

Thick Scud (*Obesogammarus crassus*)

Ecological Risk Screening Summary

U.S. Fish and Wildlife Service, June 2023
Revised, January 2024
Web Version, 3/3/2025

Organism Type: Crustacean
Overall Risk Assessment Category: High



Photo: Alex Borisenko, Centre for Biodiversity Genomics. Licensed under Creative Commons. Available: https://v3.boldsystems.org/index.php/Taxbrowser_Taxonpage?taxon=Obesogammarus+crassus&searchTax= (June 2023).

1 Native Range and Status in the United States

Native Range

From Li et al. (2023):

“Ponto-Caspian basin and Black and Caspian Seas.”

From European Commission - Joint Research Centre (2023):

“Native countries: RO [Romania], RU [Russia], UA [Ukraine]”

Status in the United States

No records of *Obesogammarus crassus* in the wild or in trade in the United States were found.

Regulations

No species-specific regulations on possession or trade were found within the United States.

Means of Introductions within the United States

No records of *Obesogammarus crassus* in the wild in the United States were found.

Remarks

No additional remarks.

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From Horton et al. (2023):

“Biota > Animalia (Kingdom) > Arthropoda (Phylum) > Crustacea (Subphylum) > Multicrustacea (Superclass) > Malacostraca (Class) > Eumalacostraca (Subclass) > Peracarida (Superorder) > Amphipoda (Order) > Senticaudata (Suborder) > Gammarida (Infraorder) > Gammaridira (Parvorder) > Gammaroidea (Superfamily) > Pontogammaridae (Family) > *Obesogammarus* (Genus) > *Obesogammarus crassus* (Species)”

According to Horton et al. (2023), *Obesogammarus crassus* is the current valid name for this species.

The following synonyms of *Obesogammarus crassus* from Horton et al. (2023) were used to search for information for this report: *Pontogammarus crassus*.

Size, Weight, and Age Range

From Li et al. (2023):

“Up to 12 mm in length. Mean breeding female 8.81 mm in length.”

Environment

From Li et al. (2023):

“*Obesogammarus crassus* lives in oligohaline water bodies; however, it tolerates both fresh and brackish waters (Jazdzewski et al. 2004; Grabowski et al. 2007; Meßner and Zettler 2018). It

inhabits a higher range of salinity in its native range (12–34 ppt) than its nonindigenous range (<0.5–19 ppt) (Holopainen et al. 2016; Paiva et al. 2018).”

“Due to its ability to tolerate various oxygen levels, temperature, salinity, [...] it is predicted that it can inhabit a broad range of ecological living conditions (Bij de Vaate et al. 2002).”

“However, *Obesogammarus crassus* experiences complete mortality under flow through, full strength seawater for 24 hours (Santagata et al. 2008).”

From Narščius (2023):

“Salinity tolerance range: 0.5-8.8 [PSU]”

Climate

No information was found on climate requirements for *Obesogammarus crassus*.

Distribution Outside the United States

Native

From Li et al. (2023):

“Ponto-Caspian basin and Black and Caspian Seas.”

From European Commission - Joint Research Centre (2023):

“Native countries: RO [Romania], RU [Russia], UA [Ukraine]”

Introduced

Srėbalienė (2016a) reports introduction of *O. crassus* to Lithuania in 1962; current population status is “abundant.”

Srėbalienė (2016b) reports introduction of *O. crassus* to Baltic Sea waters of the Kaliningrad area of Russia in 1962, but notes “first record in Vistula Lagoon (Russian part)after [sic] 1997.” Current population status is “common.”

From Li et al. (2023):

“*Obesogammarus crassus* has been found in the Pripyat River, Belarus (Semenchenko and Vezhnovetz 2008). This species occurs in the Szczecin Lagoon and Elbe River in Germany (Grabowski et al. 2007). *Obesogammarus crassus* is established in the Curonian and Vistula Lagoons in the Baltic Sea (Russia) (Berezina et al. 2011).”

“It was also stocked into freshwater basins [sic] Ukraine, Modlavia [sic], and Lithuania in the 1950’s and 1960’s [...]”

“Studies suggest that *Obesogammarus crassus* has been introduced outside of the Ponto-Caspian basin through the ‘central corridor of dispersal’, on the following route: Dnieper River to Vistula River to Oder River to Elbe River to Rhine River, and consequently into the Baltic Sea and Western Europe (Bij de Vaate et al. 2002).”

