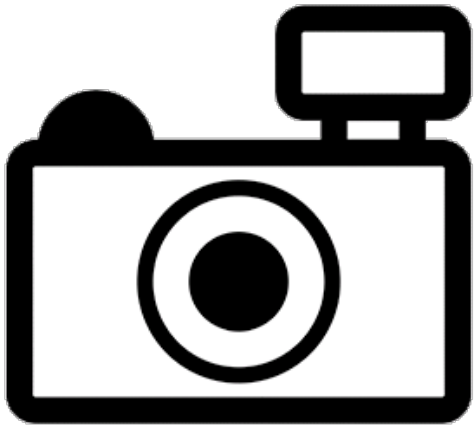
Diaphanosoma fluviatile (a cladoceran, no common name)

Ecological Risk Screening Summary

U.S. Fish and Wildlife Service, February 2023
Revised, March 2023
Web Version, 2/18/2025

Organism Type: Crustacean
Overall Risk Assessment Category: Uncertain



1 Native Range and Status in the United States

Native Range

From Lower and Daniel (2023):

"South America, Central America, and the Caribbean"

From Korovchinsky (1992):

"Brasil [sic] (Amazon region), North-East of Argentina, Venezuela (Lake Maracaibo), Nicaragua and Haiti."

From Elías-Gutiérrez et al. (2001):

"[…] Catemaco Lake, Veracruz, Mexico."

From Whitmore et al. (2019):

"*D. fluviatile* is primarily a Neotropical species reported from Argentina (Fernandes et al. 2012), Brazil, Venezuela, Haiti (Korovchinsky 1992), Nicaragua (Cisneros et al. 1991[a]), and Mexico (Elias-Gutierrez et al. 2001)."

Status in the United States

From López et al. (2008):

"We report the cladoceran *Diaphanosoma fluviatile* Hansen 1899 in Lake Waco and Lake Mexia, two reservoirs located in central Texas. This species […] only recently was reported from some locations in Louisiana and Florida […] Our new records represent a westward expansion of records previously documented in the southern United States."

From Lower and Daniel (2023):

"Established in Florida, Louisiana, and Texas, as well as the Great Lakes region (Lake Erie and Lake Michigan)."

"*Diaphanosoma fluviatile* has been found in the Maumee River and two locations in western Lake Erie in 2015 samples. […] The finding of a large population in the Maumee River and two small populations in western Lake Erie confirm that this is an established reproducing population."

According to Lower and Daniel (2023), nonindigenous occurrences of *Diaphanosoma fluviatile* have been reported in the following States. Range of observation years, number of watersheds (8-digit hydrologic unit), and population status where reported (one or more watershed) in parentheses.

- Florida (1960; 1; Established)
- Louisiana (1977-2002; 2; Established)
- Michigan (2018; 1; Unknown)
- Ohio (2015-2018; 2; Unknown)
- Texas (2003; 2; Established)
- Wisconsin (2018; 1; Unknown)

No records of *Diaphanosoma fluviatile* in trade in the United States were found.

Regulations

All species of the genus *Diaphanosoma* are regulated in Hawaii (HDOA 2019). 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 Lower and Daniel (2023):

"This species most likely arrived in the Great Lakes from the southern US populations as a hitchhiker with recreational boats, gear, bait or ornamentals. Ballast water is also a major vector of other species of North American *Diaphanosoma* (*birgei* and *brachyurum*) (Gray et al., 2007) which are in the same size range as *D. fluviatile* (Balcer et al., 1984)."

Remarks

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

From López et al. (2008):

"Many records of *D. brachyurum* in the southern United States refer to this species."

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From ITIS (2023):

Kingdom Animalia
Subkingdom Bilateria
Infrakingdom Protostomia
Superphylum Ecdysozoa
Phylum Arthropoda
Subphylum Crustacea
Class Brachiopoda
Order Diplostraca
Suborder Cladocera
Infraorder Ctenopoda
Family Sididae
Genus *Diaphanosoma*
Species *Diaphanosoma fluviatile* Hansen, 1899

According to Kotov (2018), *Diaphanosoma fluviatile* is the current valid name for this species.

Size, Weight, and Age Range

From Lower and Daniel (2023):

"Length: females 0.78-0.92 mm, males 0.65-0.75 mm (Korovchinsky, 1992)"

Environment
From Cisneros et al. (1991a):

"Some species are halophyllyc [sic; thriving in high salt concentrations] and develop better under eutrophic conditions (*Diaphanosoma fluviatile*, *Moina micrura* and *Brachionus* spp.)."

Debastiani-Júnior et al. (2016) reports *D. fluviatile* from the limnetic zone of the Jurumirim Reservoir, Brazil.

Climate
From Cisneros et al. (1991a):

"[…] frequently reported from tropical lakes (INFANTE, 1980; COLLADO *et al*., 1984; MATSUMURA-TUNDISI *et al*., 1984)."

From Whitmore et al. (2019):

"[…] neotropical […]"

Distribution Outside the United States
Native
From Lower and Daniel (2023):

"South America, Central America, and the Caribbean"

From Korovchinsky (1992):

"Brasil [sic] (Amazon region), North-East of Argentina, Venezuela (Lake Maracaibo), Nicaragua and Haiti."

From Elías-Gutiérrez et al. (2001):

"[…] Catemaco Lake, Veracruz, Mexico."

