

Starrush Whitetop (*Rhynchospora colorata*)

Ecological Risk Screening Summary

U.S. Fish and Wildlife Service, February 2023

Revised, June 2023, March 2024

Web Version, 3/29/2024

Organism Type: Flowering Plant

Overall Risk Assessment Category: Uncertain



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<http://www.worldfloraonline.org/taxon/wfo-0000515018#A> (February 2023).

1 Native Range and Status in the United States

Native Range

From POWO (2023):

“The native range of this species [*Rhynchospora colorata*] is SE. U.S.A. to N. South America.”

From Bárrrios and Copeland (2021):

“Native, Extant (resident): Anguilla; Antigua and Barbuda; Bahamas; Barbados; Belize; Bermuda; Bonaire, Sint Eustatius and Saba (Saba, Sint Eustatius); Cayman Islands; Costa Rica (Costa Rica (mainland)); Cuba; Dominica; French Guiana; Grenada; Guadeloupe; Guatemala; Haiti; Jamaica; Martinique; Mexico; Montserrat; Puerto Rico (Puerto Rico (main island)); Saint Barthelemy; Saint Kitts and Nevis; Saint Lucia; Saint Martin (French part); Saint Vincent and the Grenadines; Sint Maarten (Dutch part); Turks and Caicos Islands; United States (Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, Texas, Virginia); Venezuela, Bolivarian Republic of (Aves I., Venezuela (mainland)); Virgin Islands, British; Virgin Islands, U.S.”

Status in the United States

From Bárrrios and Copeland (2021):

“Native, Extant (resident): [...] Puerto Rico (Puerto Rico (main island)); [...] United States (Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, Texas, Virginia); [...] Virgin Islands, U.S.”

POWO (2023) reports *Rhynchospora colorata* as being introduced to the State of Tennessee. However, NatureServe (2023) lists *R. colorata* as native and critically imperiled in Tennessee.

Rhynchospora colorata is found in trade within the United States (e.g., Plant Delights Nursery 2023).

Regulations

The genus *Rhynchospora* is regulated as a noxious weed in Louisiana (Louisiana Department of Agriculture and Forestry 2022).

While effort was made to find all applicable regulations, this list may not be comprehensive.

Means of Introductions within the United States

No information on means of introduction of *Rhynchospora colorata* in the wild in the United States were found.

Remarks

Various other common names have been used for this species including, Star Sedge, Narrowleaf Whitetop, Small Whitetop Sedge, Star-rush Whitetop, and Starrush Whitetop (Bárrrios et al. 2021; NatureServe 2023).

The understanding of the distribution of *Rhynchospora colorata*, particularly outside North and South America, is not clear. *R. colorata* is native to North and South America (Bárrrios and Copeland 2021; POWO 2023). However, former subspecies of *Cyperus kyllingia*, a synonym to *R. colorata* (WFO 2023), have been redefined as belonging to the species *Cyperus mindorensis* (WFO 2023) which has a native range in southeast Asia (POWO 2024). Some sources use the name *R. colorata* but list the native range as southeast Asia (e.g., Rodiyati et al. 2005) while many sources give no indication of the native range. Every effort was made to only include

information for the species *R. colorata* which is native to North and South America in this screening, and where such a determination was not possible for distribution information, this was noted.

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From ITIS (2023):

Kingdom Plantae
Subkingdom Viridiplantae
Infrakingdom Streptophyta
Superdivision Embryophyta
Division Tracheophyta
Subdivision Spermatophytina
Class Magnoliopsida
Superorder Lilianae
Order Poales
Family Cyperaceae
Genus *Rhynchospora*
Species *Rhynchospora colorata* (L.) H. Pfeiff

According to WFO (2024), *Rhynchospora colorata* is the current accepted name for this species.

WFO (2024) lists the following as synonyms of *Rhynchospora colorata*: *Cyperus kyllingia* Endl., *Dichroma ciliatum* Pers., *Dichroma leucocephalum* Pers., *Dichromena ciliata* Pers., *Dichromena colorata* (L.) Hitchc., *Dichromena drummondiana* Steud., *Dichromena glabra* Pers., *Dichromena leucocephala* Michx., *Dichromena persooniana* Nees, *Kyllingia colorata* Druce, *K. monocephala* Rottb., *Rhynchospora drummondiana* Steud., *R. leucocephala* Boeckeler, *R. persooniana* Griseb., *R. stellata* Griseb., *R. stellata* f. *intercedens* Kük., *Schoenus coloratus* L., and *S. stellatus* Lam.

The following most used synonyms of *Rhynchospora colorata* were used to search for information for this report: *Cyperus kyllingia* Endl. and *Dichromena colorata* (L.) Hitchc.

Size, Weight, and Age Range

From WFO (2024):

“[...] to 70 cm [...]”

