Northern Clearwater Crayfish (*Faxonius propinquus*)

Ecological Risk Screening Summary

U.S. Fish and Wildlife Service, March 2024
Revised, July 2024
Web Version, 9/26/2025

Organism Type: Crustacean
Overall Risk Assessment Category: High

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1 Native Range and Status in the United States

Native Range

From Adams et al. (2010):

"In Canada it primarily occurs in Ontario and Quebec (Taylor et al. 2005). In the former it occurs from Moose River drainage in the north to Lake Huron in the South (Taylor et al. 2005). For the latter it is uncertain where its range lies, however there have been collections of this species in the St Lawrence River and Ottawa River (Taylor et al. 2005). […] In the United States it is found in: New York, Vermont, Massachusetts, Pennsylvania, Ohio, Iowa, Illinois, Indiana, Michigan, Wisconsin, and Minnesota (Taylor et al. 2005)."

From Procopio et al. (2024a):

"**Native Range:** *Faxonius propinquus* is a wide-ranging species (Fitzpatrick 1967), which is native to all the Great Lakes and their drainages, as well as other nearby drainages such as upper Hudson River. It can be found in western Vermont, and its native range extends west to southern Minnesota. The south-western margin of the range includes the Wabash River drainage in Indiana and extends through most of Illinois into north-eastern Iowa (Crocker and Barr 1968; Page 1985; Peters et al. 2014)."

From Morrill and Keller (2023):

"*Faxonious propinquus* is considered native to the Susquehanna River watershed [New York, Pennsylvania]."

From Smith et al. (2019):

"Eight crayfish species are considered native in Michigan. Three are primarily found in permanent open water habitats such as streams and lakes (*Cambarus robustus, Faxonius propinquus,* and *Faxonius virilis*)."

Status in the United States

From Procopio et al. (2024a):

"**Native Range:** *Faxonius propinquus* is a wide-ranging species (Fitzpatrick 1967), which is native to all the Great Lakes and their drainages, as well as other nearby drainages such as upper Hudson River. It can be found in western Vermont, and its native range extends west to southern Minnesota. The south-western margin of the range includes the Wabash River drainage in Indiana and extends through most of Illinois into north-eastern Iowa (Crocker and Barr 1968; Page 1985; Peters et al. 2014)."

"**Status:** Though native to the eastern portion of Lake Superior, *F. propinquus* has expanded its range to the western portion of the lake (Peters et al. 2014). *Faxonius propinquus* is abundant in lakes of northern Wisconsin (Magnuson et al. 1975; Hobbs 1989)."

From Morrill and Keller (2023):

"The current distribution of *F. propinquus* appears restricted to the Upper Lehigh River [Pennsylvania]. The persistence of *F. propinquus* at this site indicates this species has become established in the Upper Lehigh River. This is further supported by the presence of reproductive males and different size classes present […]."

Additionally, USGS (2025) reports nonnative introductions of *Faxonius propinquus* resulting in an established population in Colorado, Michigan, and New York; and introduction records with unknown population status in Illinois.

No records of *Faxonius propinquus* in live trade in the United States were found.

Regulations

Faxonius propinquus is regulated at the family level (Cambaridae) in Arizona (Arizona Game and Fish Commission 2022), California (CDFW 2021), Georgia (State of Georgia 2023), Nevada (Nevada Board of Wildlife Commissioners 2022), New Mexico (NMDGF 2023), Oregon (ODFW 2022), Utah (Utah DWR 2023), and Washington (WDFW 2022). Please refer back to state agency regulatory documents for details on the regulations, including restrictions on activities involving this species. While effort was made to find all applicable regulations, this list may not be comprehensive. Notably, it does not include regulations that do not explicitly name this species or its genus or family, for example, when omitted from a list of authorized species with blanket regulation for all unnamed species.

Means of Introductions within the United States

From Procopio et al. (2024a):

"This species was likely introduced through bait releases by anglers (Capelli and Munjal 1982)."

Remarks

This ERSS was previously published in June 2015 under the name *Orconectes propinquus*. Revisions were completed to incorporate new information and conform to updated standards.

From Procopio et al. (2024a):

"This species underwent a reclassification in 2017, changing the genus of non-cave dwelling *Orconectes* to *Faxonius* (Crandall and De Grave 2017)."

"Range expansion of the nonnative Rusty Crayfish (*F. rusticus)* threatens local populations of *F. propinquus* through hybridization and displacement (Berrill 1985; Perry et al. 2002)."

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From ITIS (2024):

Kingdom Animalia
Subkingdom Bilateria
Infrakingdom Protostomia
Phylum Anthropoda
Subphylum Crustacea
Class Malacostraca
Subclass Eumalacostraca
Superorder Eucarida
Order Decapoda
Suborder Pleocyemata

Infraorder Astacidea
Superfamily Astacoidea
Family Cambaridae
Genus *Faxonius* Ortmann, 1905
Species *Faxonius propinquus* (Girard, 1852)

According to DecaNet (2024), *Faxonius propinquus* is the current valid name for this species.

The following synonym of *Faxonius propinquus* was used to search for information for this report: *Orconectes propinquus***.**

Size, Weight, and Age Range

From Procopio et al. (2024a):

"**Size:** On average, Northern Clearwater Crayfish reach a carapace length (CL) of 25–35 millimeters (mm). Though rare, individuals measuring up to 40 mm CL have been collected (Van Deventer 1937; Momot et al. 1978)."

