung (2004) for Venezuelan guppies.”

From Lyons (2021):

“This species occurs in a broad range of freshwater habitats from small, fragmented headwater streams to deep lowland pools, and exhibits a marked degree of population differentiation in morphology, life-history characteristics, and behavior subject to environmental variables (Fajen and Breden 1992).”

From NatureServe (2026):

“Found in shallow, warm, weedy, marginal habitats (Minckley 1973). In U.S., introduced populations have been found in warm springs and canal systems.”

Climate

From Froese and Pauly (2026):

“Tropical; [...] 14°N - 2°N, 67°W - 52°W”

Distribution Outside the United States

Native

From Fricke et al. (2026):

“Distribution: Northeastern South America: coastal drainages between the Orinoco delta (Venezuela) and the Essequibo River delta (Guyana), islands of Venezuela, Netherlands Antilles, and Trinidad and Tobago.”

Introduced

From Lyons (2021):

“Introduced distribution includes every continent except Antarctica, where it has established in at least 69 countries outside of its native range.”

Africa

From Cairns et al. (2024):

“*Poecilia reticulata* were reported in 41% of African countries [...], although there are limited studies of abundant populations [Lawal et al. 2012; Gomes-Silva et al. 2020; Evans et al. 2022]. *Poecilia reticulata* occurrences are rare in Northern Africa and was [sic] only sampled in Algeria and Morocco in the 1970s [Snoeks and Theeten 2024]. They are considered present in Moroccan freshwaters in the 21st century [Deacon et al. 2011]. Reports from Western Africa and Middle Africa are similarly limited, where *P. reticulata* was introduced to Ghana and the Republic of Congo for mosquito biocontrol, and reported in Cape Verde, and the Democratic Republic of Congo in the 21st Century [Lucek and Lemoine 2012; iNaturalist community 2024; Snoeks and Theeten 2024]; [...] Abundant populations were also sampled in sewers in Lagos, Nigeria [Lawal et al. 2012].”

“In Eastern Africa, *P. reticulata* have been introduced to 11 different countries [...] In the 21st century, *P. reticulata* have been reported in a few locations in Tanzania, Malawi, Rwanda, and the Comoro Islands [Deacon 2011; Gomes-Silva et al. 2020; Robert and Lepareur 2022; Coetzer 2024]; while widespread established populations have been sampled in the Mascarene Islands [Mauritius, Réunion], Kenya, and Uganda [Njagi et al. 2019; Decru et al. 2020; Robert and Lepareur 2022] [...]

From Tavakol et al. (2017):

“Guppies have been recorded [in South Africa] from Kuruman Oog, Lake Otjikoto sinkhole, and several small coastal streams in northern KwaZulu-Natal (personal observation) and now in this study are recorded from the Crocodile River at Komatipoort. It is categorized as a fully established invasive species according to the proposed categorization by Blackburn et al. (2011).”

Additionally, Froese and Pauly (2026) report *P. reticulata* as established in the Comoros, Madagascar, Namibia, Reunion, and Zambia. They report *P. reticulata* as probably established in the Seychelles.

Americas

From Lyons (2021):

“Range extent into Suriname, Barbados, Antigua and Barbuda (Fajen and Breden 1992, Mol et al. 2012) may represent naturalized subpopulations (A. Deacon pers. comm. 2020).”

From Ranuzi et al. (2026):

“The distribution pattern of *Poecilia reticulata* (guppy) was characterized by high density mainly in the central-eastern region [Triângulo Mineiro and Alto Paranaíba region, Minas Gerais, Brazil], with notable values in the middle reaches of the Araguari River and significant presence in the lower Claro River and tributaries of the Grande River [...]

From Rosso et al. (2017):

“Ocurrence [sic] of *P. reticulata* in the lower Paraguay River represents the first record of this species in Argentina. Thirteen individuals of *P. reticulata* were collected.”

“Introduced populations in Paraguay are considered to be established (Deacon et al., 2011). However, it was not until recently, that the presence of *P. reticulata* in this country was confirmed by inspection of voucher material deposited in museums (Lucinda, 2017). Most of the localities reported by this author are concentrated in the lower Paraguay River, near the border with Argentina.”

From Aguirre (2020):

“Introduced into Santiago-Cayapas, Atacames, Sua, Mompiche, and Guayas drainages [in Ecuador] (Jimenez-Prado et al., 2015). May occur in other drainages as well.”

From Collado et al. (2025):

“In this study, we report the presence of two invasive species, the poeciliid fish *Poecilia reticulata* and the gastropod *Melanoides tuberculata*, in three isolated springs from the coast of the Atacama Desert in Antofagasta city, northern Chile. Both species were identified through diagnostic morphological features and phylogenetic analysis. This is the first confirmed record of *P. reticulata* in natural ecosystems of Chile.”

Additionally, Froese and Pauly (2026) report *P. reticulata* as established in Colombia, Costa Rica, Cuba, Jamaica, Martinique, Mexico, and Peru. They report *P. reticulata* as introduced with unknown status in Haiti and not established in Canada.

Asia

From Singh and Lakra (2011):

“Four popular species of aquarium pets [including] guppy (*Poecilia reticulata*) [...] were found in the inland waters of Kerala State [India], a biodiversity hot-spot region of the country (Raghavan et al. 2008; Krishnakumar et al. 2009).”

From Türkmen (2019):

“In this study, Guppy, *Poecilia reticulata*, is recorded for the first time from natural inlandwaters [sic] of Turkey. *P. reticulata* [...] is now established in aquifer of Çeşme-Ildır (İzmir).”

From NIES (2026):

“Hot springs in Hokkaido (Onneto Falls: declared eradication in 2019), Fukushima, Nagano, Shizuoka, Okayama, Oita, and Kagoshima Prefs., rivers and canals in Okinawa and Ogasawra [Japan].”

Additionally, Froese and Pauly (2026) report *P. reticulata* as established in East Timor, Hong Kong, Indonesia, Malaysia, Philippines, Saudi Arabia, Singapore, Sri Lanka, Taiwan, Thailand, and the United Arab Emirates. They report *P. reticulata* as introduced within unknown status in Bangladesh and not established in Laos.