Environment

From WFO (2024):

“Habitat: *Rhynchospora colorata* is most often found in open, somewhat disturbed sites, on neutral or slightly basic, sandy soil (pH usually 7-8): pastures, roadsides or dune swales. It is also occasionally found on stream banks with *Taxodium*, in savannas and in pine flatwoods.”

According to Bárríos et al. (2021), *Rhynchospora colorata* has an upper elevation limit of 300 meters and a lower elevation limit of 0 meters.

Climate

From POWO (2023):

“[...] [*Rhynchospora colorata*] grows primarily in the wet tropical biome.”

Distribution Outside the United States

Native

Part of the native range for this species is within the United States, see section 1 for a complete description of the native range.

From Bárríos and Copeland (2021):

“**Native, Extant (resident):** Anguilla; Antigua and Barbuda; Bahamas; Barbados; Belize; Bermuda; Bonaire, Sint Eustatius and Saba (Saba, Sint Eustatius); Cayman Islands; Costa Rica (Costa Rica (mainland)); Cuba; Dominica; French Guiana; Grenada; Guadeloupe; Guatemala; Haiti; Jamaica; Martinique; Mexico; Montserrat; [...] Saint Barthelemy; Saint Kitts and Nevis; Saint Lucia; Saint Martin (French part); Saint Vincent and the Grenadines; Sint Maarten (Dutch part); Turks and Caicos Islands; [...] Venezuela, Bolivarian Republic of (Aves I., Venezuela (mainland)); Virgin Islands, British; [...]”

Introduced

From POWO (2023):

“Introduced into: Bangladesh, Cambodia, Caroline Is. [Federated States of Micronesia, Palau], Galápagos [Ecuador], Lesser Sunda Is. [Indonesia], Nansei-shoto [Ryuku Islands, Japan] [...], Trinidad-Tobago”

Confidence in the following reported introductions is low due to the complex history of names used for this species and related species (see Remarks). The sources cited for the following introductions did not provide information on native range that could be used to confirm reference to the plant native to North and South America, as opposed to the use of the name *R. colorata* in reference to a Southeast Asian native plant.

According to the Global Register of Introduced and Invasive Species (GBIF Secretariat 2022), *R. colorata* is introduced in Indonesia and Timor-Leste.

CABI (2019) lists *R. colorata* as present in the United Kingdom, Australia, and New Zealand (Kermadec Islands).

India Biodiversity Portal (no date) lists *R. colorata* as present in Assam, India. Kumar and Malik (2024) also list *R. colorata* as present in western Uttar Pradesh, India.

MyBIS (2024) lists *R. colorata* as present and non-native in Malaysia.

None of the above introductions could be confirmed to have resulted in established populations.

Means of Introduction Outside the United States

No data on means of introduction were found for *Rhynchospora colorata* in the wild outside the United States.

Short Description

From WFO (2024):

“Plants perennial, cespitose or solitary, to 70 cm; rhizomes slender, scaly, to 2 mm thick. Culms erect, slender, leafy-based, trigonous, several-ribbed. Leaves spreading to erect, overtopped by culm; blades narrowly linear, proximally flattened, 0.5–3 mm wide, apex tapering, trigonous. Inflorescences terminal, solitary, headlike, dense, white, leafy-involucrate; involucre bracts several, flaring to recurved, white from broadened base nearly to median, then green to tapered tip, longer bracts 13 cm × 2–7 mm. Spikelets white, ovoid, 5–7 mm, apex acute; fertile scales many, boat shaped, sharply curved keeled, 3–4(–5) mm, apex acute or blunt. Flowers: perianth absent. Fruits several per spikelet, 1.5–1.7(–2) mm; body yellow to mahogany, broadly pyriform obovoid, tumidly lenticular, 1 × 0.5–0.7 mm, widest at apex, margins thickened, interrupted at base of tubercle; surfaces transversely undulate rugose, ridges contiguous, of short linear papillae; tubercle broadly triangular, 0.5–0.6 mm, gray crustaceous, apex short acuminate.”

Biology

From POWO (2023):

“It [*Rhynchospora colorata*] is a perennial or rhizomatous geophyte [...].”

Human Uses

From Bárrrios and Copeland (2021):

“This species [*Rhynchospora colorata*] is grown as an ornamental.”

From POWO (2023):

“It [*Rhynchospora colorata*] is [sic] has social uses and as animal food and a medicine.”

Diseases

Poelen et al. (2014) lists the following pathogens for *Rhynchospora colorata*: *Melanographium fasciculatum*, *Puccinia dichromenae*, *P. dichelostemmae*, and *Ustilaginoidea dichromenae*.

Threat to Humans

Navasero and Navasero (2022) include *R. colorata* in their list of host plants of the armyworm *Mythimna separata*, a serious crop pest in the Philippines and elsewhere.

3 Impacts of Introductions

No introductions could be confirmed to have resulted in established populations, and no information on impacts of introductions was found.

Trade of the genus *Rhynchospora* is regulated by the State of Louisiana (LDF 2022); see Section 1 for detailed information.