From Whitmore et al. (2019):

"*D. fluviatile* is primarily a Neotropical species reported from Argentina (Fernandes et al. 2012), Brazil, Venezuela, Haiti (Korovchinsky 1992), Nicaragua (Cisneros et al. 1991[a]), and Mexico (Elias-Gutierrez et al. 2001)."

Introduced
From Lower and Daniel (2023):

"Established […] as well as the Great Lakes region (Lake Erie […]). [northern shore of Lake Erie is in Ontario, Canada]"

Means of Introduction Outside the United States

From Lower and Daniel (2023):

"This species most likely arrived in the Great Lakes from the southern US populations as a hitchhiker with recreational boats, gear, bait or ornamentals. Ballast water is also a major vector of other species of North American *Diaphanosoma* (*birgei* and *brachyurum*) (Gray et al., 2007) which are in the same size range as *D. fluviatile* (Balcer et al., 1984)."

Short Description

From Lower and Daniel (2023):

"This cladoceran has an elongated body and rectangular head. Its swimming antennae do not reach the posterior margin. Antennal setae 4-8/0-1-4. The ventral margin of the valves lacks inflexion and are armed with several setae and a row of 4–6 spinules between each two setae. One dorsal spine is present near the posterior margin of the valve. The postabdomen has a wide dorsal proximal prominence and three spines on base of claw. Claws are armed with a line of fine denticles (Elías-Gutiérrez et al., 2001). Care should be taken to distinguish this species from similar natives *Diaphanosoma birgei* and *Diaphanosoma brachyurum*."

Biology

From Lower and Daniel (2023):

"This species is parthenogenetic, with offspring developing from unfertilized eggs (López et al. 2008). *Diaphanosoma fluviatile* feeds predominantly on tiny particles (bacteria and detritus) and algal food consisting mainly of green algae (Oocystis), and likely consumes nanoplanktonic algae as well (Cisneros et al. 1991b). Diaphanosoma fluviatile tended to be present in higher numeric proportions during the peak of the rainy season (June-September) in its native habitat (Cisneros et al. 1991a). Fernandes et al. (2012) report the "time to hatchling" of *D fluviatile* as 6 days."

Human Uses

No information was found on human uses of *Diaphanosoma fluviatile*.

Diseases

No information was found associating *Diaphanosoma fluviatile* with any diseases listed by the World Organisation of Animal Health (2023).

No information was found on diseases associated with *Diaphanosoma fluviatile*.

Threat to Humans

No information was found on threats to humans from *Diaphanosoma fluviatile*.

3 Impacts of Introductions

Diaphanosoma fluviatile has been introduced to and is established in North America. However, the potential impacts of these introductions are unknown. The following information refers to *potential* impacts of introduction.

From Lower and Daniel (2023):

"Impact of Introduction: Several very similar native species are present in the Great Lakes, suggesting limited potential for dramatic ecosystem disturbances, but this species may compete with native zooplankton for resources (Associated Press, 2018)."

The importation, possession, or trade of *Diaphanosoma fluviatile* is regulated in Hawaii (HDOA 2019).

4 History of Invasiveness

The History of Invasiveness for *Diaphanosoma fluviatile* is classified as Data Deficient. Although established populations of *D. fluviatile* have been found outside of its native range, there was no information found regarding actual impacts of introduction.

5 Global Distribution

Figure 1. Known global distribution of *Diaphanosoma fluviatile*. Observations are reported from North America, Central America, and South America. Map from GBIF Secretariat (2023).

Additional georeferenced observations from within the native range that were used to select source points in the climate matching analysis were derived from the following sources: Elías-Gutiérrez et al. (2001; Lake Catemaco, Mexico), Cisneros et al. (1991b; Lake Managua, Nicaragua), Korovchinsky (1992; Lake Maracaibo, Venezuela; Haiti), Fernandes et al. (2001; Garças Lakes, Brazil), Debastiani-Júnior et al. (2016; Jurumirim Reservoir, Brazil), Brito et al.

(2011; Tres Marias and Furnas Reservoir, Brazil), Panarelli et al. (2013; Taquari River, Brazil), and Pecorari et al. (2006; Lake Setúba, Argentina).