Europe

From Dyldin et al. (2020):

“Aquarists often release this species to Russian rivers, although in winter all individuals die, and only in warm water bodies at a thermal power station does naturalization occur, such as at the Krasnodar Thermal Power Plant (Emtyl’ and Ivanenko, 2002)”

From Jamonneau et al. (2025):

“In continental Europe, established populations of *P. reticulata* have been reported from Albania, Czech Republic, Germany, Hungary, Slovakia, Netherlands, Romania, Poland, Slovakia, Spain, UK and Ukraine (Elvira and Almodóvar, 2001; Nowak *et al.*, 2008; Deacon *et al.*, 2011; Nekrasova *et al.*, 2023). Except for a population in southern Spain, *P. reticulata* has failed to establish outside geothermal springs or thermally polluted water bodies due to the relatively low winter temperatures of continental Europe (Elvira and Almodóvar, 2001).”

“An established population of Trinidadian guppies (*Poecilia reticulata*) [...] has been observed in thermal waters in the Parc des Thermes of Juvignac, near Montpellier (Southern France).”

From Froese and Pauly (2026):

“Recorded from central Italy. Established in thermal canals of the Viterbo town area (E. Spada and L. Giuliani, www.repubblica.it) starting from 1996 [Bianco 2014].”

Oceania

Eldredge (2000) reports *P. reticulata* as established in the Cook Islands, Fiji, French Polynesia, New Caledonia, Palau, Papua New Guinea, Samoa, and Vanuatu.

From Froese and Pauly (2026):

“[In New Zealand] Survives only in the thermal waters of the Waikato River.”

“[In Australia] populations are occurring in urban streams throughout coastal Queensland.”

Additionally, Froese and Pauly (2026) report *P. reticulata* as established in Tahiti.

Means of Introduction Outside the United States

From Jordan (2018):

“Initial introductions of *P. reticulata* were conducted as a means of mosquito control in Asia, the Pacific, Africa, and Europe [...] It is likely that *P. reticulata* has been introduced into many countries via accidental or intentional release of aquarium fish into waterways and many introduced populations have become established.”

“Among some management agencies, there is concern that *P. reticulata* held in aquaculture facilities may be relocated by predatory birds. Steps to minimise this form of introduction are encouraged by bodies such as the Queensland Department of Primary Industry, Australia.”

Short Description

From Froese and Pauly (2026):

“Dorsal spines (total): 0; Dorsal soft rays (total): 7 - 8; Anal spines: 0; Anal soft rays: 8 - 10. Body shape (shape guide): fusiform / normal; Cross section: circular.”

“Males are about half the size of females with colorful tail and caudal fin; the anal fin is transformed into a gonopodium for internal fertilization.”

From Jordan (2018):

“*P. reticulata* has clear sexual dimorphism. Males are 25-35 mm ([standard length]) and have conspicuous polymorphic colour patterns consisting of combinations of black, white, red orange, yellow, green, iridescent spots, lines and speckles [...] Females are uniform silver grey, and are larger and deeper bodied than males (40-60 mm [standard length]). Juvenile fish resemble females [...]”

Biology

From Froese and Pauly (2026):

“Feeds on zooplankton, small insects and detritus.”

“Males mature at 2 months and females at 3 months of age [Riehl and Baensch 1991].”

“Males are continuously chasing and mating females. Females can store sperms for later fertilization and may produce young every four weeks. Pregnant females are recognizable by black triangle between anal and pelvic fins. After a gestation period of four to six weeks females give birth to 20-40 live young. No parental care is exercised and parents may even prey on their young.”

From Lyons (2021):

“Age at first reproduction in females ranges from 78-91 days, with females maturing earlier in high-predation environments (Reznick et al. 2006). Reproductive lifespan (age at first maturity to age of senescence) ranges from 462-800 days, depending on predation and environmental parameters (Reznick et al. 2006). Females produce 15-28 broods over the period of their reproductive life, and exhibit interbrood periods from 25-31 days (Reznick et al. 2006).”

From Jordan (2018):

“*P. reticulata* is omnivorous; feeding on algae (approximately 50% of the wild diet), invertebrate larvae and benthic detritus (Dussault and Kramer 1981). Within their natural range they may also

prey on larvae of their own species and of *Rivulus hartii* (Houde, 1997). Experimental captive trials have found that the closely related *Gambusia holbrooki* preys on a wide range of larvae of other fish species from areas into which *P. reticulata* has also been introduced (Howe et al., 1997), suggesting that *P. reticulata* may also prey on these species.”

From Nico et al. (2026):

“This species has been shown through experimentation to be an alternative host to glochidia of the native [within the United States] unionid mussels *Lampsilis cardium* and *Utterbackia imbecillis* (Watters and O'Dee 1998).”

Human Uses

From Nico et al. (2026):

“This species is widely studied as a model species [sic] ecology and evolutionary biology, and has had a long and popular history as an ornamental fish. A wide variety of strains differing in color and fin shape have been developed by aquarists (Axelrod et al. 1985; Sakurai et al. 1993; Wischnath 1993).”

From Jordan (2018):

“[...] *P. reticulata* has considerable economic value as an ornamental aquarium species and is widely cultured in commercial fish hatcheries. A number of highly ornamented aquarium strains have been developed, and are extremely popular in the retail aquarium trade, being carried by up to 95% of pet shops in one region of Canada. Major producers include Singapore, Malaysia and Taiwan.”

“[...] *P. reticulata* is one of the most popular aquarium fishes, and has been in the ornamental fish hobby since the early 1900s. It has high recreational and aesthetic value in captivity, but has little or no social benefit in its feral state and is not suitable for recreational fishing.”

“While initially thought to be a good candidate for mosquito control, *P. reticulata* has had mixed success in controlling mosquito populations (Juliano et al., 1989; Castleberry and Cech, 1990).”

P. reticulata is in trade in the United States (e.g., Dan's Fish 2026). Chapman et al. (1997) documented just under 4 million *P. reticulata* imported into the United States in October 1992 alone, more than double the volume of any other ornamental fish species imported during that time period.

Diseases

***Poecilia reticulata* is reported as susceptible to spring viraemia of carp, a disease listed by the World Organisation for Animal Health (2026).**

From Crane and Eaton (1997):

“With regard to the host range, it is noteworthy that the name spring viraemia of carp is misleading. It is generally accepted, if not proven yet, that most if not all cyprinid species are likely to be affected to a lesser or greater degree. In addition, some non-cyprinid fish species such as [...] the poeciliid guppy, *Lebistes reticulatus* [synonym for *Poecilia reticulata*] (Bachmann and Ahne 1974) [...] are also susceptible to infection and succumb to disease [...]”