4 History of Invasiveness

The History of Invasiveness for *Rhynchospora colorata* is classified as No Known Nonnative Population. *R. colorata* has been reported as introduced outside its native range in Asia, the Caribbean, and various islands in the Pacific Ocean. However, due to the confusion over the scientific name and native range of this species, none of the reported introductions could be confirmed both as established populations and as belonging to *R. colorata* as currently defined by WFO (2024). *R. colorata* was found in trade in the United States and internationally, however, no information on volume of trade was found.

5 Global Distribution



Figure 1. Reported global distribution of *Rhynchospora colorata*. Map from GBIF Secretariat (2023). Observations are reported from Africa, Asia, Oceania, Europe, North America, and South America. Locations in South America (except Venezuela), Europe, Africa, Asia, and Oceania were not used as source locations for climate matching as they could not be confirmed as established populations of *R. colorata* or may represent a separate species (POWO 2024; WFO 2024). Occurrences in the United States in Washington, D.C., and Oregon represented cultivated individuals and were not included in the climate matching analysis.

6 Distribution Within the United States

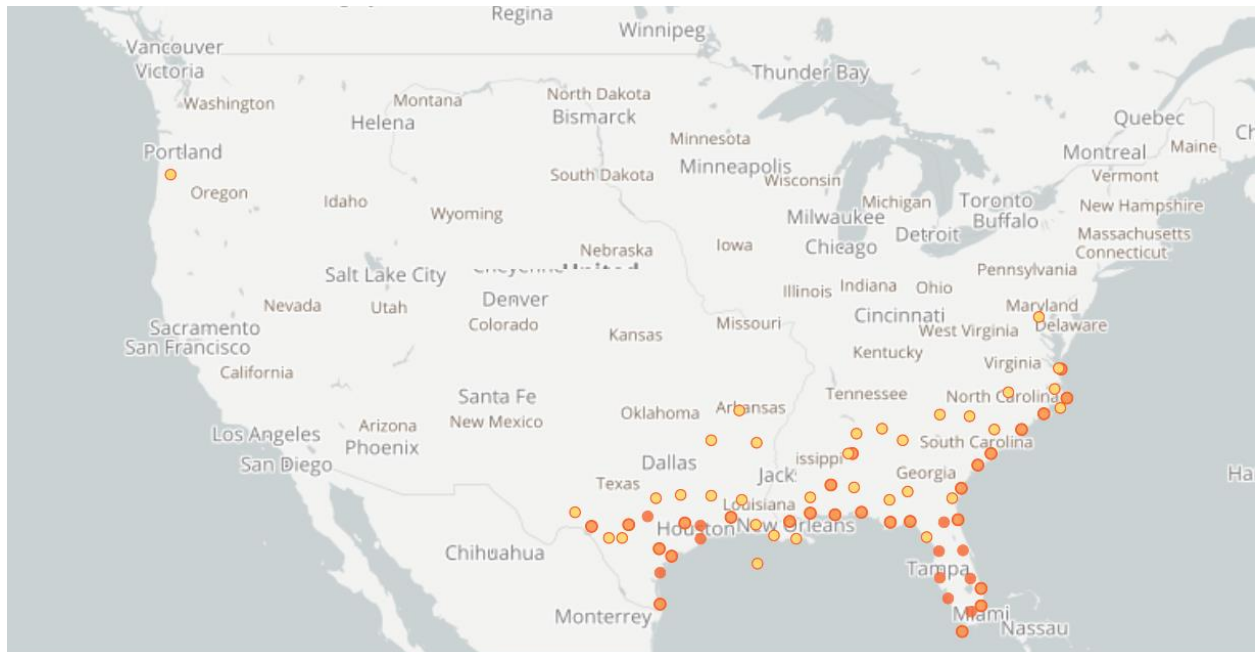


Figure 2. Reported distribution of *Rhynchospora colorata* in the United States. Map from GBIF-US (2023). Observations are reported from Oregon, Texas, Oklahoma, Arkansas, Louisiana, Mississippi, Alabama, Georgia, Florida, South Carolina, North Carolina, Tennessee, Virginia, and Washington, D.C. The locations in Oregon and Washington, D.C., were not used as source locations for the climate matching analysis as they did not represent established populations.