6 Distribution Within the United States

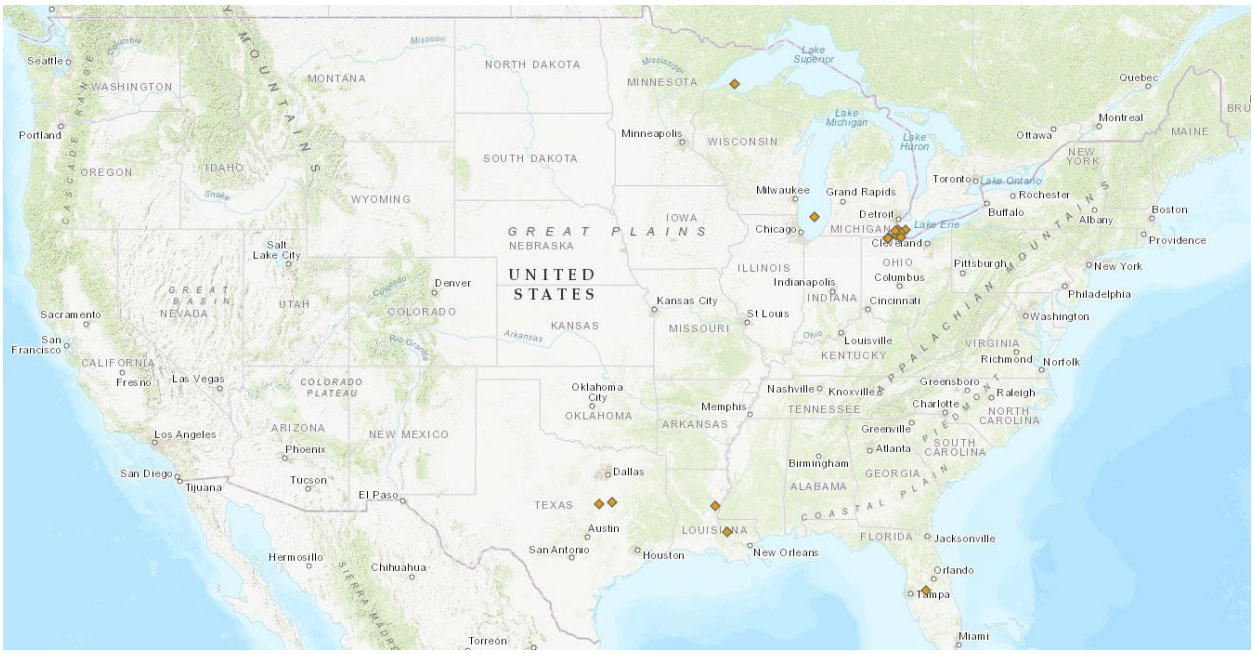


Figure 2. Reported distribution of *Diaphanosoma fluviatile* in the United States. Map from Lower and Daniel (2023). Observations are reported from Lake Michigan, Lake Superior, western Lake Erie, Florida, Louisiana, and Texas.

7 Climate Matching

Summary of Climate Matching Analysis

The climate match for *Diaphanosoma fluviatile* in the contiguous United States was generally high throughout the United States east of the Great Plains region. Areas of high match were concentrated in the Midwest, Great Lakes region, and in the Southeast along the Gulf Coast. Medium matches were found in patches west of the Great Plains in the Western Mountains, Great Basin, and Southwest regions. Areas of low match were found in the Pacific Northwest and in regions surrounding the Cascade-Sierra Mountain Range. The overall Climate 6 score (Sanders et al. 2023; 16 climate variables; Euclidean distance) for the contiguous United States was 0.562, 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 *Diaphanosoma fluviatile* (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.