From Vincent and Font (2003):

“Two of the most important freshwater helminths present in Hawaiian streams are *Camallanus cotti* Fujita, 1927 and *Bothriocephalus acheilognathi* Yamaguti, 1934 [now valid as *Schyzocotyle acheilognathi*]. This roundworm and tapeworm have been introduced into the Hawaiian Islands indirectly through the purposeful introduction of exotic poeciliids [such as *Poecilia reticulata*] for mosquito control and accidentally through unwanted aquarium releases (Devick 1991; Font and Tate, 1994).”

From Harris and Lyles (1992):

“*Gyrodactylus bullatarudis* Turnbull, 1956, and *Gyrodactylus turnbulli* Harris, 1986, are recorded from guppies (*Poecilia reticulata*) from the northern mountains of Trin.”

From Paperna et al. (2001):

“Systemic iridovirus-like infections have been reported from several exotic ornamental fish [including] in guppy *Poecilia reticulata* [...] in the USA [...] (Hedrick & McDowell 1995).”

From Prasadan and Devi (2007):

“Yellow grub disease was noticed for the first time in the ornamental freshwater guppy, *Poecilia reticulata* (Poeciliidae) collected from various freshwater bodies of Wayanad, Kerala. Out of 412 fishes examined, 67 (16.26%), were found infected. Morphological studies on the metacercariae show that the species is *Clinostomum complanatum*.”

Additionally, Poelen et al. (2014) report *Poecilia reticulata* as a host to the following parasites and pathogens: *Amplichaecum robertsi*, *Anguillicola crassus*, Aquareovirus A, *Argulus foliaceus*, *Argulus japonicus*, *Ascocotyle felippei*, *Austrodiplostomum compactum*, *Centrocestus formosanus*, *Chilodonella* sp., *Contracaecum robustum*, *Contracaecum rudolphii*, *Cryptosporidium molnari*, *Dactylogyrus extensus*, *Diplostomum spathaceum*, *Eustrongylides ignotus*, fancy-tailed guppy virus, *Flavobacterium columnare*, Frog virus 3, *Glossocercus aurita*, *Gnathosoma procyonis*, *Gyrodactylus poeciliae*, *Haplobothrium globuliforme*, *Ichthyobodo* sp., *Ichthyophthirius multifiliis*, *Lernaea cyprinacea*, *Megalocytivirus pagrus I*, *Mycolicibacterium fortuitum*, *Myxobolus* sp., *Neogogatea pandionis*, *Neogogatea* sp., *Paracapillaria philippinensis*, *Parspina bagre*, *Posthodiplostomum* spp., *Procamallanus rebecca*, *Ranavirus micropterus I* (largemouth bass virus), Redspotted grouper nervous necrosis virus, *Saccocoelioides* sp., Santee-

Cooper ranavirus, *Southwellina hispida*, *Syncuaria squamata*, *Tetrahymena corlissi*, *Trichodina acuta*, *Trichodina heterodentata*, *Urocleidoides reticulatus*, and *Valipora mutabilis*.

Threat to Humans

From Froese and Pauly (2026):

“Threat to humans: Potential pest”

3 Impacts of Introductions

From Nico et al. (2026):

“The guppy is considered a threat to native cyprinids and killifishes (Sigler and Sigler 1987). For instance, it has adversely affected the White River springfish, *Crenichthys baileyi*, in a Nevada spring (Deacon et al. 1964). Two subspecies of this springfish are now listed as federally endangered (U.S. Fish and Wildlife Service 1993), and three others are proposed for listing (U.S. Fish and Wildlife Service 1994). The guppy has also been implicated in the decline of the Utah sucker, *Catostomus ardens*, in a thermal spring in Wyoming (Courtenay et al. 1987). [...] This species also presents a threat because it is a known carrier of certain exotic trematode parasites (Leberg and Vrijenhoek 1994). Guppies, and other introduced poeciliids, have been implicated in the decline of native damselflies on Oahu, Hawaii. The distributions of the damselflies and introduced fishes were often found to be mutually exclusive, probably resulting from predation by the fish on the insects (Englund 1999).”

From Brock and Kam (1997):

“[...] *Halocaridina rubra* [native brackish water shrimp] was seen in pond no. 19 (a sinkhole near Kaloko Fishpond [in the Kaloko-Honokohau National Historic Park, North Kona, Hawai‘i]) on the first visit (March 1994) but by the second visit in August 1994, guppies (*Poecilia reticulata*) had colonized this pond and the shrimp absent [sic]. The anchialine shrimp/amphipod complex has continued to be absent up to the present time (June 1997).”

“The ecological shifts that may occur in the benthic community of an anchialine pool when the keystone herbivorous *Halocaridina rubra* are driven from the lighted portions of the pool by alien predatory fish were readily apparent in pond nos. 69-74. The preliminary surveys of this pool complex noted benthic communities that were dominated by a mix of the cyano-bacterial mat (the orange *Schizothrix* mat as well as *Rhizoclonium* sp.) and the vascular pondweed *Ruppia maritima* all of which are common elements in undisturbed anchialine pools. Following the colonization of these pools by guppies, the pools became filled with the green alga, *Cladophora* sp., which choked out most of the *Ruppia* and overtopped the *Schizothrix* causing its demise [...]”

From Valero et al. (2008):

“*Skiffia bilineata* is one of several endangered viviparous goodeids from Central México, whose remaining habitats are increasingly shared with invasive guppies. Experiments in which guppy

sex ratios were manipulated to vary the proportion of heterospecific to conspecific females showed that male guppies [*Poecilia reticulata*] courted and attempted forced copulations with *S. bilineata* females even when females of their own species were in excess. This behaviour places an additional, and previously unrecognized, burden on a group of endemic Mexican fishes already in risk of extinction.”

Poecilia reticulata is regulated in Hawaii (HDOA 2019) and New Mexico (NMDGF 2010) in the United States. See section 1.

4 History of Invasiveness

The History of Invasiveness for *Poecilia reticulata* is classified as High. There are numerous reports of established populations of this species outside of its native range. Reliable documentation of negative impacts of introductions was found. These impacts have included declines of native fishes in the western United States, reproductive competition with a native fish in Mexico, and disappearance of a keystone species of shrimp from brackish water pools in Hawai‘i resulting in larger ecological shifts.