Normant (2020) reports introduction of *O. crassus* to Baltic Sea waters of Poland in 1999; current population status is “common.”

From Gollasch (2021):

“First reported in 2015 in waters adjacent to the Baltic [in Germany], probably first recorded further inland (much) earlier.”

“Population status: Established (Low level of certainty)”

Gollasch (2019) reports introduction of *O. crassus* to North Sea waters of Germany in 2016; current population status is “common.”

From Paidere et al. (2019):

“[...] the presence of *Obesogammarus crassus* in the Riga port area [Latvia] has been confirmed (at Voleri, in 2016, pers. unpublished results).”

CABI (2019) lists introduced populations of *Obesogammarus crassus* in Ukraine (Seebens et al. 2017).

Means of Introduction Outside the United States

From Li et al. (2023):

“It should be noted that where *Obesogammarus crassus* is introduced, it is frequently inoculated in high numbers by ballast water exchange (Grabowski et al. 2007). The distribution of this species has already spread extensively beyond its native range; it has been introduced to western European waters via ballast water transport (Holdrich and Pöckl 2007). [...] It was also stocked into freshwater basins Ukraine, Modlavia [sic], and Lithuania in the 1950’s and 1960’s as a food source for fishes (Konopacka and Jazdzewski 2002).”

From European Commission - Joint Research Centre (2023):

“Primary Pathways: escape from confinement (aquaculture/mariculture) and corridor (interconnected waterways/basins/seas)”

Short Description

From Li et al. (2023):

“*Obesogammarus crassus* is an off-white amphipod with an endopod that is no more than 30% of the length of its exopod (Dobson 2012). The exopod is short and its length is as long as the

width of the urosome. This species has dense tufts of setae on uropod 3 and spines on urosome 1 and 2 that form a single central line. The large segment towards the base of the posterior pereopod is expanded and protrudes downwards. *Obesogammarus crassus* looks similar to *Pontogammarus robustoides*, but has only a single pair of spines on urosome 2, and has few setae on its posterior pereopod.”

Biology

From Li et al. (2023):

“*Obesogammarus crassus* is an omnivorous dietary generalist (Bij de Vaate et al. 2002; Hänfling et al. 2011). Juveniles (<7 mm) are primarily detritivores/algivorous, and adults (>7mm) are omnivorous (consuming plants and other invertebrates equally) (Berezina et al. 2017). [...] *Obesogammarus crassus* has a relatively short life span and generation time (Bij de Vaate et al. 2002). It does not grow rapidly, but has an early sexual maturity. The female carries the eggs in a brood pouch and the average brood size is 25.33 (Kurandina 1975). This species has a breeding period of 7 months and has an average of 3 generations per year. Compared to other amphipods that have extended geographical ranges into Central Europe from either the Ponto-Caspian basin or North America, *Obesogammarus crassus* has intermediate fecundity (Grabowski et al. 2007).”

Human Uses

From Li et al. (2023):

“It was also stocked into freshwater basins Ukraine, Modlavia [sic], and Lithuania in the 1950’s and 1960’s as a food source for fishes (Konopacka and Jazdzewski 2002).”

Diseases

No information was found associating *Obesogammarus crassus* with any diseases listed by the World Organisation for Animal Health (2023).

From Benesh et al. (2017):

“*Obesogammarus crassus* hosts the endoparasite *Amphilina foliacea*.”

According to Horton et al. (2023) *Obesogammarus crassus* is the host or prey of the following parasites: *Maritrema inusitatum*, *Maritrema sobolevi*, *Nicolla skrjabini*, and *Caudotestis skrjabini*.

Threat to Humans

From Li et al. (2023):

“Establishment of *Obesogammarus crassus* has not been known to cause a hazard or threat to human health, [...]”

3 Impacts of Introductions

From Zaiko et al. (2011):

“In the Curonian Lagoon [Lithuania and Russia], [*Dreissenia*] *polymorpha*, *O. crassus* and [*Pontogammarus*] *robustoides* have caused a severe reduction of the relative abundance of the former community dominant species or even population extinction within the ecosystem. Thus, according to Arbačiauskas (2008), the Curonian Lagoon has been conquered by Ponto-Caspian amphipod invaders (*P. robustoides*—in the central freshwater part of the lagoon, *O. crassus*—in the northern part, which is more affected by brackish water inflows from the Baltic Sea), and freshwater amphipods do not occur there today.”