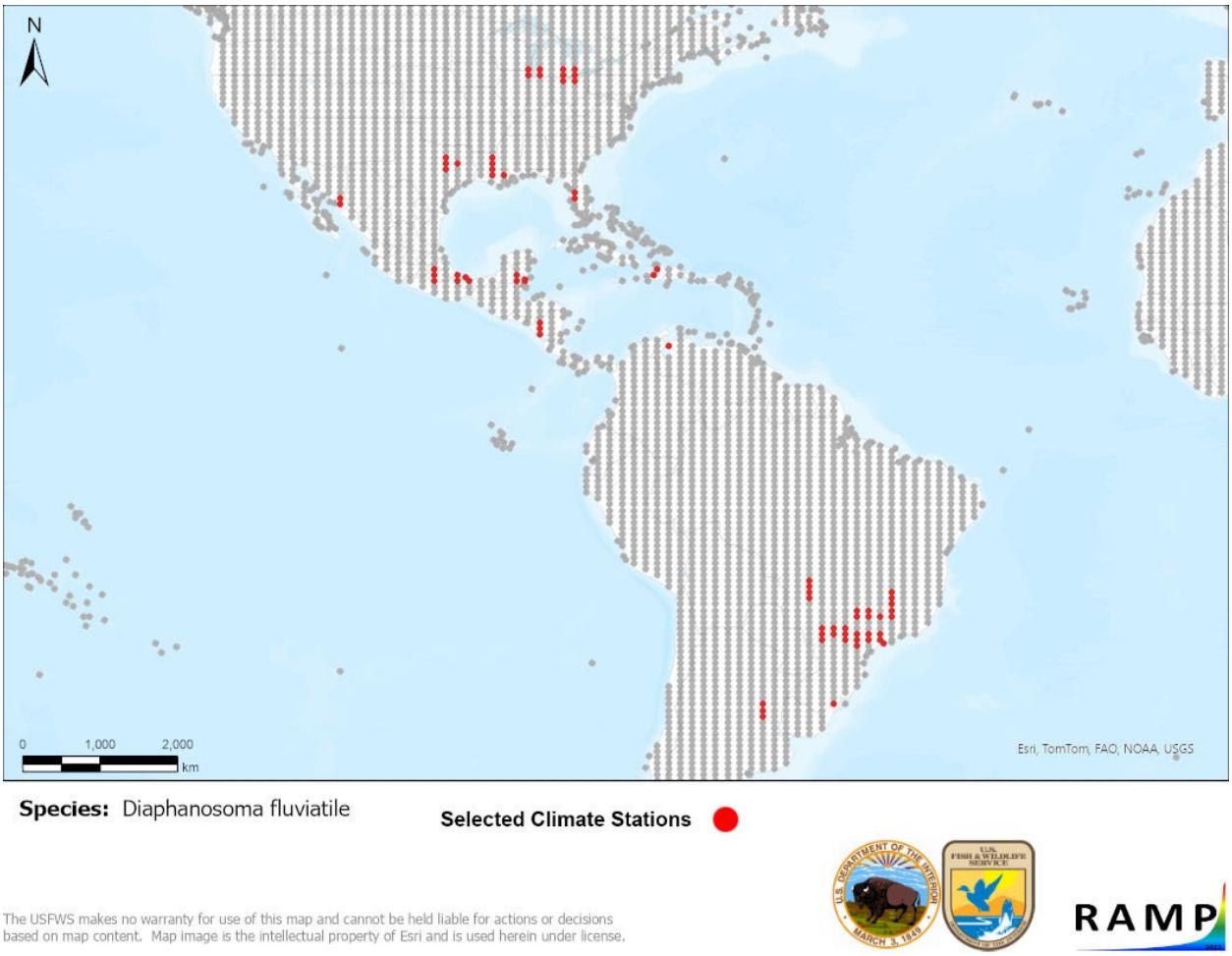


Figure 3. RAMP (Sanders et al. 2023) source map showing weather stations selected as source locations (red; United States, Mexico, Nicaragua, Venezuela, Brazil, Argentina, and Haiti) and non-source locations (gray) for *Diaphanosoma fluviatile* climate matching. Source locations from GBIF Secretariat (2023), Lower and Daniel (2023), Elías-Gutiérrez et al. (2001), Cisneros et al. (1991b), Korovchinsky (1992), Fernandes et al. (2001), Debastiani-Júnior et al. (2016), Brito et al. (2011), Panarelli et al. (2013), and Pecorari et al. (2006). Selected source locations are within 100 km of one or more species occurrences, and do not necessarily represent the locations of occurrences themselves.

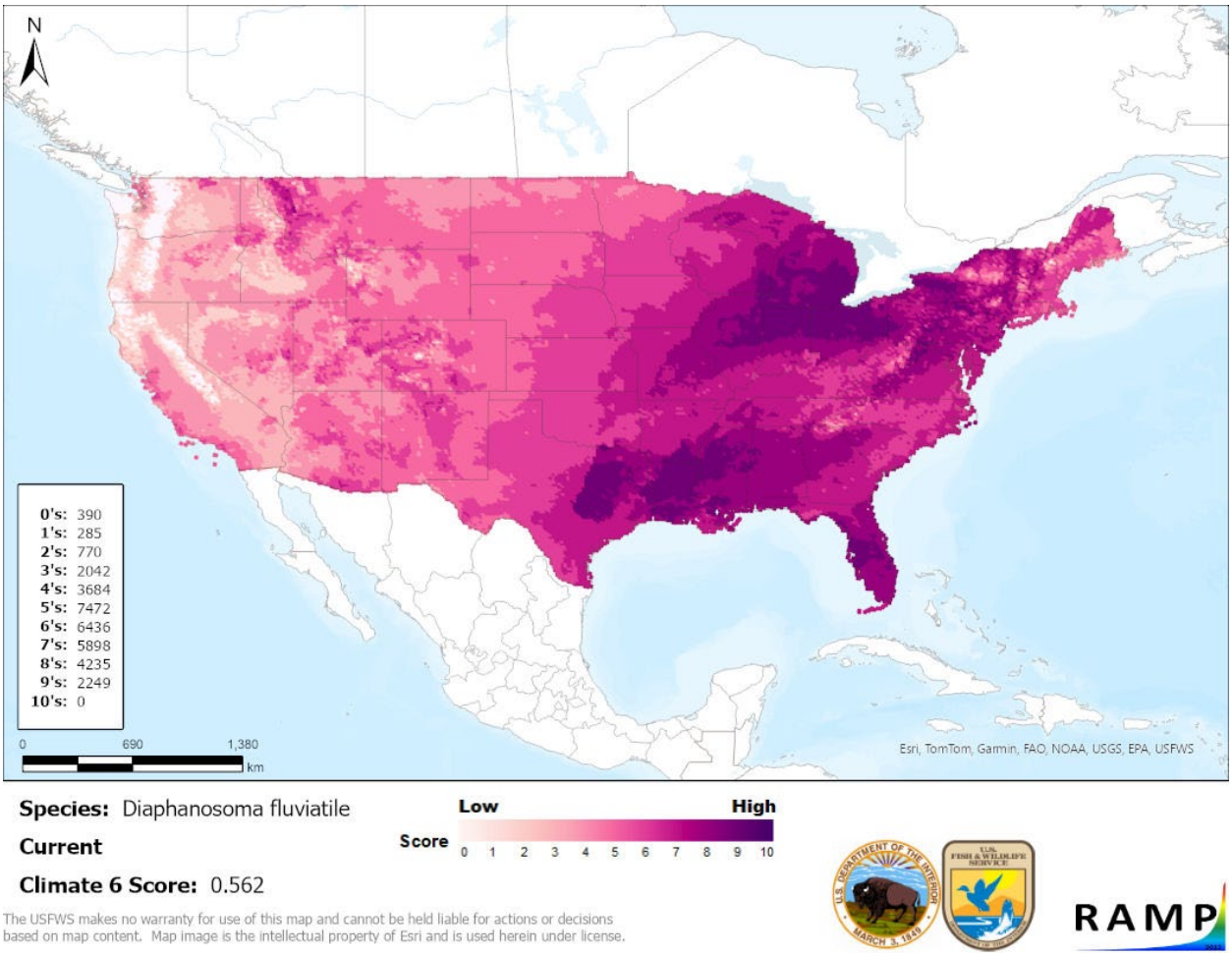


Figure 4. Map of RAMP (Sanders et al. 2023) climate matches for *Diaphanosoma fluviatile* in the contiguous United States based on source locations reported by GBIF Secretariat (2023), Lower and Daniel (2023), Elías-Gutiérrez et al. (2001), Cisneros et al. (1991b), Korovchinsky (1992), Fernandes et al. (2001), Debastiani-Júnior et al. (2016), Brito et al. (2011), Panarelli et al. (2013), and Pecorari et al. (2006). 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 *Diaphanosoma fluviatile* is classified as Low. Limited information is available on the biology, ecology, and distribution of this species. In particular, the distribution is patchily described, with relatively few available georeferenced occurrences of the species. Information on impacts from the introduced populations was not available.