5 Global Distribution

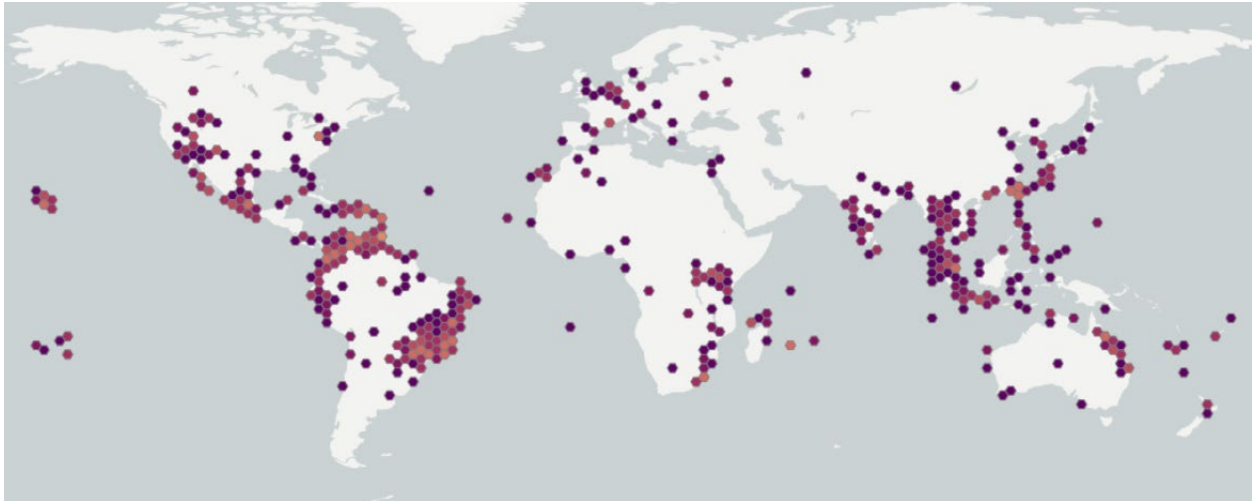


Figure 1. Reported global distribution of *Poecilia reticulata*. Map from GBIF Secretariat (2023). Observations are reported from Algeria, Anguilla, Antigua and Barbuda, Argentina, Australia, Austria, Bangladesh, Barbados, Belgium, Bolivia, Brazil, British Virgin Islands, Cambodia, Canada, Canary Islands, Cape Verde, Chile, China, Colombia, Comoro Islands, Cook Islands, Costa Rica, Cuba, Democratic Republic of the Congo, Denmark, Dominica, Dominican Republic, East Timor, Ecuador, Fiji, France, French Guiana, Gabon, Germany, Greece, Guadeloupe, Guyana, Haiti, India, Indonesia, Israel, Italy, Ivory Coast, Jamaica, Japan, Kenya, Laos, Madagascar, Malawi, Malaysia, Martinique, Mauritius, Mexico, Morocco, Mozambique, Myanmar, Netherlands, New Caledonia, New Zealand, Nigeria, Palau, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Portugal, Republic of the Congo, Réunion, Russia, Rwanda, Saint Barthélemy, Saint Martin, Saudi Arabia, Senegal, Serbia, Seychelles, Singapore, Slovakia, South Africa, South Korea, Spain, Sri Lanka, Suriname, Tahiti, Taiwan, Tanzania, Thailand, Trinidad and Tobago, Uganda, Ukraine, United Kingdom, United States (including Hawaii, Puerto Rico, and the U.S. Virgin Islands), Vanuatu, Venezuela, Vietnam, and Zimbabwe.

Points in Anguilla, Argentina, Australia outside of Queensland, Bangladesh, Bolivia, British Virgin Islands, Cambodia, Canada, Canary Islands, Chile, mainland China, Dominica, Dominican Republic, Europe, French Guiana, Gabon, Haiti, India outside of Kerala, Israel, Ivory Coast, major islands of Japan, Laos, Mozambique, Myanmar, New Zealand, Panama, Russia, Saint Barthélemy, Saint Martin, Senegal, Seychelles, South Korea, Vietnam, and Zimbabwe were not included in the climate matching analysis because these points do not represent known established populations of *P. reticulata* in natural environmental conditions (i.e., many of these observations are at thermally influenced waterways). Furthermore, most points within the United States were not included in the climate matching analysis as these did not represent established populations (figure 2).

No georeferenced occurrences were available for established populations of *Poecilia reticulata* in French Polynesia, Ghana, Namibia, Samoa, Turkey, United Arab Emirates, or Zambia.

6 Distribution Within the United States

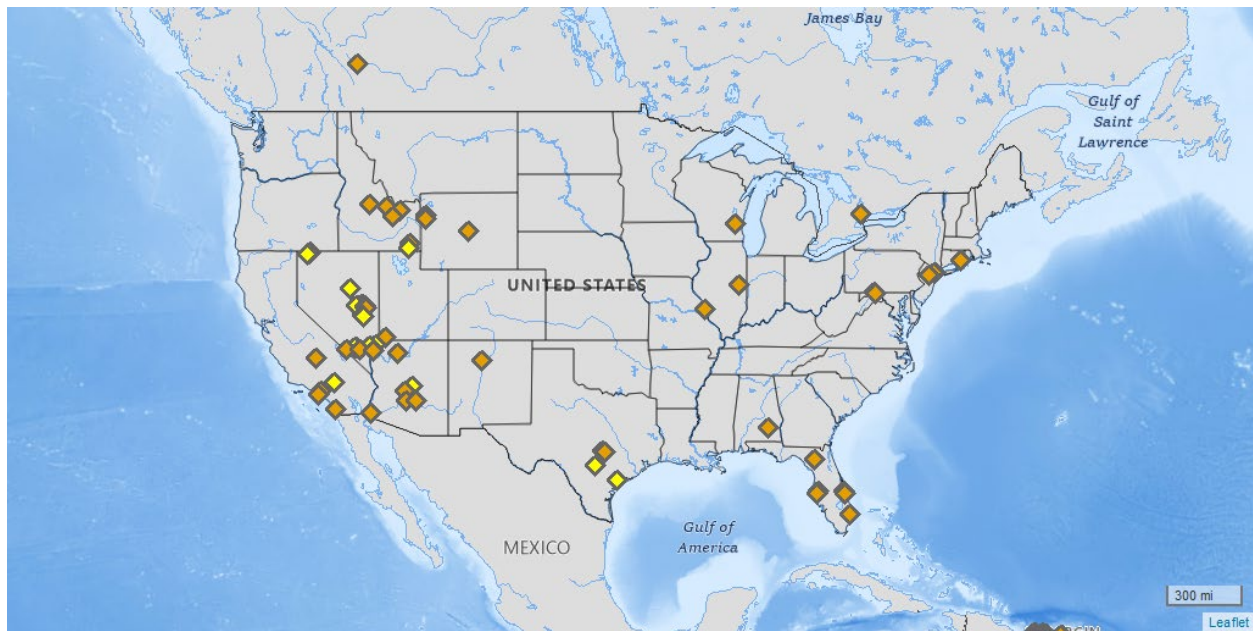


Figure 2. Reported distribution of *Poecilia reticulata* in the contiguous United States. Map from Nico et al. (2026). The orange diamonds are nonnative observations that do not represent established populations; yellow diamonds represent established nonnative populations. Only observations in Texas were included in the climate matching analysis. In all other locations, *P. reticulata* is established in waters that are naturally or artificially warmed above ambient temperatures, so climate matching based on the weather stations near those locations would not accurately reflect the conditions in which *P. reticulata* is established.