From Li et al. (2023):

“Where established, *Obesogammarus crassus*, has outcompeted various native species (Bij de Vaate et al. 2002).”

“Establishment of *Obesogammarus crassus* has not been known to cause a hazard or threat to human health, damage to infrastructure, or negative impacts on water quality. It has not been documented that this species is detrimental to markets or economic sectors, recreational activities or associated tourism, or the perceived aesthetic or natural value of the areas it inhabits.”

4 History of Invasiveness

The History of Invasiveness for *Obesogammarus crassus* is classified as High. Introductions of *O. crassus* outside of its native range have led to nonnative established populations. It has been documented that where this species has been introduced and established, native amphipod populations have been outcompeted and possibly extirpated.

5 Global Distribution



Figure 1. Reported global distribution of *Obesogammarus crassus*. Map from GBIF Secretariat (2022). Observations are concentrated around the Caspian Sea, the Black Sea, and the Baltic Sea. Because the climate matching analysis (Section 7) is not valid for marine waters, no marine occurrences were used in the climate matching analysis.

Jeunen et al. (2022) identified locations of populations in Belarus that do not appear on this map but were included in the climate match analysis.

6 Distribution Within the United States

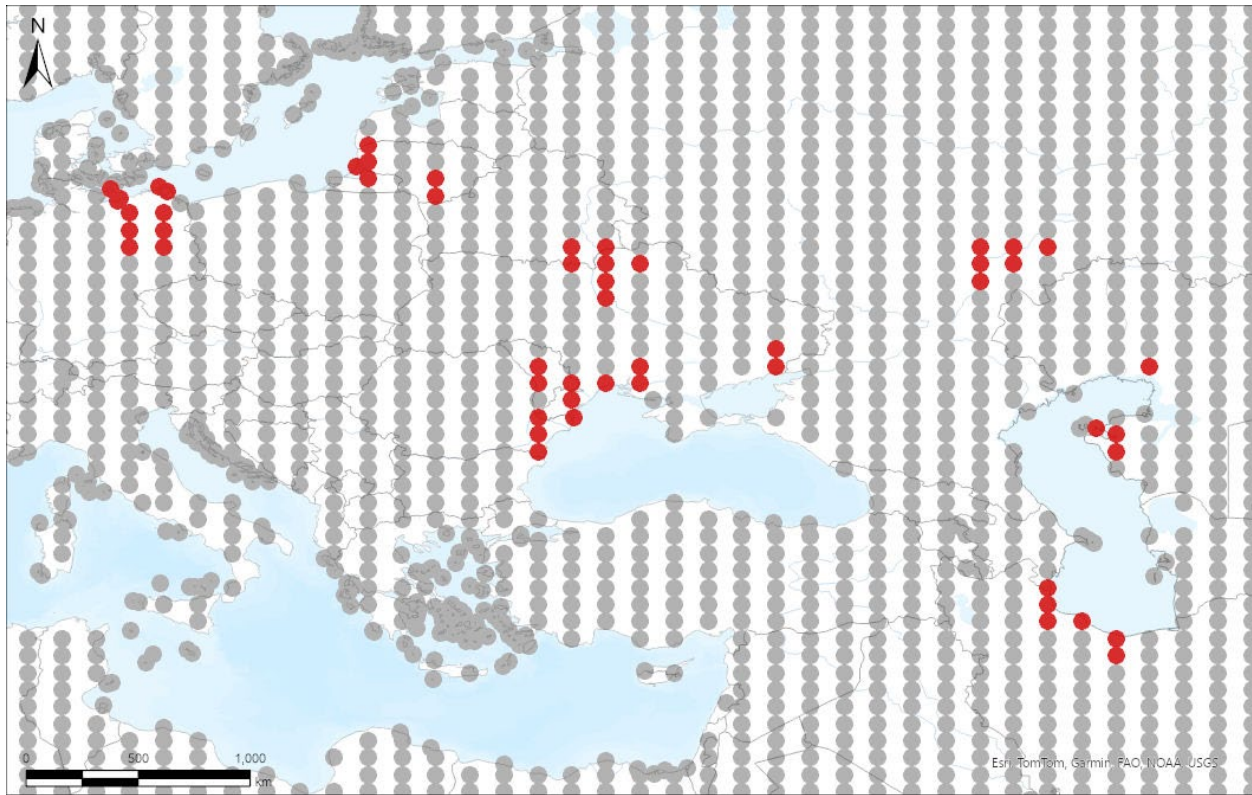
No records of *Obesogammarus crassus* in the wild in the United States were found.