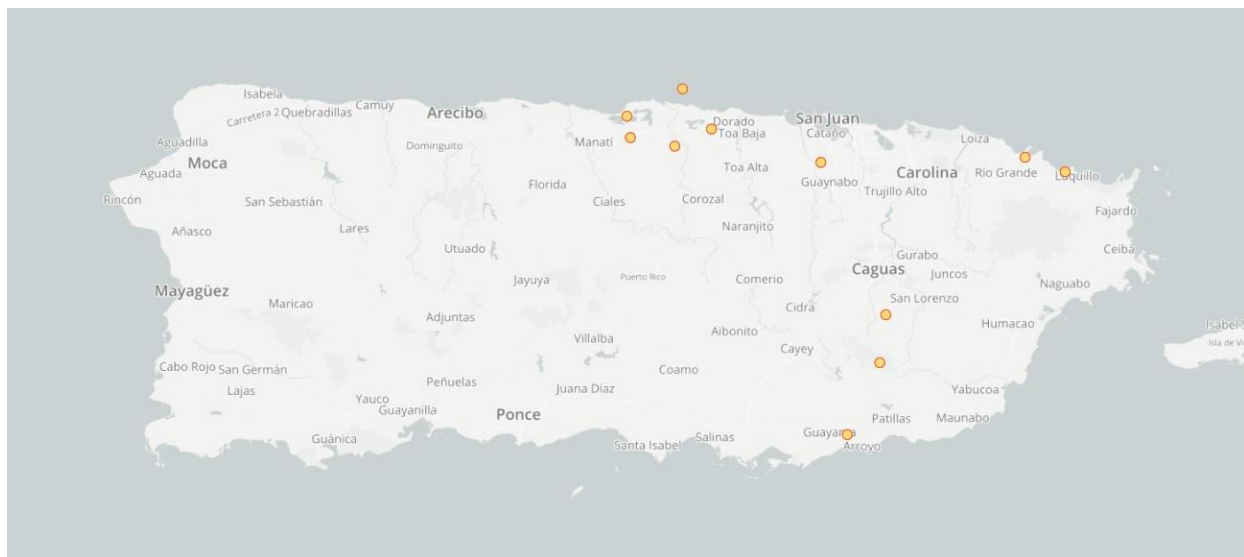


Figure 3. Reported distribution of *Rhynchospora colorata* in Puerto Rico. Map from GBIF-US (2023).



Figure 4. Reported distribution of *Rhynchospora colorata* in Hawaii. Map from GBIF-US (2023). Observations are reported from Oahu and Hawaii islands. These observations were not used as source locations for the climate matching analysis as they could not be confirmed to be established populations.



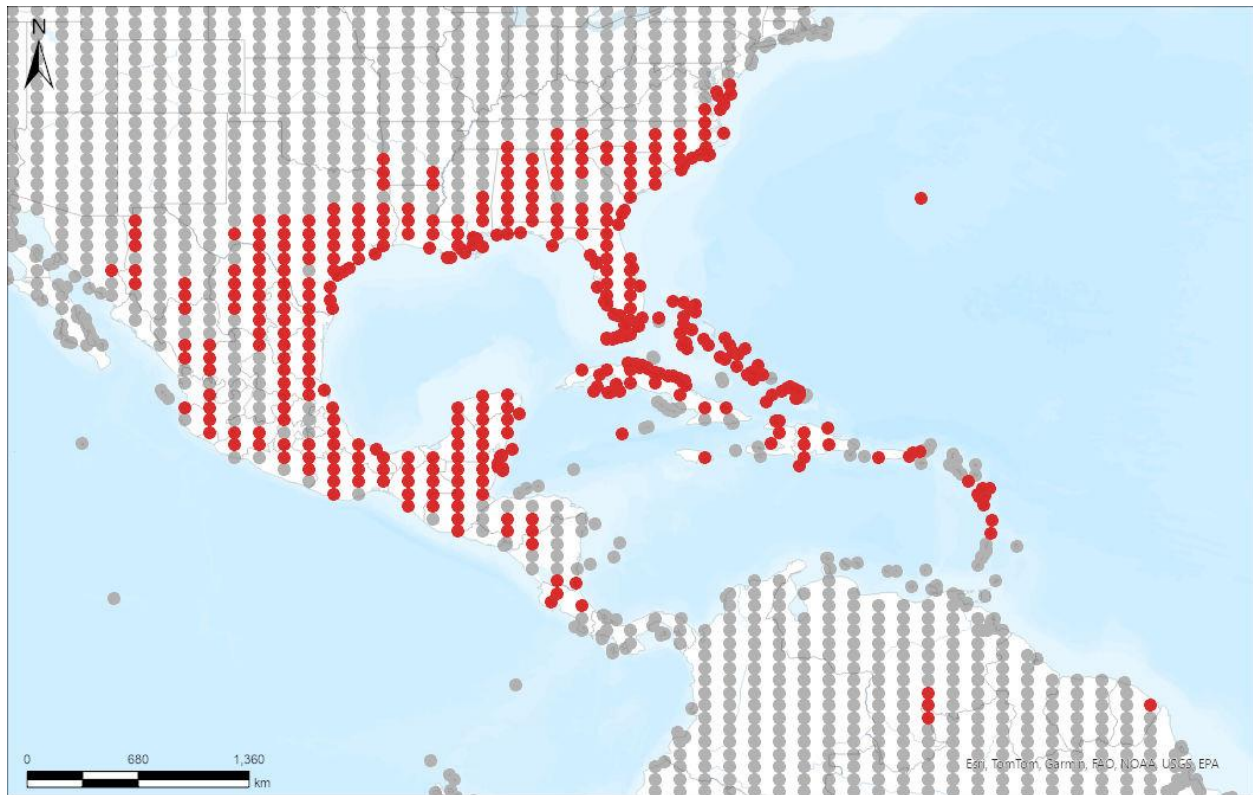
Figure 5. Reported distribution of *Rhynchospora colorata* in Northern Mariana Islands. Map from GBIF-US (2023). Observations are reported on the island of Anatahan of the Northern Mariana Islands. This observation was not used as a source location for the climate matching analysis as it could not be confirmed to be an established population.