"Although the average life expectancy of *F. propinquus* is about 2 years of age (Van Deventer 1932; Crocker and Barr 1968; Corey 1988), in rare instances individuals have been found to live up to 4 years (Corey 1988)."

Environment

From NatureServe (2024):

"Habitat Type: Freshwater"

"Generally inhabits the rapid parts of streams with rock/gravel substrate; prefers cool, unpolluted water. In Indiana, it is positively associated with streams with medium flow and large gravel-cobble substrates, lack of fine sediment and macrophyte growth, in wooded riparian areas (Burskey and Simon, 2010)."

Climate

No information was found on climate used by *Faxonius propinquus*.

Distribution Outside the United States

Native

A portion of the species' native range is within the United States; see section 1 for a full description.

From Adams et al. (2010):

"In Canada it primarily occurs in Ontario and Quebec (Taylor et al. 2005)."

Introduced
From Adams et al. (2010):

"Taylor et al. (2005) noted that it has been introduced in northwestern Ontario."

Means of Introduction Outside the United States

No records were found on means of introduction of *Faxonius propinquus* in the wild outside the United States.

Short Description

From Procopio et al. (2024a):

"**Identification:** *Faxonius propinquus* are a relatively small crayfish that are typically brownish-green with a dark saddle spanning the dorsal surface of its abdomen. The tips of their claws (chelae) are orange or red with black subterminal rings (Guarino et al. 2012; Taylor et al. 2015). Descriptions and illustrations of the defining morphological features of *F. propinquus* are given by Taylor et al. (2015). These features include an excavated rostrum that is nearly straight or slightly concave with margins that terminate to strong spines. A strong median carina is present, and chelae are large with moderately long fingers. Two rows of rounded tubercles are found along mesial margin of palm region. Form 1 (breeding) males have gonopods with two short straight elements that are in line with main shaft and have a nearly straight dorsal edge."

Biology

From Procopio et al. (2024a):

"*Faxonius propinquus* do not construct burrows (Van Deventer 1937; Bovbjerg 1952; Berrill and Chenoweth 1982). They are confined to permanent water bodies where they occupy benthic environments throughout the year (Van Deventer 1937; Bovbjerg 1952). In an experiment examining their tolerance to desiccation, Bovbjerg (1952) found that no *F. propinquus* burrowed, even in soft substrates, when water levels subsided. Their inability to burrow led to high rates of mortality due to desiccation. This suggests that *F. propinquus'* absence in temporary bodies of water can be attributed to its inability to survive dry periods (Bovbjerg 1952)."

"[…] *F. propinquus* […] has fall and spring breeding season [sic] that is followed by a period where males revert to their second form (the non-reproductive stage) (Ortmann 1906; Van Deventer 1932). The time and length of the *F. propinquus* mating season varies greatly with latitude. *Faxonius propinquus* have been observed copulating from July through November, and in the spring as late March (Ortmann 1906; Van Deventer 1937; Crocker 1957; Fielder 1972). Populations in the more northern latitudes tend to mate in the fall, while those that reside further south may mate in both the fall and early spring (Van Deventer 1937; Fielder 1972)."

"Females lay their eggs during the spring as temperatures increase, and in most populations, egg-bearing females can be found during the months of April and May (Van Deventer 1932; Crocker and Barr 1968; Fielder 1972). The eggs hatch between May and July, and the young remain attached to the mother's abdomen for about two weeks (Crocker and Barr 1968). At their first

appearance, the free-swimming young measure roughly 3.9-6 mm CL (~ 8-12 mm in total length) (Van Deventer 1932; Crocker and Barr 1968; Fielder 1972). Juveniles grow about 1-2 mm CL each molt, and by the end of their first summer they reach sexual maturity at approximately 16-20 mm CL (Van Deventer 1937; Crocker and Barr 1968; Fielder, 1972; Momot et al. 1978). Most individuals will mate during their first fall, producing a brood the following spring. Though many survive to produce a second brood the next year, the majority of *F. propinquus* who mate in their first year of life die as yearlings (Crocker and Barr 1968)."

Human Uses

From Procopio et al. (2024b):

"*F. propinquus* is a commonly used species for fish bait (Cappelli and Munjal, 1982). Their presence has also been found to decrease the density of a nuisance macrophyte (*Cladophora glomerata*) [Schanoist, 2016]. […] They are not important for medicine or research, and they pose little recreational value."

Diseases

All species of North American freshwater crayfish, including *F. propinquus*, have been documented as susceptible hosts to infection with *Aphanomyces astaci,* the causative agent of crayfish plague. Crayfish plague is a disease listed by the World Organisation for Animal Health (2024).

According to Poelen et al. (2014), *F. propinquus* is also a host to the pathogenic water mold *Saprolegnia australis*.

Threat to Humans

From Procopio et al. (2024b):

"*F. propinquus* are not reported to pose a threat to human health. They do not cause damage to infrastructure. *F. propinquus* does not negatively impact water quality. Northern Clearwater Crayfish prey on commercially important native fish eggs, but their predation has not been reported to damage any commercial fisheries. They have not been reported to have any effect on recreational activities, tourism, or the perceived aesthetic of the habitats they inhabit."