7 Climate Matching

Summary of Climate Matching Analysis

In the contiguous United States, high climate matches for *Obesogammarus crassus* occurred in the Great Lakes Basin and in the West, in the Rocky Mountains and the Great Basin. The lowest climate matches occurred along the Pacific coast, Cascade Mountains, and Sierra Nevada. The climate match was also medium to low along the Gulf and southern Atlantic coasts. The overall Climate 6 score (Sanders et al. 2023; 16 climate variables; Euclidean distance) for the contiguous United States was 0.694, 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 *Obesogammarus crassus* (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.

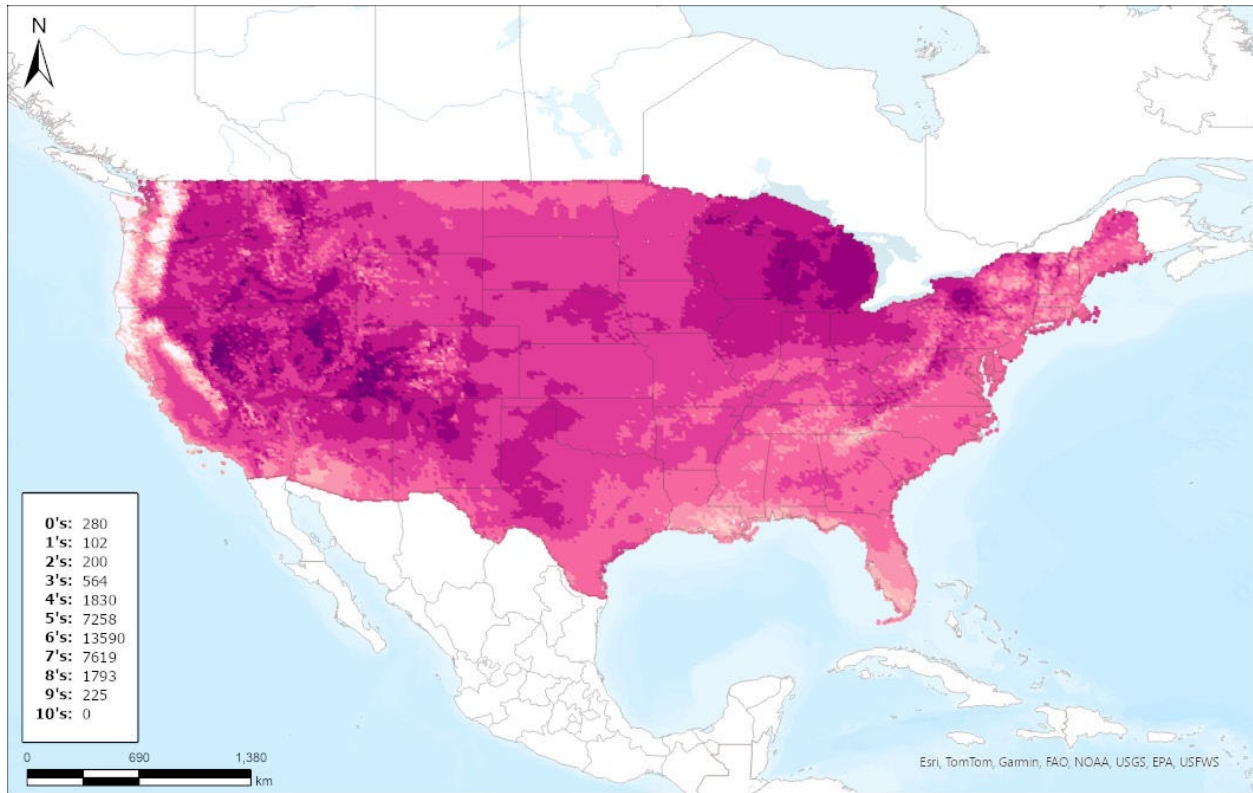


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RAMP

Figure 2. RAMP (Sanders et al. 2023) source map showing weather stations around the Caspian Sea, the Black Sea, and the Baltic Sea. selected as source locations (red; Iran, Ukraine, Germany, Russia, Kazakhstan, Lithuania, Romania, Azerbaijan, Republic of Moldova, and Belarus) and non-source locations (gray) *Obesogammarus crassus* climate matching. Source locations from GBIF Secretariat (2022) and Jeunen et al. (2022). Selected source locations are within 100 km of one or more species occurrences, and do not necessarily represent the locations of occurrences themselves.