7 Climate Matching

Summary of Climate Matching Analysis

The climate match for *Rhynchospora colorata* was generally high in the southeastern contiguous United States. Areas of high match were found from central Texas to southern New Jersey, centered around the native range. Areas of low match were found in the Pacific Northwest into northern California, Rocky Mountains, Great Basin, and northern Great Plains. The Northeast, Southwest, southern Midwest, and Central Plains had a medium climate match. The overall Climate 6 score (Sanders et al. 2023; 16 climate variables; Euclidean distance) for the contiguous United States was 0.540, 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 *Rhynchospora colorata* (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 6. RAMP (Sanders et al. 2023) source map showing weather stations in North and South America selected as source locations (red; United States, Mexico, Belize, Guatemala, Honduras, Nicaragua, Costa Rica, Venezuela, French Guiana, Bahamas, and many of the countries in the Greater and Lesser Antilles) and non-source locations (gray) for *Rhynchospira colorata* 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.

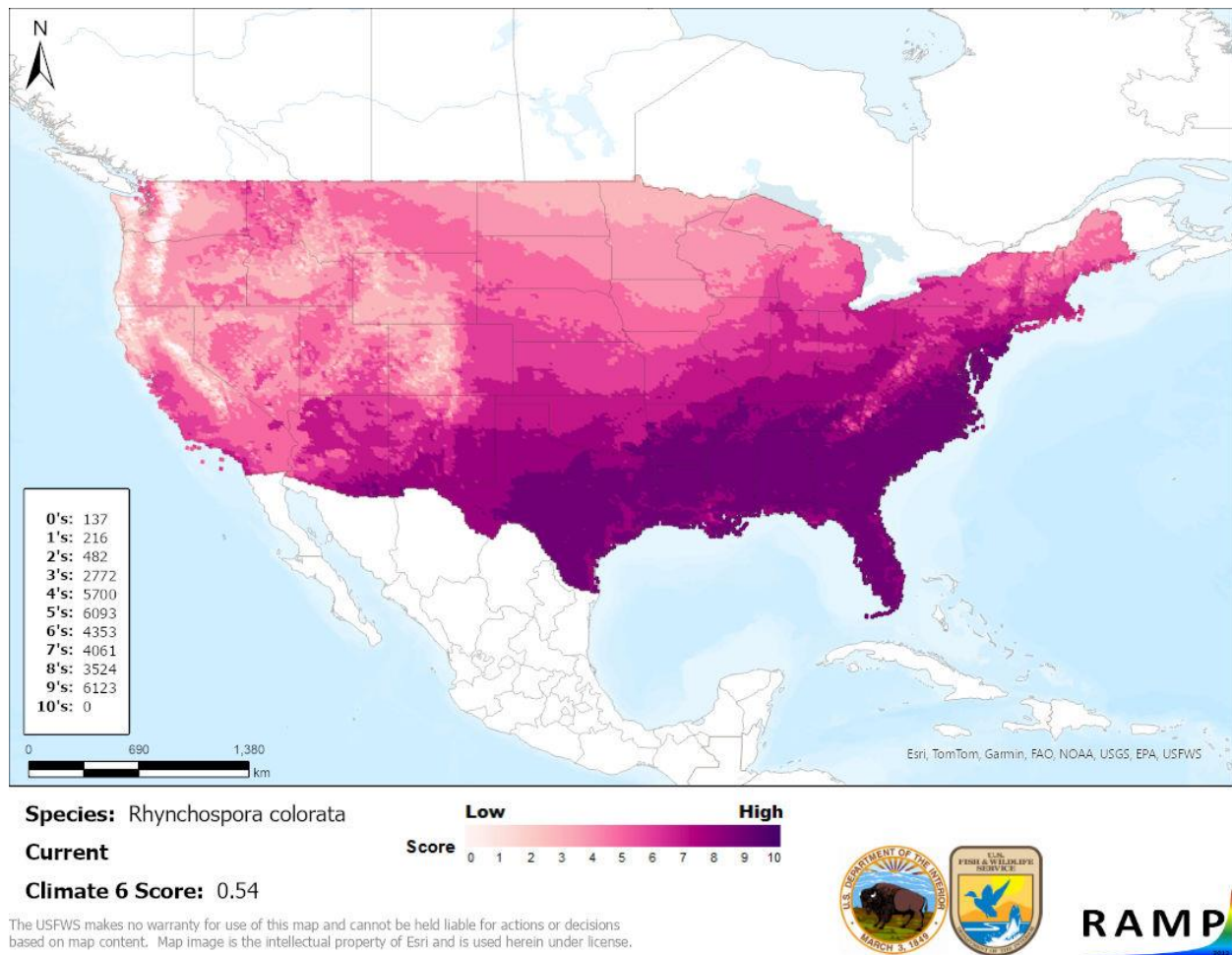


Figure 7. Map of RAMP (Sanders et al. 2021) climate matches for *Rhynchospora colorata* in the contiguous United States based on source locations reported by GBIF Secretariat (2023). Counts of climate match scores are tabulated on the left. 0/Pale Pink = Lowest match, 10/Dark Purple = Highest match.

8 Certainty of Assessment

The Certainty of Assessment for *Rhynchospora colorata* is classified as Low. Limited and sometimes contradictory information is available on the biology, ecology, and distribution of *R. colorata*. In particular, information on the range of *R. colorata* outside of North and South America was limited in detail and complicated by the taxonomic issue with the synonym's subspecies assignment to a different species. Information on introductions was found; however, no establishment could be confirmed and no information on impacts was available. *R. colorata* was found in trade; however, information on the volume or duration of trade was not found. Due to limited information with which to evaluate the History of Invasiveness and complicated understanding of the species' range, the Certainty of Assessment is Low.

9 Risk Assessment

Summary of Risk to the Contiguous United States

Rhynchospora colorata, Starrush Whitetop, is a flowering plant that is native to North and South America. This perennial plant can be found in a variety of environments but is typically seen in wetlands. *R. colorata* is in trade as an ornamental plant in the United States. The genus *Rhynchospora* is regulated in Louisiana. *R. colorata* has been observed outside of its native range, however, information on the origin of this species in the Eastern Hemisphere is not clear and complicated by a taxonomic issue. No populations outside the native range could be confirmed as established, and no information on impacts of introductions was found. The History of Invasiveness for *Rhynchospora colorata* is classified as No Known Nonnative Population due to the uncertainty around the species range and lack of information on impacts of introduction. The climate