3 Impacts of Introductions

From Rosenthal et al. (2006):

"This is the first study to suggest that northern crayfish [*Faxonius propinquus* as *Orconectes propinquus*], in addition to rusty crayfish, can cause [benthic] community changes at the whole-lake scale. This is not particularly surprising, given the high abundance that northern crayfish achieve. However, other lakes in which this might have been observed have subsequently been invaded by rusty crayfish (Olsen et al. 1991), possibly masking the effects of northern crayfish."

From Lodge et al. (1986):

"*Orconectes propinquus* is now common in northern Wisconsin, apparently having replaced *O. virilis* in many lakes."

"Whether *O. virilis* or *O. propinquus* significantly altered the communities they invaded is not known."

The following information includes implied impacts from *Faxonius propinquus* introductions or includes this species in a group of crayfishes that were evaluated but individual species contributions could not be determined.

From Procopio et al. (2024a):

"Magnuson et al. (1975) presented data indicating that introduced crayfishes (*F. propinquus*, *F. rusticus, F. virilis*) reduced the abundance of macroinvertebrates that serve as important fish forage. Additionally, the crayfish provided only a marginal food source to game fishes, and they threatened to eliminate native crayfish species (Magnuson et al.1975). "

From Hobbs et al. (1989):

"McKnight (unpubl.) implied that *O. propinquus* was a significant predator of fish eggs (*Salvelinus namaycush* (Waldbaum, 1792) and *Coregonus clupeaformis* (Mitchill, 1818)) in Trout Lake in Vilas County and Magnuson et al. (1975), Horns & Magnuson (1981), and McBride (1983) showed that in some situations crayfishes (*O. propinquus, O. rusticus, O. virilis*) prey significantly on trout eggs."

Faxonius propinquus is regulated in Arizona (Arizona Game and Fish Commission 2022), California (CDFW 2021), Georgia (State of Georgia 2023), Nevada (Nevada Board of Wildlife Commissioners 2022), New Mexico (NMDGF 2023), Oregon (ODFW 2022), Utah (Utah DWR 2023), and Washington (WDFW 2022). See section 1.

4 History of Invasiveness

The History of Invasiveness is classified as High. *Faxonius propinquus* has been reported as introduced and established outside of its native range. Established, nonnative populations are found in Colorado, New York, Pennsylvania, Michigan, and Wisconsin in the United States and in northwestern Ontario, Canada. Negative impacts have included changes to benthic communities and replacement of native crayfish. Possible impacts also include predation on fish eggs.

5 Global Distribution

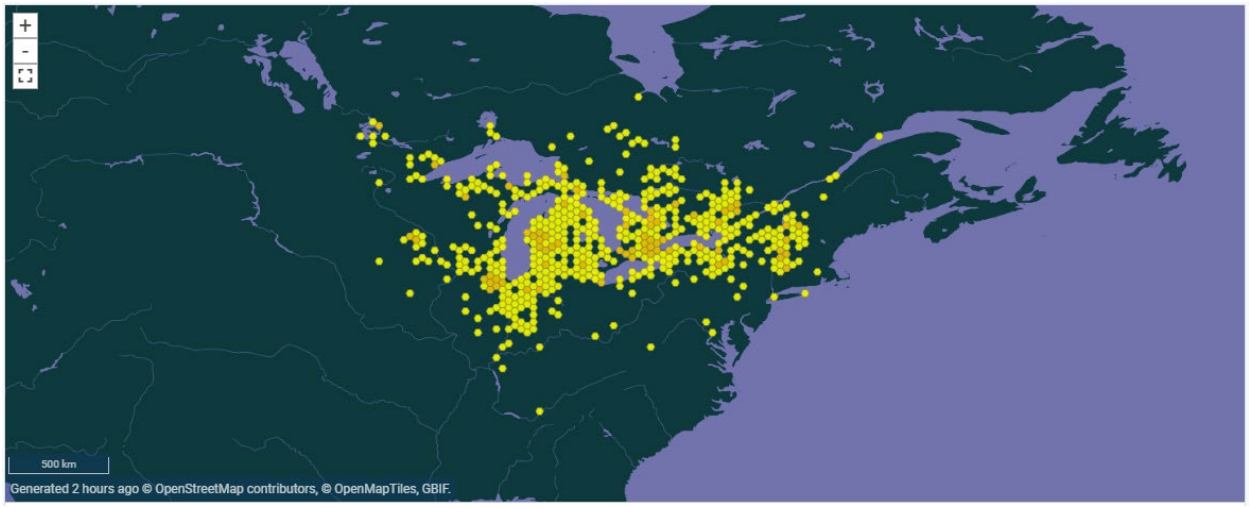

Figure 1. Reported global distribution of *Faxonius propinquus*. Map from GBIF Secretariat (2023). Majority of observations are reported from the Great Lakes with additional observations in the Northern Plains, Northeast, Southeast, and Appalachian regions of the United States. Observations are also reported in southern Ontario and Quebec. Observations in southern Kentucky, Tennessee, West Virginia, Maryland, southern Ohio, southern Pennsylvania, southern Iowa, northern Ontario, and eastern Quebec do not represent established populations and were therefore excluded from the climate match analysis.