Figure 3. Reported distribution of *Poecilia reticulata* in Hawai'i. Map from Nico et al. (2026). The orange diamonds are nonnative observations that do not represent established populations; yellow diamonds represent established nonnative populations. Only established populations were used to select source points for the climate matching analysis.

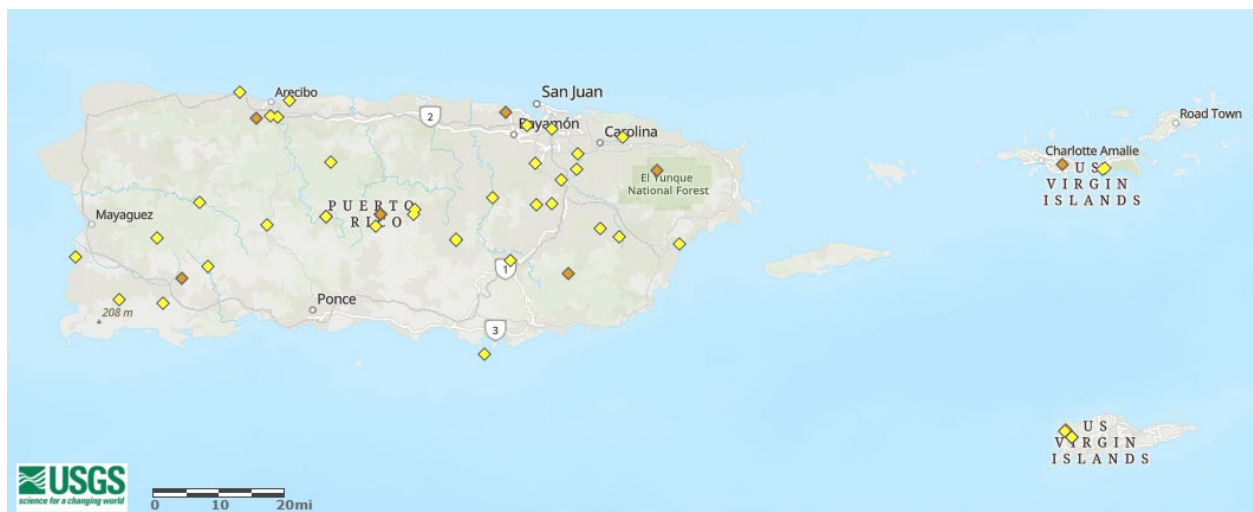


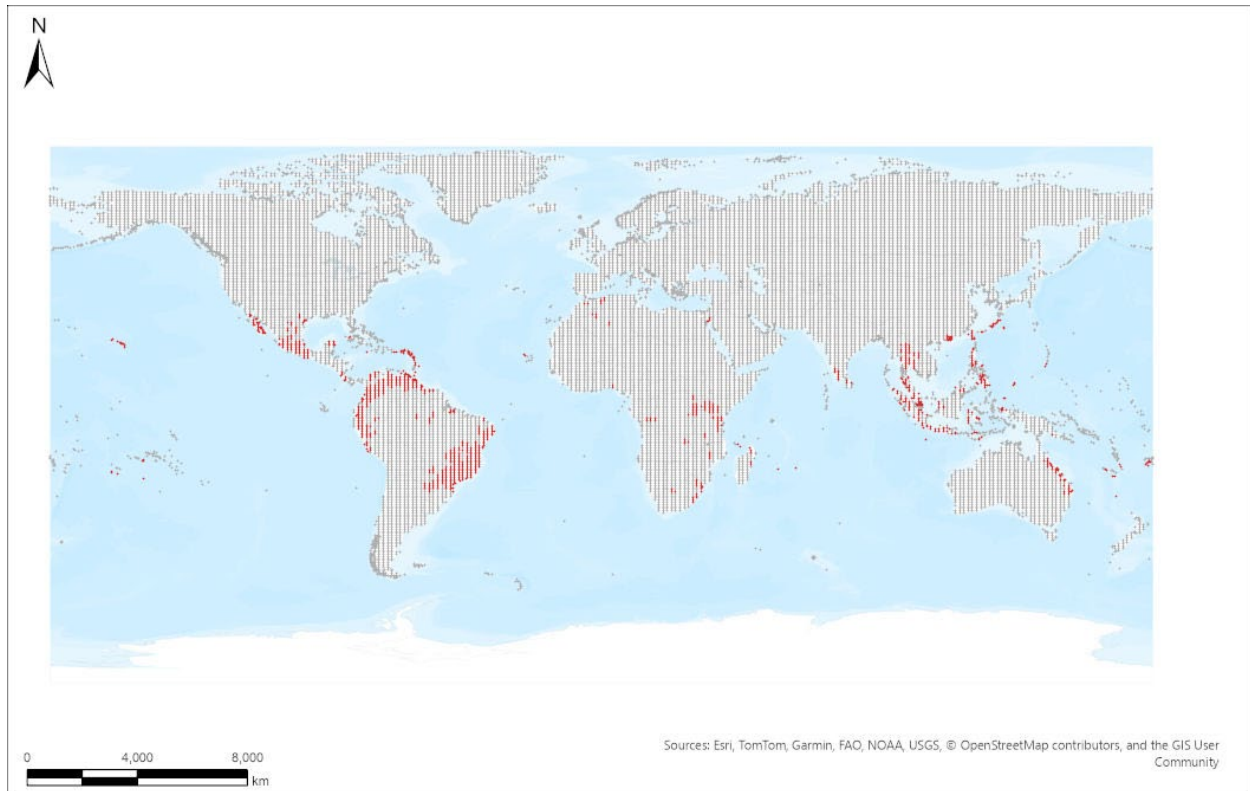
Figure 4. Reported distribution of *Poecilia reticulata* in Puerto Rico and the U.S. Virgin Islands. Map from Nico et al. (2026). The orange diamonds are nonnative observations that do not represent established populations; yellow diamonds represent established nonnative populations. Only established populations were used to select source points for the climate matching analysis.