Species: *Obesogammarus crassus*

Current

Climate 6 Score: 0.694



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Figure 3. Map of RAMP (Sanders et al. 2023) climate matches for *Obesogammarus crassus* in the contiguous United States based on source locations reported by GBIF Secretariat (2022) and Jeunen et al. (2022). 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 *Obesogammarus crassus* is classified as Medium. There is little data and research about the species from peer-reviewed sources. Though some of the available sources have concluded nonnative establishment and resulting negative impacts, there is a lack of abundant and convincing information.

9 Risk Assessment

Summary of Risk to the Contiguous United States

Obesogammarus crassus, thick scud, is an amphipod that is native to the Ponto-Caspian basin of Europe. *O. crassus* has an omnivorous diet and can tolerate a range of oxygen levels, temperatures, and salinities. *O. crassus* is generally moved between water bodies via ballast water transport, and there were reports of its historical use as a stocked food source for fish. The History of Invasiveness for *O. crassus* is classified as High due to known, nonnative, established

populations that have competed with native amphipod species with a negative outcome for the native species. The climate matching analysis for the contiguous United States indicates establishment concern. The highest matches occur in the Great Lakes Basin and along the Rocky Mountains and Great Basin. The Certainty of Assessment for this ERSS is classified as Medium due to a limited amount of available research and knowledge regarding impacts. The Overall Risk Assessment Category for *Obesogammarus crassus* 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): Medium**
- **Remarks, Important additional information: None**
- **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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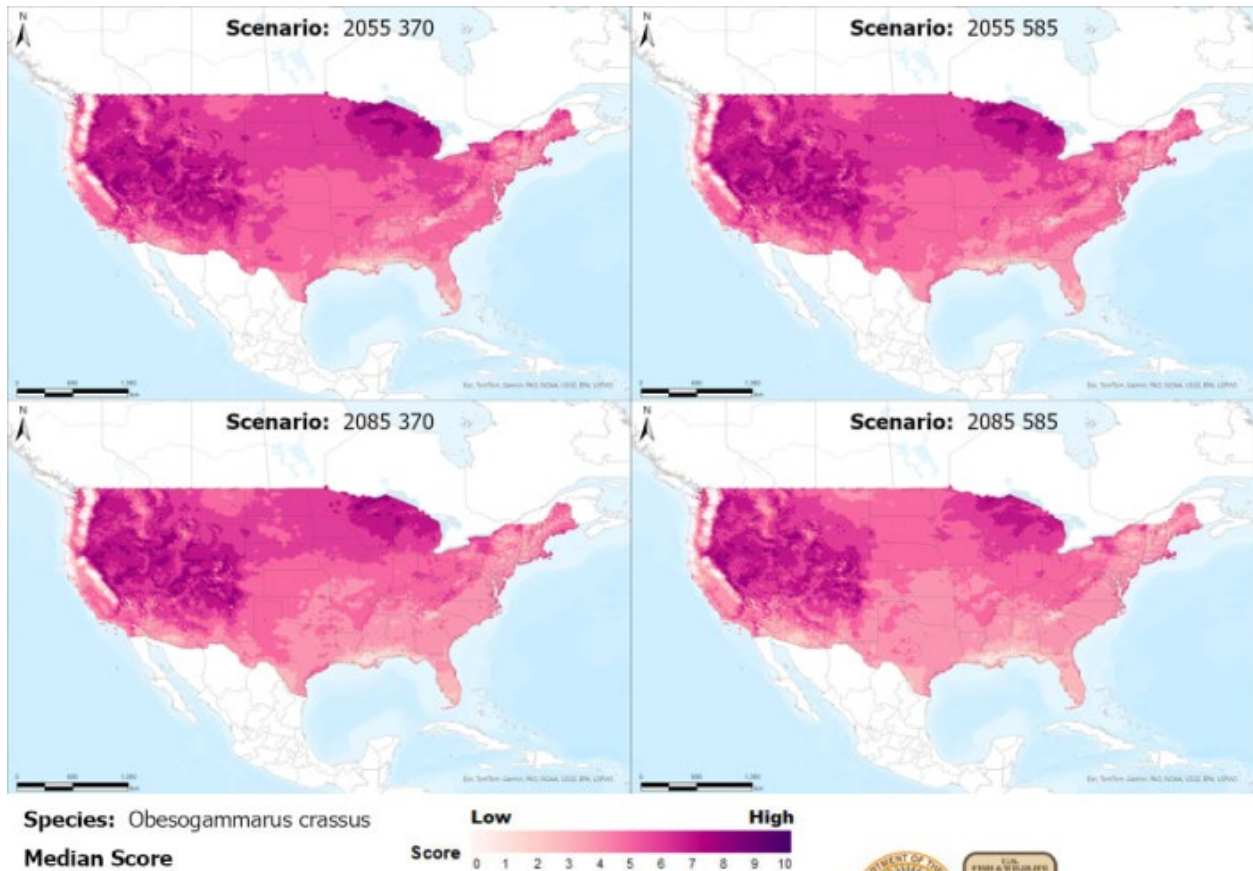
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Appendix