6 Distribution Within the United States

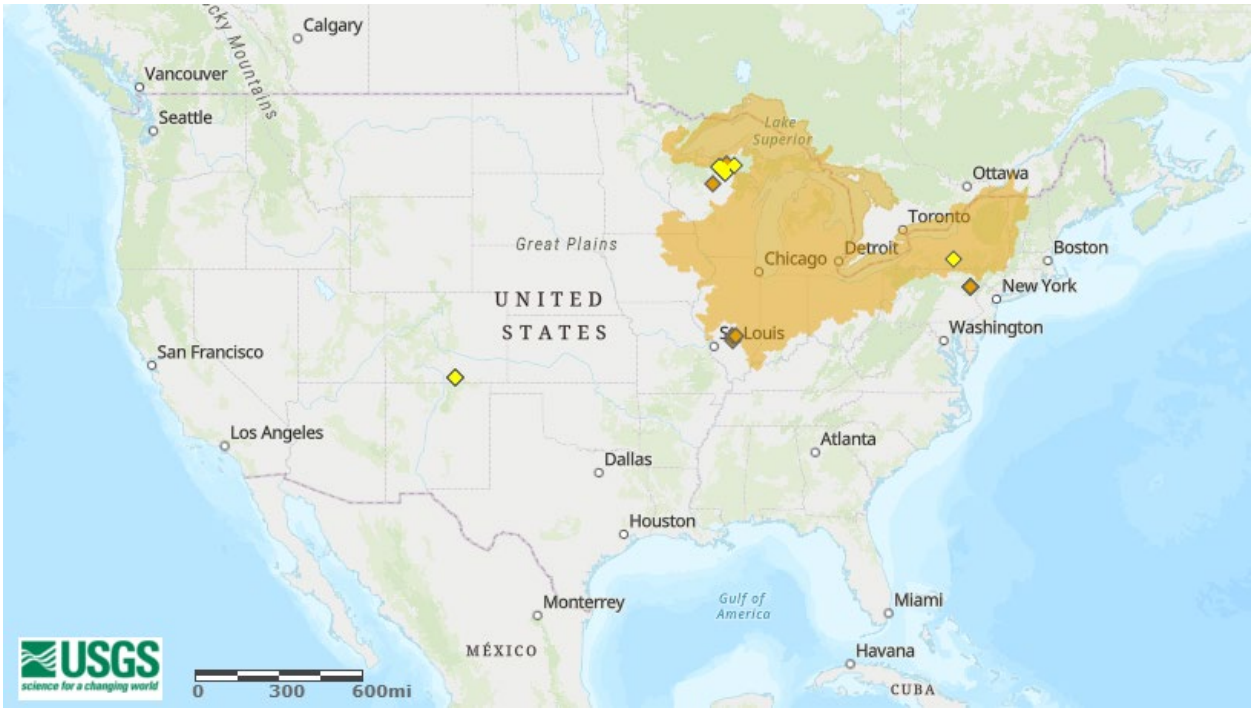

Figure 2. Reported distribution of *Faxonius propinquus* in the United States. Map from USGS (2025). Shaded orange areas represent the native range of *F. propinquus*. Diamonds represent introduction records that resulted in an established population (yellow) or for which the status is unknown (orange). Observations are reported outside the native range in Colorado, Illinois, New York, Wisconsin, and Pennsylvania. Observations with unknown population status were not used in the climate matching analysis.

7 Climate Matching

Summary of Climate Matching Analysis

The climate match for *Faxonius propinquus* to the contiguous United States found areas of high climate match in parts of the Northern Plains, Great Lakes (including the native range), Northeast, northern parts of Southeast and Appalachian regions. Areas of low climate match were found in the Gulf Coast, Florida, parts of Western Mountains, Northern Pacific Coast, California, and western parts of Great Basin. Areas of medium match were scattered throughout the Northern Plains, Colorado Plateau, and Southern Plains into parts of the Southeast. The overall Climate 6 score (Sanders et al. 2023; 16 climate variables; Euclidean distance) for the contiguous United States was 0.776, 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 *Faxonius propinquus* (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.'