7 Climate Matching

Summary of Climate Matching Analysis

The climate match for *Poecilia reticulata* to the contiguous United States was high across the far southern United States including the Gulf Coast, Southern Atlantic Coast, and Southwest regions. There were additional scattered areas of high match in the Great Basin and California. The highest climate match was found in central Texas, where *P. reticulata* is already established. Low climate matches were found in the Northeast, Northern Plains, along the eastern margin of the Rocky Mountains, along the Sierra Nevada and Cascade ranges, and along the Pacific coast from San Francisco Bay to the Olympic Peninsula. Medium matches covered the remaining areas, including much of the central United States. The overall Climate 6 score (Sanders et al. 2023; 16 climate variables; Euclidean distance) for the contiguous United States was 0.509, 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). The climate matching results presented here may underestimate the areas where *P. reticulata* may become established. *P. reticulata* has a history of establishing a population when introduced to thermally regulated waters. Specific locations with suitable thermally regulated waters may exist in areas with low climate match.

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



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Figure 5. RAMP (Sanders et al. 2023) source map showing weather stations throughout the world selected as source locations (red; Algeria, Anguilla, Antigua and Barbuda, Argentina, Australia, Barbados, Brazil, British Virgin Islands, Cape Verde, China, Christmas Island, Colombia, Comoros, Cook Islands, Costa Rica, Cuba, Democratic Republic of the Congo, Dominica, Ecuador, Fiji, Guadeloupe, Guam, Guyana, Hong Kong, India, Indonesia, Jamaica, Japan, Kenya, Lao People's Democratic Republic, Madagascar, Malawi, Malaysia, Martinique, Mauritius, Mayotte, Mexico, Montserrat, Morocco, Mozambique, Myanmar, New Caledonia, Nicaragua, Norfolk Island, Palau, Papua New Guinea, Paraguay, Peru, Philippines, Puerto Rico, Republic of the Congo, Rwanda, Saint Kitts and Nevis, Saint Lucia, Saudi Arabia, Singapore, South Africa, Sri Lanka, Suriname, Taiwan, Tanzania, Thailand, Trinidad and Tobago, Uganda, United States Virgin Islands, United States, Vanuatu, Venezuela, and Zambia) and non-source locations (gray) for *Poecilia reticulata* 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.

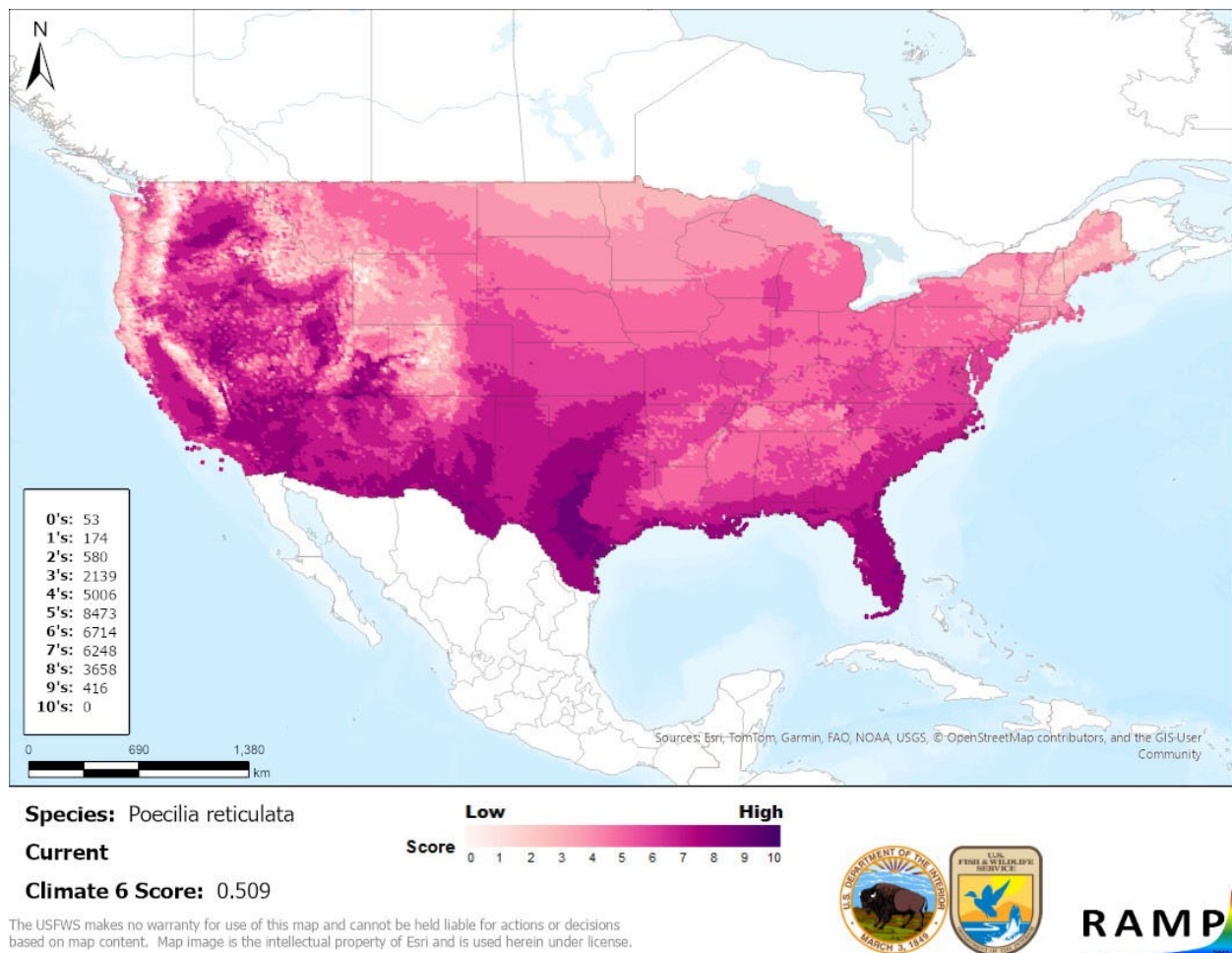


Figure 6. Map of RAMP (Sanders et al. 2023) climate matches for *Poecilia reticulata* in the contiguous United States based on source locations reported by GBIF Secretariat (2023). Counts of climate match scores are tabulated on the left. 0/Pale Pink=Lowest match, 10/Dark Purple = Highest match.