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 (2022) and Jeunen et al. (2022).

Under the future climate scenarios (figure A1), on average, high climate match for *Obesogammarus crassus* was projected to occur in the Great Basin region of the contiguous United States. Under some scenarios, there were also areas of high climate match in the northern Great Lakes. Areas of low climate match were projected to occur in the Northern Pacific Coast and Southern Florida regions. Small areas of the Gulf Coast also had low matches. The Climate 6 scores for the individual future scenario models (figure A2) ranged from a low of 0.169 (model: UKESM1-0-LL, SSP5, 2085) to a high of 0.588 (model: MPI-ESM1-2-HR, SSP3, 2055). All future scenario Climate 6 scores were above the Establishment Concern threshold, indicating that Yes, there was an Establishment Concern for this species. The Climate 6 score for the current climate match (0.694, figure 3) 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). Under one or more time step and climate scenarios, areas within the Colorado Plateau 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 Colorado Plateau, Great Basin, Gulf Coast, and Southern Plains saw a large decrease in the climate match relative to current conditions. Additionally, areas within the Appalachian Range, California, Great Lakes, Mid-Atlantic, Northeast, Northern Plains, Southeast, Southern Atlantic Coast, Southwest, and Western Mountains saw a moderate decrease in the climate match relative to current conditions. The degree of change increased between time step 2055 and time step 2085, and between SSP3 and SSP5 within time step 2085.



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Figure A1. Maps of median RAMP (Sanders et al. 2023) climate matches projected under potential future climate conditions using five global climate models for *Obesogammarus crassus* in the contiguous United States. Climate matching is based on source locations reported by GBIF Secretariat (2022) and Jeunen et al. (2022). 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.

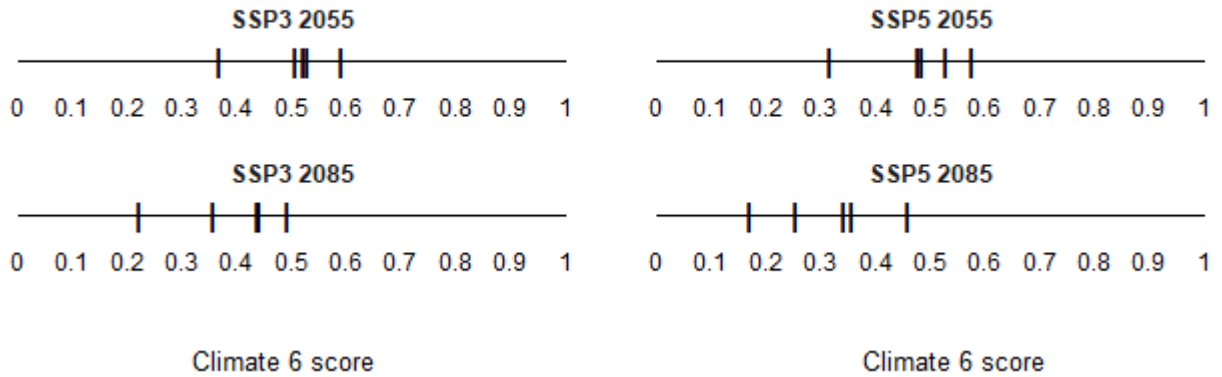


Figure A2. Comparison of projected future Climate 6 scores for *Obesogammarus crassus* in the contiguous United States for each of five global climate models under four combinations of Shared Socioeconomic Pathway (SSP) and time step. SSPs used (from left to right): SSP3, SSP5 (Karger et al. 2017, 2018;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