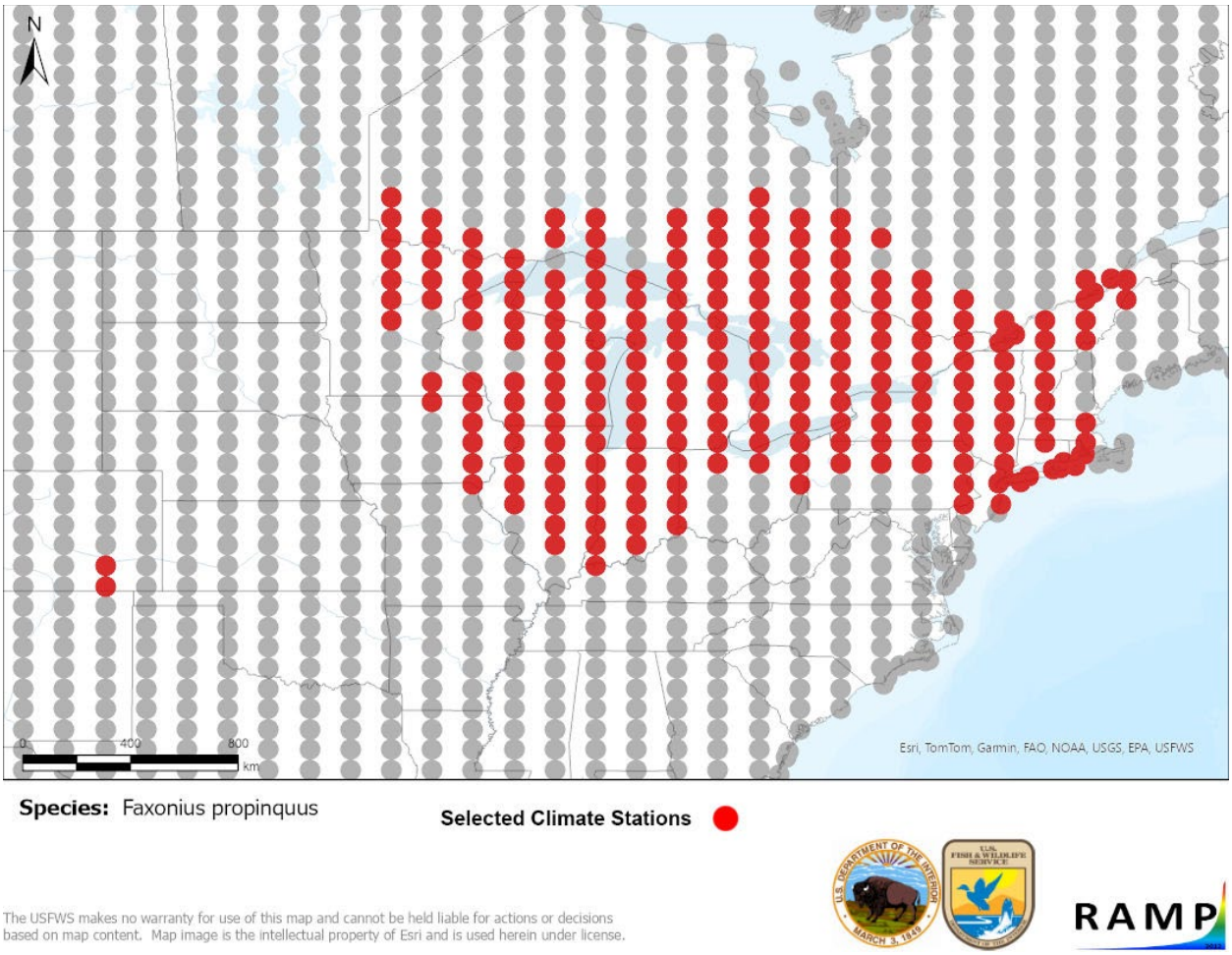

Figure 3. RAMP (Sanders et al. 2023) source map showing weather stations in North America that were selected as source locations (red; United States, Canada) and non-source locations (gray) for *Faxonius propinquus* climate matching. Source locations from GBIF Secretariat (2023). Selected source locations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