matching analysis for the contiguous United States indicates establishment concern for this species outside its native range. Areas of high match were found in the southeastern United States, surrounding the native range, extending from central Texas to southern New Jersey. Areas of low match were found primarily in the West. The Certainty of Assessment for this ERSS is classified as Low due to limited information and the unclear introduced range. The Overall Risk Assessment Category for *Rhynchospora colorata* in the contiguous United States is Uncertain.

Assessment Elements

- **History of Invasiveness (see section 4): No Known Nonnative Population**
- **Establishment Concern (see section 7): Yes**
- **Certainty of Assessment (see section 8): Low**
- **Remarks, Important additional information: None**
- **Overall Risk Assessment Category: Uncertain**

10 Literature Cited

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

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11 Literature Cited in Quoted Material

Note: The following references are cited within quoted text within this ERSS, but were not accessed for its preparation. They are included here to provide the reader with more information.

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Appendix

Summary of Future Climate Matching Analysis

Future climate projections represent two Shared Socioeconomic Pathways (SSP) developed by the Intergovernmental Panel on Climate Change (IPCC 2021): SSP5, in which emissions triple by the end of the century; and SSP3, in which emissions double by the end of the century. Future climate matches were based on source locations reported by GBIF Secretariat (2023).

Under the future climate scenarios (figure A1), on average, high climate match for *Rhynchospora colorata* was projected to occur in the Appalachian Range, Gulf Coast, Mid-Atlantic, Northeast, and Southeast regions of the contiguous United States. The lowest climate match was projected to occur in the Northern Pacific Coast region. The areas of high match decreased with time and between SSP3 and SSP5, contracting toward southwestern Texas and in a second direction toward the Mid-Atlantic and Northeast. The Northern Plains had mainly a medium match over both time steps and SSPs while low and medium matches were scattered through much of the West. The Climate 6 scores for the individual future scenario models (figure A2) ranged from a low of 0.597 (model: MPI-ESM1-2-HR, SSP5, 2085) to a high of 0.788 (model: UKESM1-0-LL, SSP5, 2085). 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 (0.540, figure 7) 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 (figure A3). Under one or more time step and climate scenarios, areas within the Great Lakes and Northeast saw a large increase in the climate match relative to current conditions. Additionally, areas within the Appalachian Range, Colorado Plateau, Great Basin, Northern Pacific Coast, Northern Plains, Southern Plains, and Western Mountains saw a moderate increase in the climate match relative to current conditions. Under one or more time step and climate scenarios, areas within the Appalachian Range, Mid-Atlantic, Southeast, 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. The degree of change increased with time and from SSP3 to SSP5.