9 Risk Assessment

Summary of Risk to the Contiguous United States

Diaphanosoma fluviatile, is a neotropical cladoceran native to South America, Central America, and the Caribbean that can be found in rivers, lakes, and reservoirs. They are similar in appearance to other *Diaphanosoma* species native to the United States and feed mainly on

bacteria, detritus and algae. *D. fluviatile* are parthenogenic and offspring hatch from unfertilized eggs. This species has been introduced to and is established in the United States and Canada, however the History of Invasiveness for *D. fluviatile* is classified as Data Deficient due to a lack of information regarding impacts of introduction. The climate matching analysis for the contiguous United States indicates establishment concern for this species. Areas of high match were found throughout the United States east of the Great Plains region. The Certainty of Assessment for this ERSS is classified as Low due to patchy distribution information, including limited georeferenced observations for use in the climate matching analysis, and lack of information regarding impacts of introduction. The Overall Risk Assessment Category for *D. fluviatile* 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: Parthenogenetic**
- **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.

Brito SL, Maia-Barbosa PM, Pinto-Coelho RM. 2011. Zooplankton as an indicator of trophic conditions in two large reservoirs in Brazil. Lakes & Reservoirs: Research and Management 16:253–264.

Cisneros R, Mangas EI, Van Maren M. 1991a. Qualitative and quantitative structure, diversity and fluctuations in abundance of zooplankton in Lake Xolotlán (Managua). Hydrobiological Bulletin 25(2):151–156.

Cisneros R, Hooker E, Velasquez LE. 1991b. Natural diet of herbivorous zooplankton in Lake Xolotlán (Managua). Hydrobiological Bulletin 25(2):163–167.

Debastiani-Júnior J, Elmoor-Loureiro RLM, Nogueira MG. 2016. Habitat architecture influencing microcrustaceans composition: a case study on freshwater Cladocera (Crustacea Branchiopoda). Brazilian Journal of Biology 76:93–100.

Elías-Gutiérrez M, Smirnov NN, Suárez-Morales E, Dimas-Flores N. 2001. New and little known cladocerans (Crustacea: Anomopoda) from southeastern Mexico. Hydrobiologia 442:41–54.

Fernandes APC, Braghin LSM, Nedli J, Palazzo F, Lansac-Tôha FA, Bonecker CC. 2012. Passive zooplankton community in different environments of a neotropical floodplain. Acta Scientarium 34(4):413–418.

GBIF Secretariat. 2023. GBIF backbone taxonomy: *Diaphanosoma fluviatile*. Copenhagen: Global Biodiversity Information Facility. Available: https://www.gbif.org/species/5180005 (February 2023).

[HDOA] Hawaii Department of Agriculture. 2019. Non-domestic animal import rules. Hawaii Administrative Rules Chapter 4-71.

[ITIS] Integrated Taxonomic Information System. 2023. *Diaphanosoma fluviatile* Hansen, 1899. Reston, Virginia: Integrated Taxonomic Information System. Available: https://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=83843#null (February 2023).

Korovchinsky NM. 1992. Sididae & Holopedidae. Guides to the identification of the microinvertebrates of the continental waters of the world 3. The Hague, The Netherlands: SPB Academic Publishing.

Kotov A. 2018. *Diaphanosoma fluviatile* Hansen, 1899. World Register of Marine Species. Available: https://www.marinespecies.org/aphia.php?p=taxdetails&id=1302645#sources (February 2023).

López C, Soto LM, Dávalos-Lind L, Lind O. 2008. Occurrence of *Diaphanosoma fluviatile* Hansen 1899 (Cladocera: Sisidae) in two reservoirs in central Texas. The Southwestern Naturalist 53(3):412–414.

Lower E, Daniel WM. 2023. *Diaphanosoma fluviatile* Hansen, 1899. Gainesville, Florida: U.S. Geological Survey, Nonindigenous Aquatic Species Database. Available: https://nas.er.usgs.gov/queries/FactSheet.aspx?SpeciesID=2648 (February 2023).

Panarelli EA, Güntzel AM, Borges CN. 2013. How does the Taquari River influence in the cladoceran assemblages in three oxbow lakes? Brazilian Journal of Biology 73(4):717–725.

Pecorari S, José de Paggi S, Paggi JC. 2006. Assessment of the urbanization effect on a lake by zooplankton. Water Resources 33(6):677–685.

Sanders S, Castiglione C, Hoff M. 2023. Risk Assessment Mapping Program: RAMP. Version 5.0. U.S. Fish and Wildlife Service.

Whitmore EA, Connolly JK, Van Damme K, Watkins JM, Hinchey EK, Rudstam LG. 2019. First record of the Neotropical cladoceran *Diaphanosoma fluviatile* in the Great Lakes basin. Bioinvasions records 8(3):614.