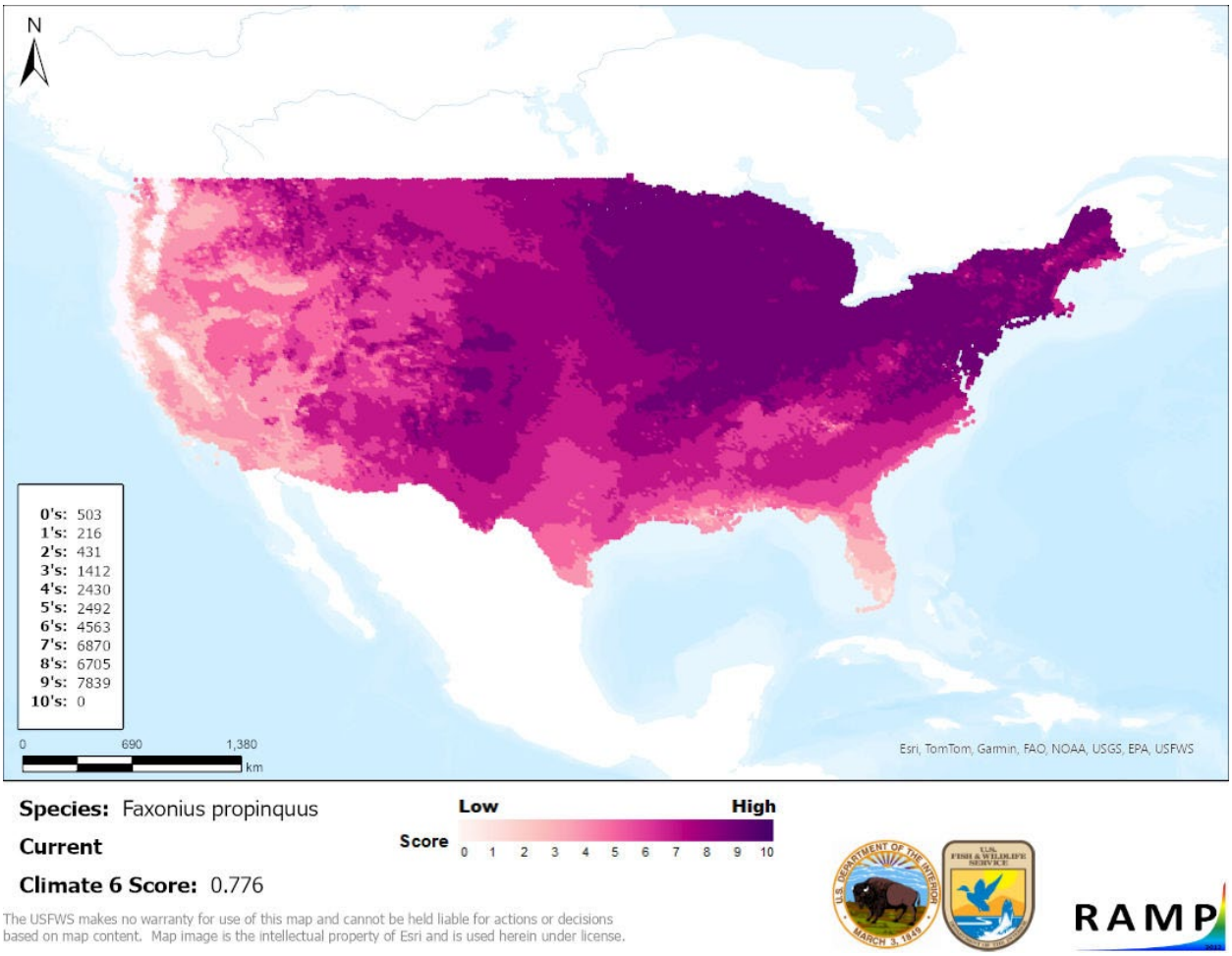

Figure 4. Map of RAMP (Sanders et al. 2023) climate matches for *Faxonius propinquus* in the contiguous United States based on source locations reported by GBIF Secretariat (2023). Counts of climate match scores are tabulated on the left. 0/Pale Pink = Lowest match, 10/Dark Purple = Highest match.

8 Certainty of Assessment

The Certainty of Assessment is High. There is quality information available about the biology and ecology of *Faxonius propinquus*. The distribution of the species is well described. Records of introduction, as well as information regarding the impacts of introduction is available. Information on impacts of introduction is from peer-reviewed sources.

9 Risk Assessment

Summary of Risk to the Contiguous United States

The Northern Clearwater Crayfish, *Faxonius propinquus*, is a crayfish native to the Great Lakes and adjacent drainages in the United States and Canada. It is found in streams and lakes with cool water and is sometimes used as bait. The History of Invasiveness for *F. propinquus* is classified as High. It has been reported as established outside of its native range in Colorado, New York, Michigan, and Wisconsin in the United States and in northwestern Ontario, Canada.

Most recently, *F. propinquus* has become established in the Delaware River watershed along the border of Pennsylvania and New York. Impacts from introduction include changes in benthic communities and replacement of native crayfish species. This species has likely been introduced through the use of bait by anglers. However, no information regarding this species in trade was found. It is regulated as part of the Family Cambaridae in eight States. The climate matching analysis for the contiguous United States indicates establishment concern for this species outside its native range. Areas of high climate match found outside its native range were located throughout the Northern Plains and Northeast regions and into the Southeast region. The Certainty of Assessment is High. The Overall Risk Assessment Category for *Faxonius propinquus* is High.

Assessment Elements

- **History of Invasiveness (see Section 4): High**
- **Establishment Concern (see Section 7): Yes**
- **Certainty of Assessment (see Section 8): High**
- **Remarks, Important additional information: Susceptible to infection with *Aphanomyces astaci*, causative agent of crayfish plague, which is a World Organisation for Animal Health listed disease.**
- **Overall Risk Assessment Category: High**

10 Literature Cited

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

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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 (2023).

Under the future climate scenarios (figure A1), on average, high climate match for *Faxonius propinquus* was projected to occur in the Northern Plains, Great Lakes, and Northeast regions of the contiguous United States. Areas in the Great Lakes and Northeast regions, in particular, had high climate match across all scenarios and time steps. Areas of low climate match were projected to occur in California, along the Northern Pacific Coast, and in the Western Mountains, Desert Southwest, Great Basin, and Southern Florida regions. The Climate 6 scores for the individual future scenario models (figure A2) ranged from a low of 0.428 (model: UKESM1-0-LL, SSP5, 2085) to a high of 0.729 (model: MPI-ESM1-2-HR, SSP5, 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 (0.776, 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 (figure A3), the most extreme climate scenario. Very small areas of moderate increase in climate match relative to the current match were observed under all scenarios, mainly with the Western Mountain and Colorado Plateau regions. Some areas of minor increase were also observed in the same regions under some time step and climate scenarios. Under one or more time step and climate scenarios, areas within the Appalachian Range, Mid-Atlantic, Northeast, Northern Plains, Southeast, and Southern Plains saw a large decrease in the climate match relative to current conditions. Additionally, areas within the California, Colorado Plateau, Great Basin, Great Lakes, Gulf Coast, Southern Atlantic Coast, Southwest, and Western Mountains saw a moderate decrease in the climate match relative to current conditions.