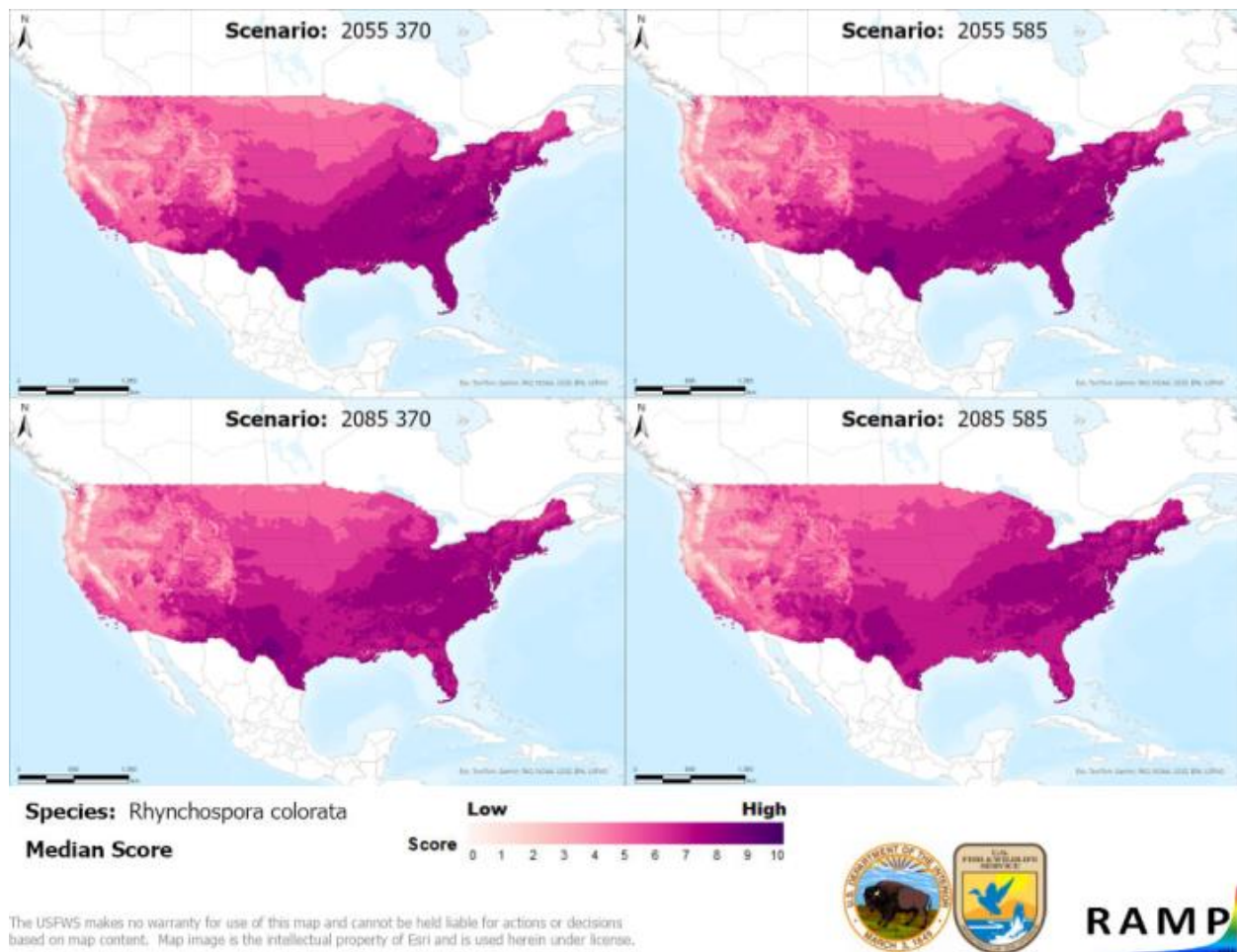


Figure A1. Maps of median RAMP (Sanders et al. 2023) climate matches projected under potential future climate conditions using five global climate models for *Rhynchospora colorata* in the contiguous United States. Climate matching is based on source locations reported by GBIF Secretariat (2023). Shared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