World Organisation for Animal Health. 2023. Animal diseases. Paris: World Organisation for Animal Health. Available: https://www.woah.org/en/what-we-do/animal-health-and-welfare/animal-diseases/ (February 2023).

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.

Associated Press. 2018. Two new zooplankton species found in Lake Erie. Pittsburgh, Pennsylvania. The Pittsburgh Post-Gazette, August 10, 2018.

Balcer MD, Korda NL, Dodson SI. 1984. Zooplankton of the Great Lakes: a guide to the identification and ecology of the common crustacean species. Madison: University of Wisconsin Press.

Collado C, Fernando CH, Sephton D. 1984. The freshwater zooplankton of Central America and the Caribbean. Hydrobiologia 113:105–119.

Gray DK, Johengen TH, Reid DF, MacIsaac HJ. 2007. Efficacy of open-ocean ballast water exchange as a means of preventing invertebrate invasions between freshwater ports. Limnology and Oceanography 52:2386–2397.

Infante A. 1980. El zooplankton del I.ago de Valencia. Caracas, Venezuela: CONICIT. Informe cientifico.

Matsumura-Tundisi T, Tundisi JG, Tavares LS. 1984. Diel migration and vertical distribution of Cladocera in Lake D. Helvecio (Minas Gerais, Brazil). Hydrobiologia 113:299–306.

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), Lower and Daniel (2023), Elías-Gutiérrez et al. (2001), Cisneros et al. (1991b), Korovchinsky (1992), Fernandes et al. (2001), Debastiani-Júnior et al. (2016), Brito et al. (2011), Panarelli et al. (2013), and Pecorari et al. (2006).

Under the future climate scenarios (figure A1), on average, high climate match for *Diaphanosoma fluviatile* was projected to occur in the Great Lakes, Southeast, and Southern Florida regions of the contiguous United States. Small areas of high match were scattered in the Western Mountains and Great Basin under most scenarios. Areas of low climate match were projected to occur in the Northern Pacific Coast region. Areas of high match tended to be smaller in time step 2085 than in time step 2055 for both SSPs. The Climate 6 scores for the individual future scenario models (figure A2) ranged from a low of 0.46 (model: MPI-ESM1-2-HR, SSP5, 2085) to a high of 0.577 (model: IPSL-CM6A-LR, 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 (0.562, figure 4) falls within 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, Northeast, Northern Pacific Coast, and Western Mountains saw a moderate increase in the climate match relative to current conditions. No large increases were observed regardless of time step and climate scenarios. Under one or more time step and climate scenarios, areas within the Gulf Coast saw a large decrease in the climate match relative to current conditions. Additionally, areas within the Appalachian Range, Great Basin, Great Lakes, Mid-Atlantic, Northeast, Northern Plains, Southeast, Southern Atlantic Coast, Southern Florida, and Southern Plains 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). The degree of change increased from SSP3 to SSP5 and with time from 2055 to 2085.