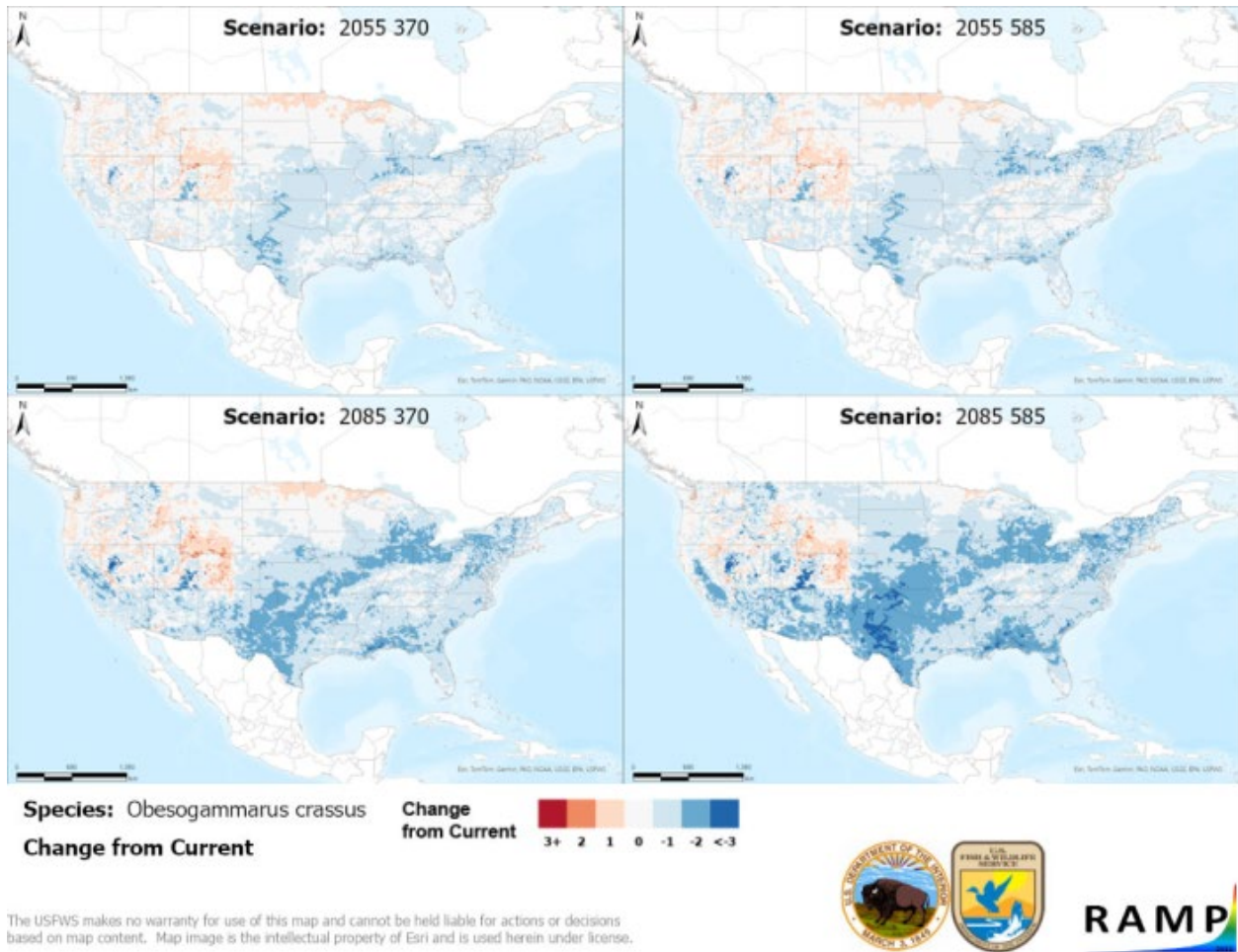


Figure A3. RAMP (Sanders et al. 2023) maps of the contiguous United States showing the difference between the current climate match target point score (figure 3) and the median target point score for future climate scenarios (figure A1) for *Obesogammarus crassus* based on source locations reported by GBIF Secretariat (2022) and Jeunen et al. (2022). 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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