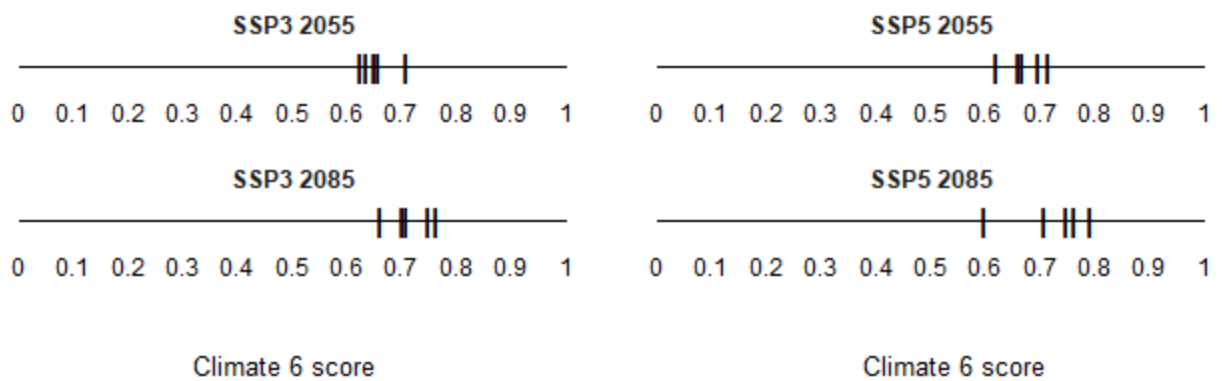
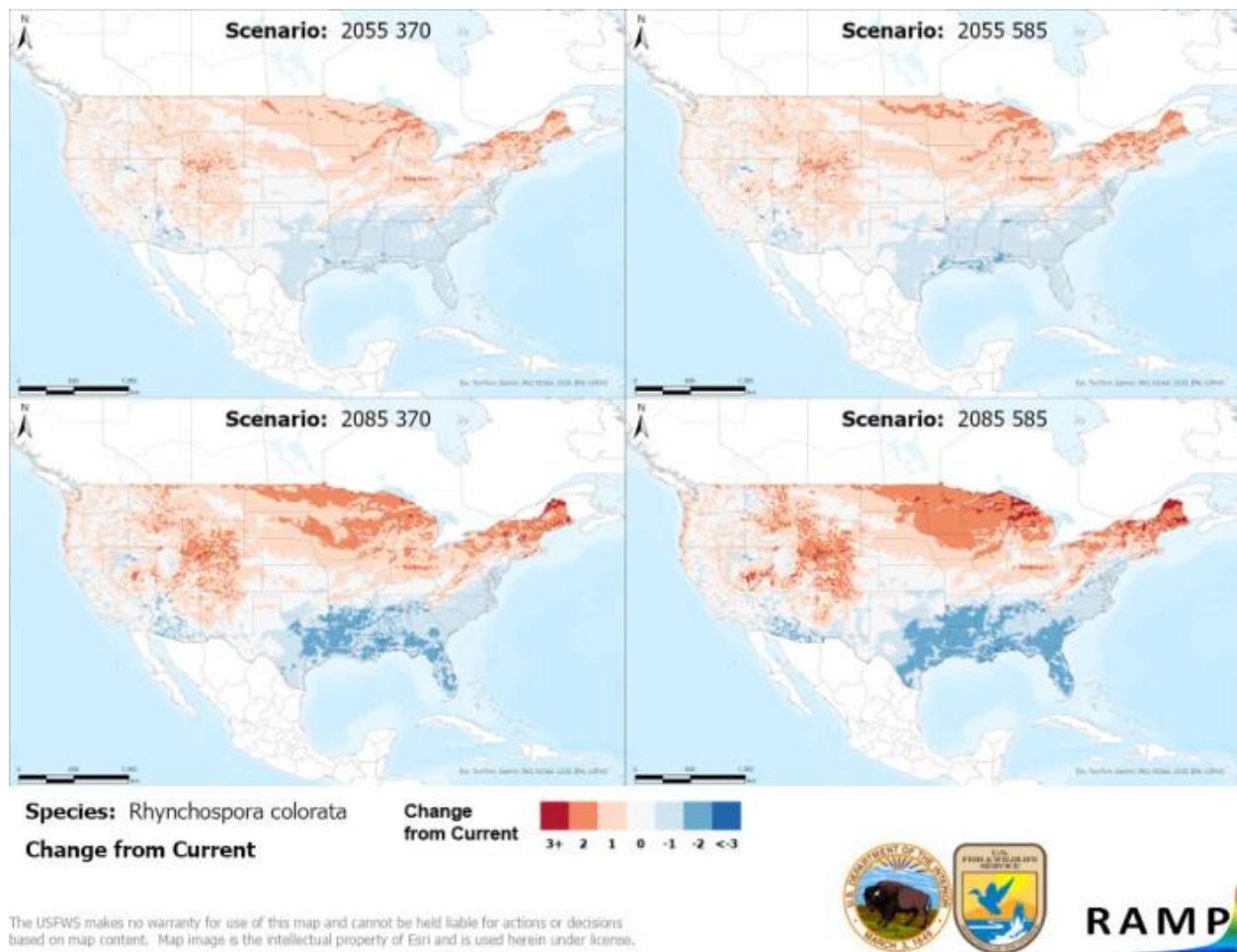


Figure A2. Comparison of projected future Climate 6 scores for *Rhynchospora colorata* in the contiguous United States for each of five global climate models under four combinations of Shared Socioeconomic Pathway (SSP) and time step. SSPs used (from left to right): SSP3, SSP5 (Karger et al. 2017, 2018;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



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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 *Rhynchospira colorata* 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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