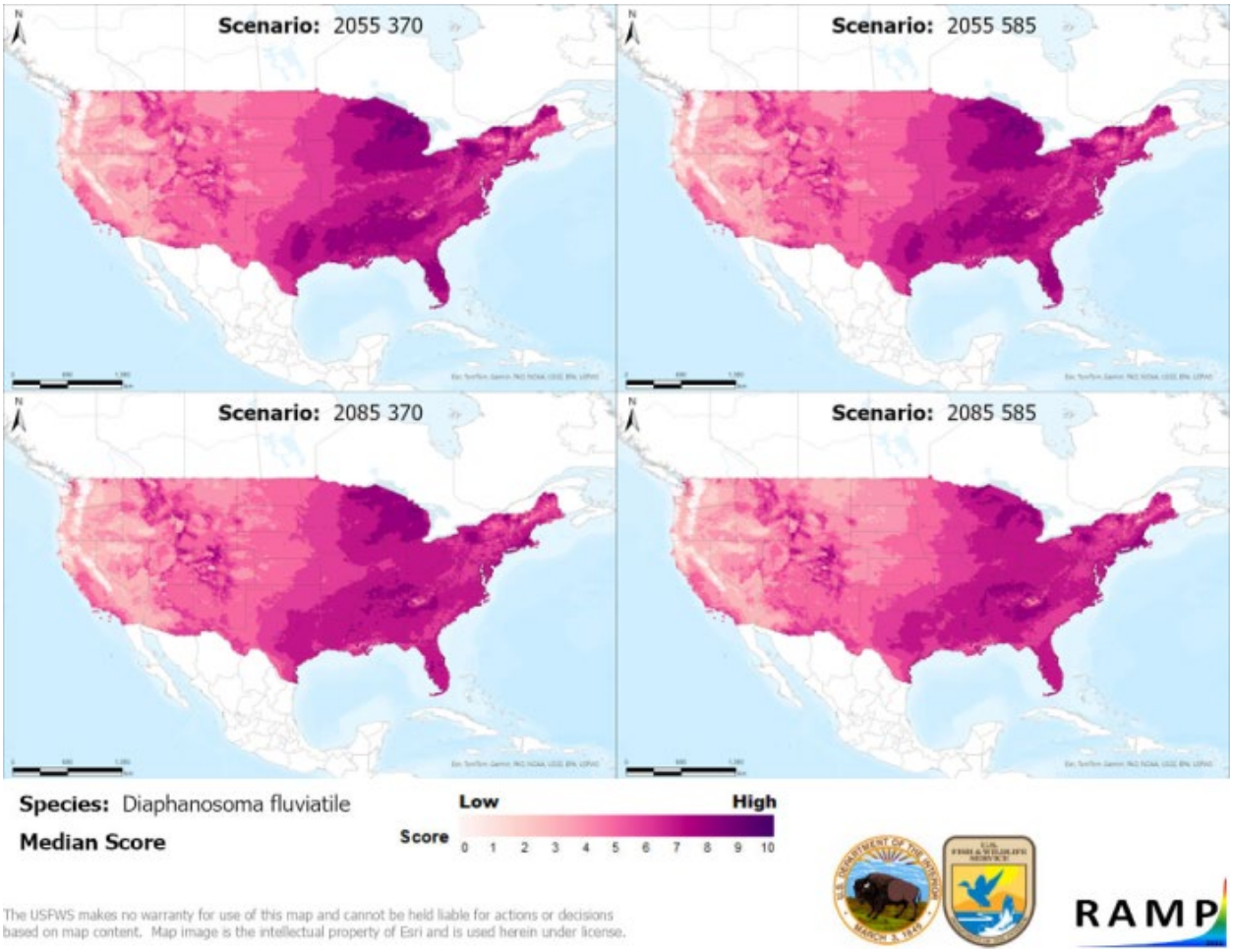


Figure A1. Maps of median RAMP (Sanders et al. 2023) climate matches projected under potential future climate conditions using five global climate models for *Diaphanosoma fluviatile* in the contiguous United States. Climate matching is based on source locations reported by GBIF Secretariat (2023), Lower and Daniel (2023), Elías-Gutiérrez et al. (2001), Cisneros et al. (1991b), Korovchinsky (1992), Fernandes et al. (2001), Debastiani-Júnior et al. (2016), Brito et al. (2011), Panarelli et al. (2013), and Pecorari et al. (2006). 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.

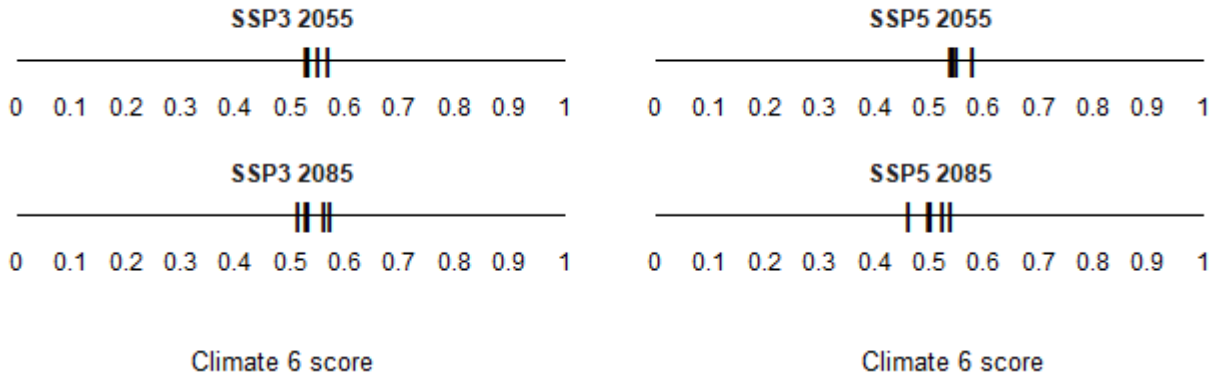


Figure A2. Comparison of projected future Climate 6 scores for *Diaphanosoma fluviatile* in the contiguous United States for each of five global climate models under four combinations of Shared Socioeconomic Pathway (SSP) and time step. SSPs used (from left to right): SSP3, SSP5 (Karger et al. 2017,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