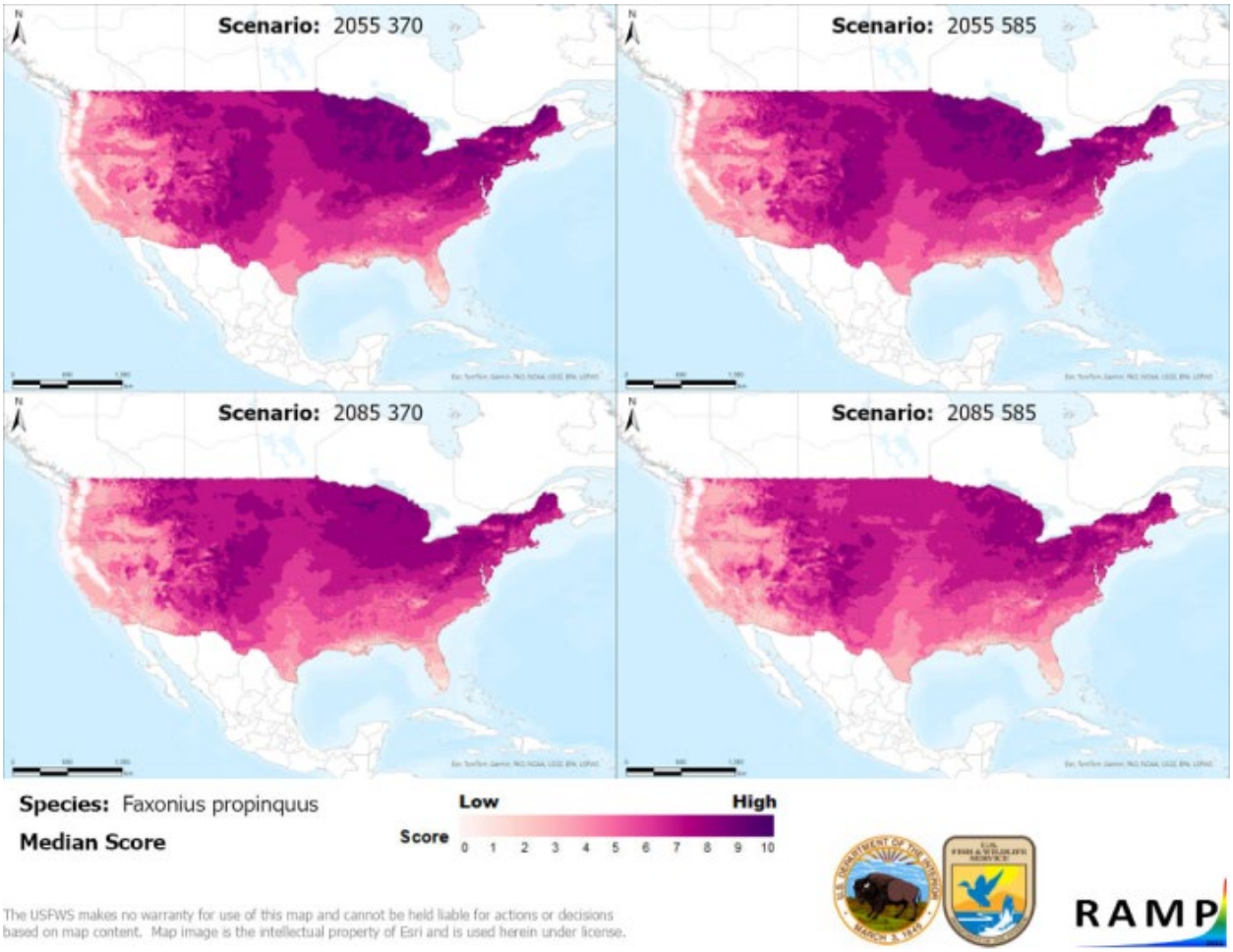

Figure A1. Maps of median RAMP (Sanders et al. 2023) climate matches projected under potential future climate conditions using five global climate models for *Faxonius propinquus* in the contiguous United States. Climate matching is based on source locations reported by GBIF Secretariat (2023). Shared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

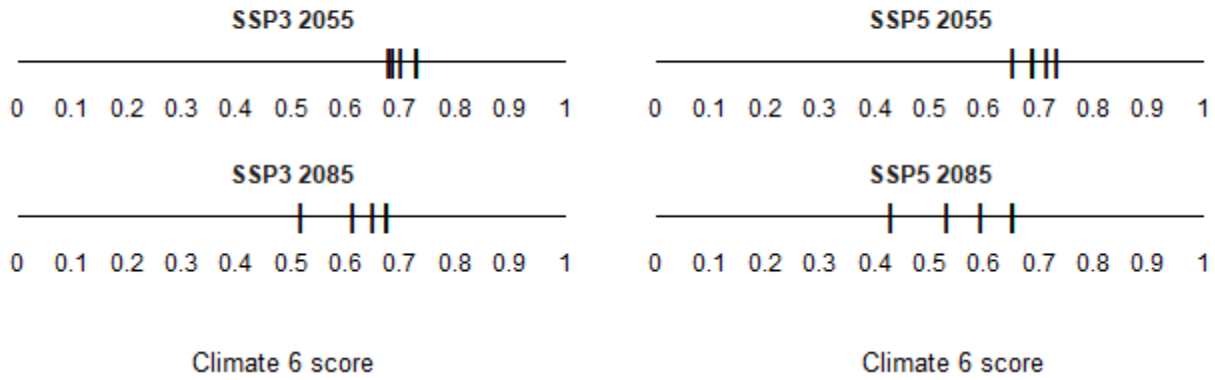

Figure A2. Comparison of projected future Climate 6 scores for *Faxonius propinquus* in the contiguous United States for each of five global climate models under four combinations of Shared Socioeconomic Pathway (SSP) and time step. SSPs used (from left to right): SSP3, SSP5 (Karger et al. 2017, 2018;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