8 Certainty of Assessment

The Certainty of Assessment for *Poecilia reticulata* is classified as High. This classification is based on the presence of reasonably complete information on species distribution and information on the nature of impacts. Multiple scientific studies have documented negative impacts from introductions of this species outside of its native range. Some populations are established in thermally influenced waters like hot springs and were therefore excluded from the climate matching analysis, but this is not thought to alter the conclusion that there is establishment concern for the contiguous United States.

9 Risk Assessment

Summary of Risk to the Contiguous United States

Poecilia reticulata is a freshwater to brackish water fish that is native to coastal drainages of northeastern South America. This omnivorous species can be found in a wide variety of habitats from mountain springs to turbid lowland ponds, as well as artificial environments such as thermally influenced waterways. In addition to its high adaptability, *P. reticulata* is a livebearer with rapid sexual maturation and reproductive cycles. While it was initially stocked as a method of mosquito control around the world, *P. reticulata* continued to gain popularity as an ornamental fish within the aquarium trade and as a model species for genetics research. This global popularity has led to further introductions and established populations outside of its native range. Multiple studies have documented declines in a variety of native species following *P. reticulata* introductions. *P. reticulata* is regulated in at least two U.S. States. The History of Invasiveness for *Poecilia reticulata* is classified as High due to evidence of established populations outside of its native range and reliable documentation of negative impacts from introductions. The climate matching analysis for the contiguous United States indicates establishment concern for this species, with high climate matches found in several areas of the southern and western contiguous United States. The Certainty of Assessment for this ERSS is classified as High due to the presence of reasonably complete information on species distribution and impacts. The Overall Risk Assessment Category for *Poecilia reticulata* 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: May establish populations in hot springs and other thermally influenced waterways in areas outside its usual climatic range.**
- **Overall Risk Assessment Category: High**

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Note: The following references were accessed for this ERSS. References cited within quoted text but not accessed are included below in section 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 *Poecilia reticulata* was projected to occur in the Great Basin, Gulf Coast, Southern Atlantic Coast, Southern Florida, and Southwest regions of the contiguous United States. Some areas of high match, with variable extent, were projected as well for the southern Great Lakes region under all scenarios except SSP3, 2055. The Climate 6 scores for the individual future scenario models (figure A2) ranged from a low of 0.566 (model: MPI-ESM1-2-HR, SSP5, 2085) to a high of 0.725 (model: MRI-ESM2-0, SSP5, 2085). 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 (0.509, figure 6) falls below 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 Appalachian Range, Colorado Plateau, Great Basin, Great Lakes, Northeast, Northern Pacific Coast, Northern Plains, and Western Mountains saw a moderate increase in the climate match relative to current conditions. The geographic extent of these areas of moderate increase was much greater under scenario SSP5, 2085, than under any other scenario. No large increases were observed regardless of time step and climate scenarios. Under one or more time step and climate scenarios, areas within California, the Gulf Coast, Southeast, Southern Atlantic Coast, Southern Florida, Southern Plains, and Southwest saw a moderate decrease in the climate match relative to current conditions. No large decreases were observed regardless of time step and climate scenarios. Additional very small areas of large or moderate change may be visible on the maps (figure A3).

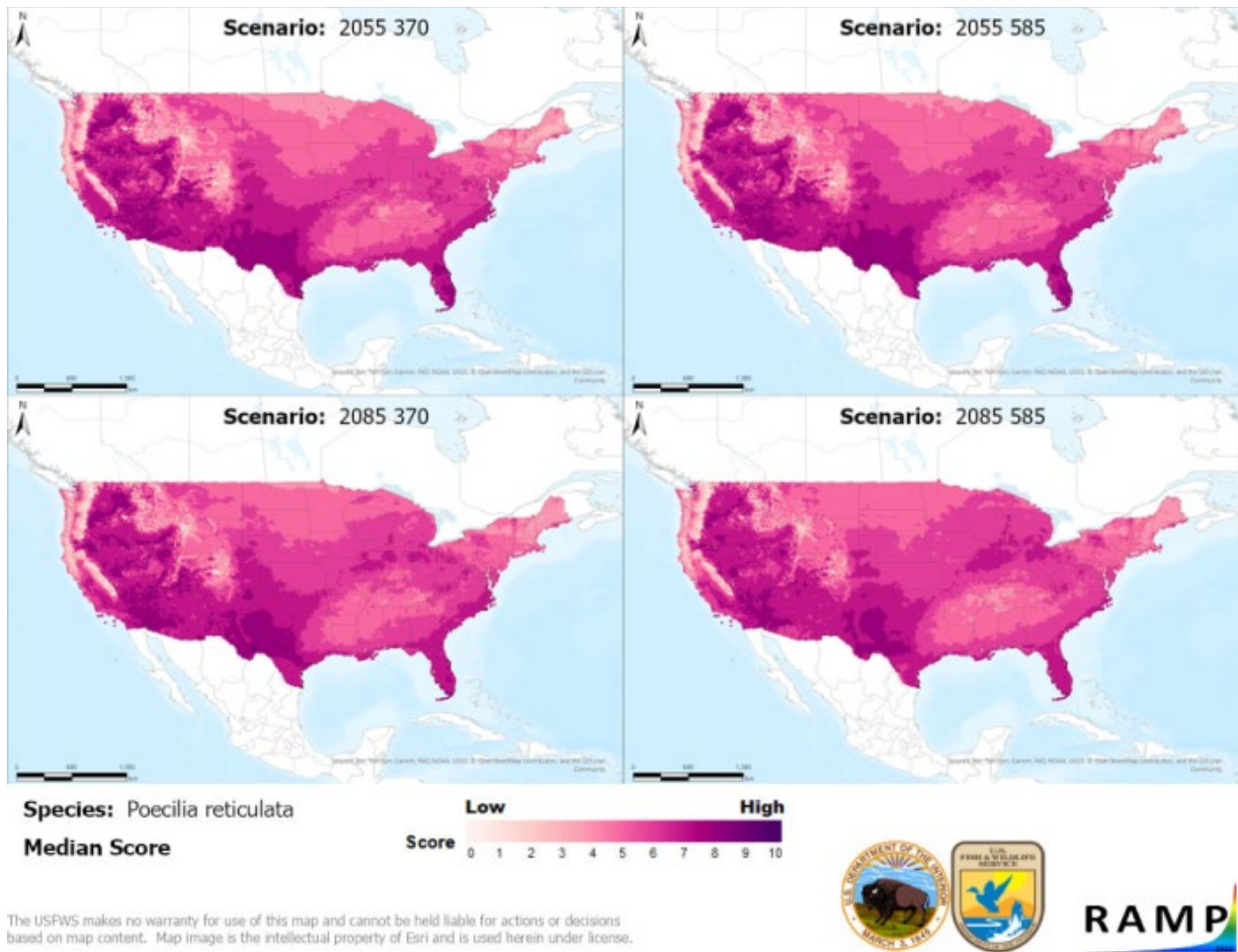


Figure A1. Maps of median RAMP (Sanders et al. 2023) climate matches projected under potential future climate conditions using five global climate models for *Poecilia reticulata* in the contiguous United States. Climate matching is based on source locations reported by GBIF Secretariat (2023) and GBIF-US (2026). 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.