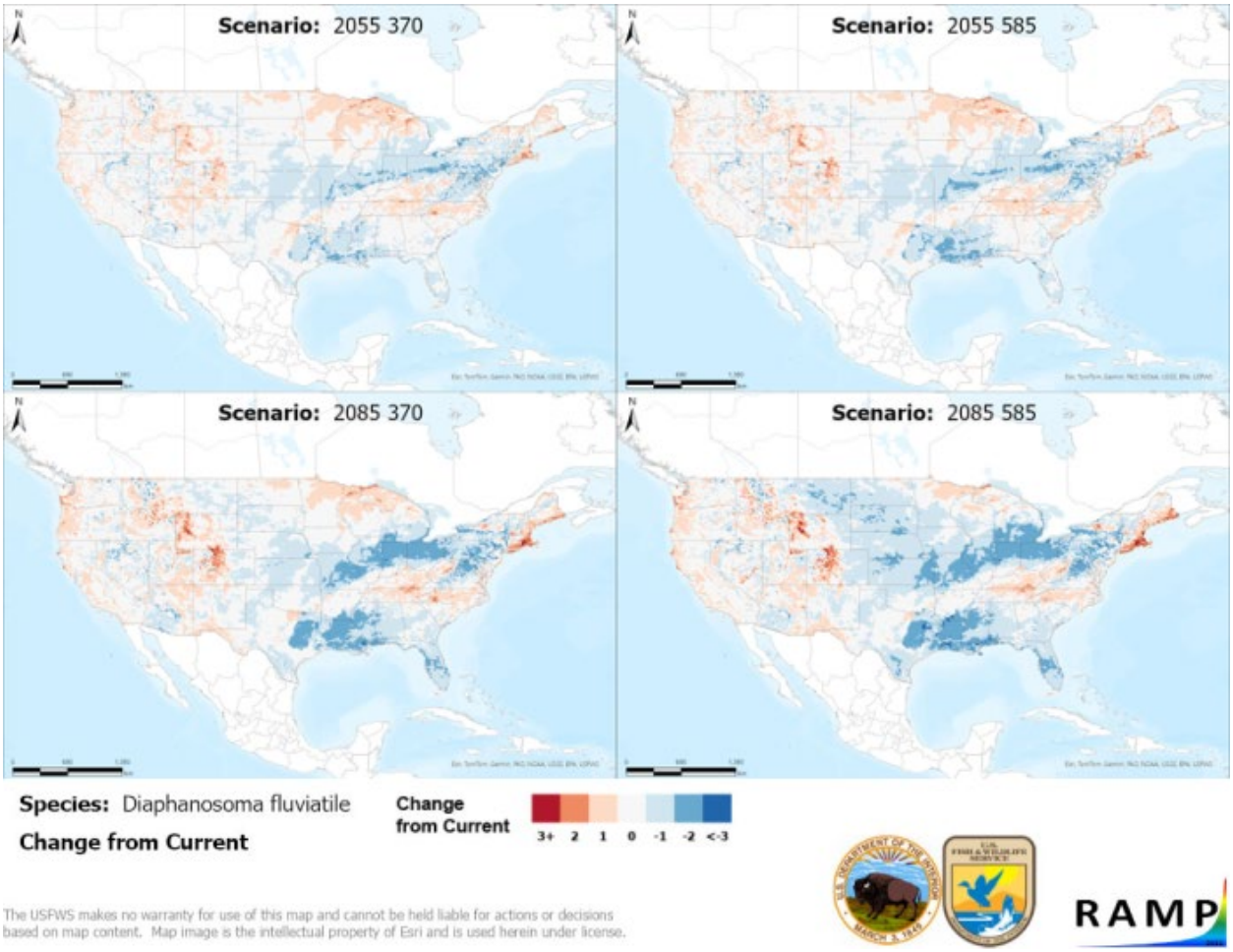


Figure A3. RAMP (Sanders et al. 2023) maps of the contiguous United States showing the difference between the current climate match target point score (figure 4) and the median target point score for future climate scenarios (figure A1) for *Diaphanosoma fluviatile* based on source locations reported by GBIF Secretariat (2023), Lower and Daniel (2023), Elías-Gutiérrez et al. (2001), Cisneros et al. (1991b), Korovchinsky (1992), Fernandes et al. (2001), Debastiani-Júnior et al. (2016), Brito et al. (2011), Panarelli et al. (2013), and Pecorari et al. (2006). 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.

Literature Cited

Brito SL, Maia-Barbosa PM, Pinto-Coelho RM. 2011. Zooplankton as an indicator of trophic conditions in two large reservoirs in Brazil. Lakes & Reservoirs: Research and Management 16:253–264.

Cisneros R, Hooker E, Velasquez LE. 1991b. Natural diet of herbivorous zooplankton in Lake Xolotlán (Managua). Hydrobiological Bulletin 25(2):163–167.

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Fernandes APC, Braghin LSM, Nedli J, Palazzo F, Lansac-Tôha FA, Bonecker CC. 2012. Passive zooplankton community in different environments of a neotropical floodplain. Acta Scientarium 34(4):413–418.

GBIF Secretariat. 2023. GBIF backbone taxonomy: *Diaphanosoma fluviatile*. Copenhagen: Global Biodiversity Information Facility. Available: https://www.gbif.org/species/5180005 (February 2023).

[IPCC] Intergovernmental Panel on Climate Change. 2021. Climate change 2021: the physical science basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press.

Karger DN, Conrad O, Böhner J, Kawohl T, Kreft H, Soria-Auza RW, Zimmermann NE, Linder P, Kessler M. 2017. Climatologies at high resolution for the Earth land surface areas. Scientific Data 4:170122.

Karger DN, Conrad O, Böhner J, Kawohl T, Kreft H, Soria-Auza RW, Zimmermann NE, Linder HP, Kessler M. 2018. Data from: Climatologies at high resolution for the earth's land surface areas. EnviDat. Available: https://doi.org/10.16904/envidat.228.v2.1.

Korovchinsky NM. 1992. Sididae & Holopedidae. Guides to the identification of the microinvertebrates of the continental waters of the world 3. The Hague, The Netherlands: SPB Academic Publishing.

Lower E, Daniel WM. 2023. *Diaphanosoma fluviatile* Hansen, 1899. Gainesville, Florida: U.S. Geological Survey, Nonindigenous Aquatic Species Database. Available: https://nas.er.usgs.gov/queries/FactSheet.aspx?SpeciesID=2648 (February 2023).

Panarelli EA, Güntzel AM, Borges CN. 2013. How does the Taquari River influence in the cladoceran assemblages in three oxbow lakes? Brazilian Journal of Biology 73(4):717–725.

Pecorari S, José de Paggi S, Paggi JC. 2006. Assessment of the urbanization effect on a lake by zooplankton. Water Resources 33(6):677–685.

Sanders S, Castiglione C, Hoff M. 2023. Risk Assessment Mapping Program: RAMP. Version 5.0. U.S. Fish and Wildlife Service.