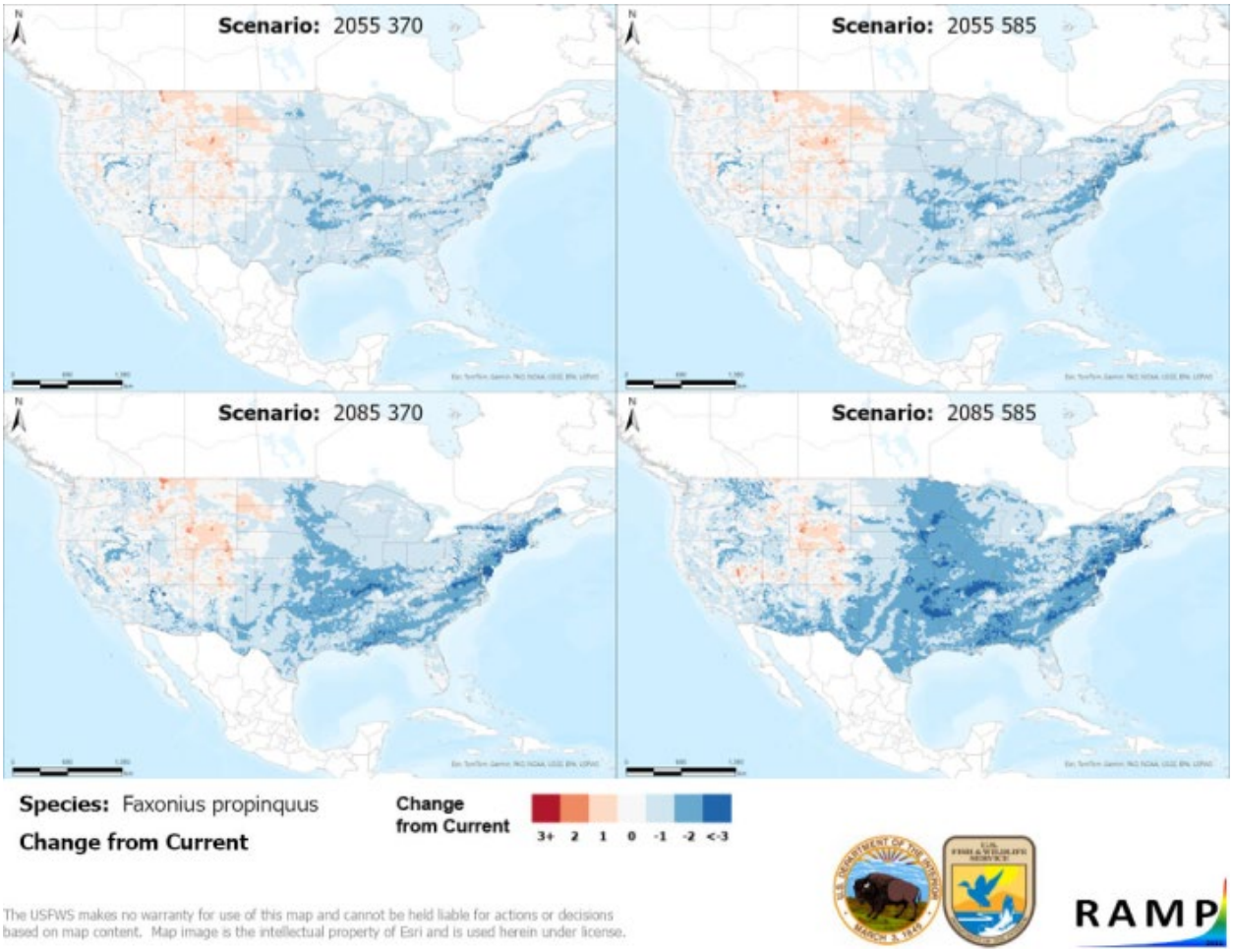

Figure A3. RAMP (Sanders et al. 2023) maps of the contiguous United States showing the difference between the current climate match target point score (figure 4) and the median target point score for future climate scenarios (figure A1) for *Faxonius propinquus* based on source locations reported by GBIF Secretariat (2023). Shared Socioeconomic Pathways (SSPs) used (from left to right): SSP3, SSP5 (IPCC 2021). Time steps: 2055 (top row) and 2085 (bottom row). Climate source data from CHELSA (Karger et al. 2017, 2018); global models used: GFDL-ESM4, UKESM1-0-LL, MPI-ESM1-2-HR, IPSL-CM6A-LR, and MRI-ESM2-0. Shades of blue indicate a lower target point score under future scenarios than under current conditions. Shades of red indicate a higher target point score under future scenarios than under current conditions. Darker shades indicate greater change.

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