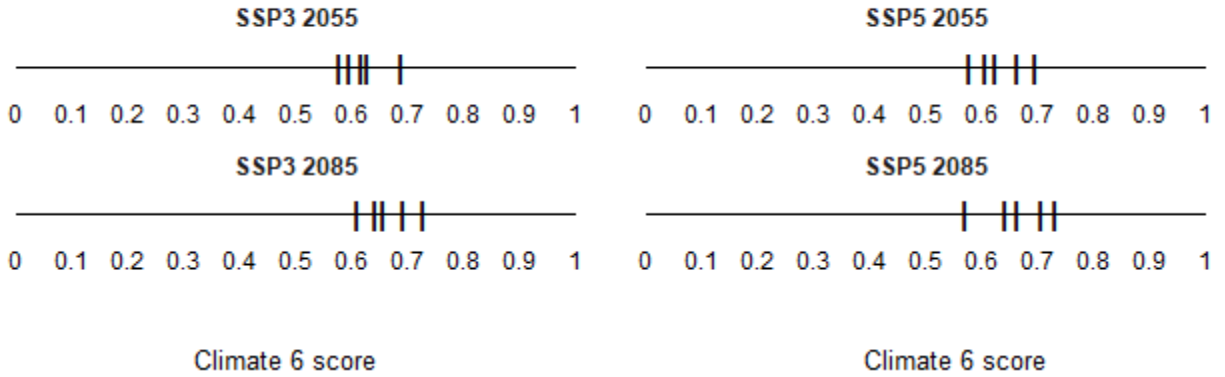


Figure A2. Comparison of projected future Climate 6 scores for *Poecilia reticulata* in the contiguous United States for each of five global climate models under four combinations of Shared Socioeconomic Pathway (SSP) and time step. SSPs used (from left to right): SSP3, SSP5 (Karger et al. 2017, 2018;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

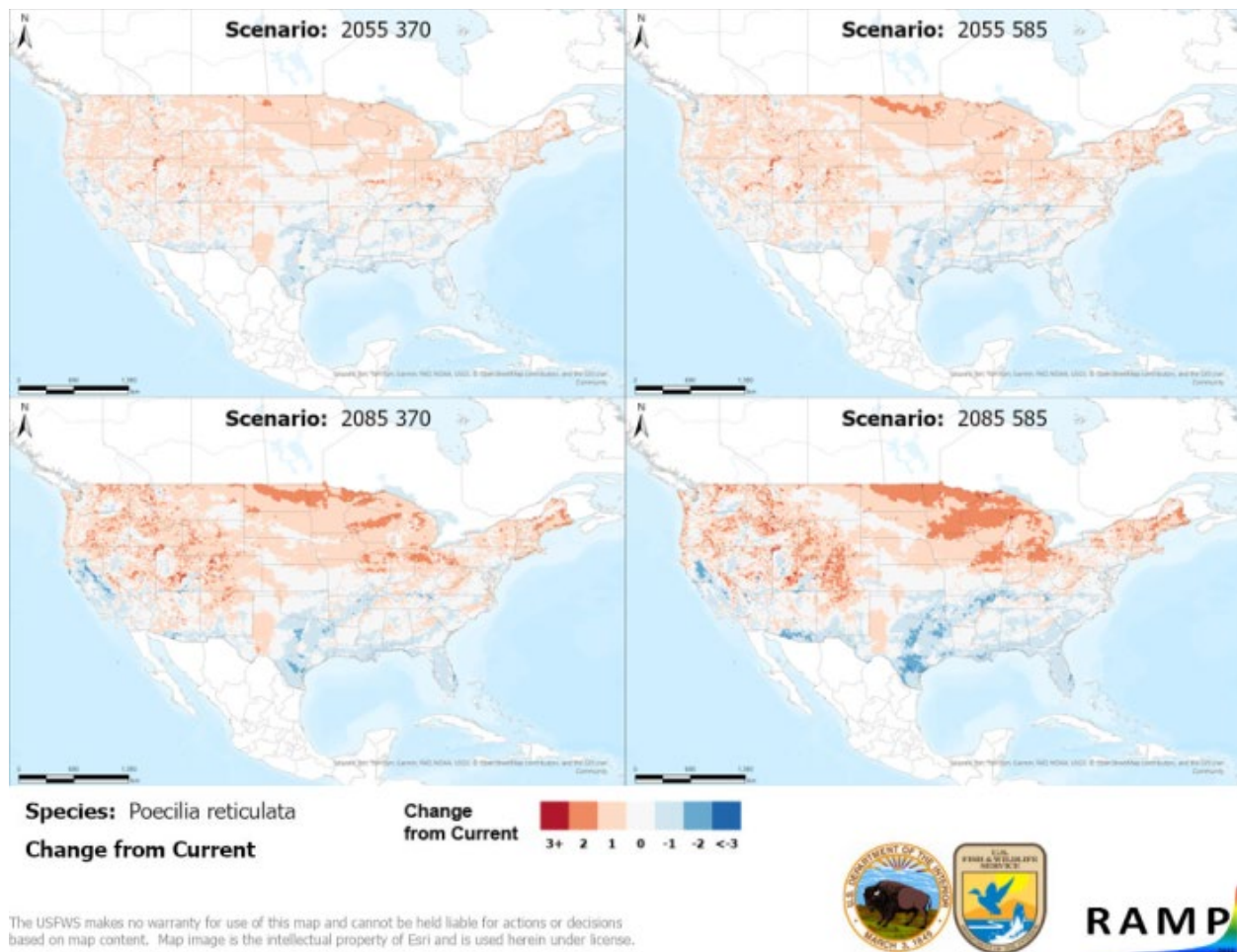


Figure A3. RAMP (Sanders et al. 2023) maps of the contiguous United States showing the difference between the current climate match target point score (figure 6) and the median target point score for future climate scenarios (figure A1) for *Poecilia reticulata* based on source locations reported by GBIF Secretariat (2023) and GBIF-US (2026). 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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