West Indian Marsh Grass (*Hymenachne amplexicaulis*)
Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, December 2022
Revised, May 2023
Web Version, 3/14/2025

Organism Type: Flowering Plant
Overall Risk Assessment Category: High


Photo: Ian Cowan. Licensed under: CC BY-NC 4.0. Available: https://www.inaturalist.org/observations/37077548 (December 2022).

1 Native Range and Status in the United States

Native Range

According to USDA (2022), *Hymenachne amplexicaulis* is native to Mexico, Barbados, Cuba, Dominica, Dominican Republic, Guadeloupe, Haiti, Jamaica, St. Lucia, Martinique, Puerto Rico, Belize, Costa Rica, Guatemala, Honduras, Nicaragua, Panama, El Salvador, French Guiana, Guyana, Suriname, Venezuela, Brazil, Bolivia, Colombia, Ecuador, Peru, Paraguay, and Uruguay.

Wearne et al. (2010) also lists Argentina as part of the native range for *Hymenachne amplexicaulis*.

Status in the United States

According to USDA (2022), *Hymenachne amplexicaulis* is naturalized in the southeastern United States, in Florida and Louisiana.

From Jacono (2014):

"H. amplexicaulis is known only from the extreme south-southeastern states of Florida and Lousiana [sic]. In Florida, 20 counties (out of 67) have been documented with herbarium specimens (FLAS; USF; LSU) representing floodplain marshes and the margins of hardwood swamps of the typically expansive and low elevation river basins of central and south central Florida."

Howard (2025) lists an observation of an established population of *Hymenachne amplexicaulis* in Charleston County, South Carolina.

According to USDA (2022), *H. amplexicaulis* is native to Puerto Rico.

No records of *H. amplexicaulis* 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

From Jacono (2014):

"The method by which *H. amplexicaulis* was introduced to the USA is not clear, although it is more likely to have been intentionally introduced as a pasture grass rather than accidentally or naturally introduced via migrating waterfowl (Langeland et al., 2008; Montemayor et al., 2013; Urbatsch and Saichuk, 2014)."

Remarks

From Jacono (2014):

"H. amplexicaulis is restricted as a quarantine pest in Australia only […]"

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From ITIS (2022):

Kingdom Plantae
   Subkingdom Viridiplantae

Infrakingdom Streptophyta
Superdivision Embryophyta
Division Tracheophyta
Subdivision Spermatophytina
Class Magnoliopsida
Superorder Lilianae
Order Poales
Family Poaceae
Genus *Hymenachne*
Species *Hymenachne amplexicaulis*

According to WFO (2022), *Hymenachne amplexicaulis* is the current valid name for this species.

Size, Weight, and Age Range

From Wearne et al. (2010):

"*Hymenachne amplexicaulis* is a robust, stoloniferous, perennial grass commonly 1–2.5 m tall."

Environment

From WFO (2022):

"Swamps, ditches, and margins of rivers, lakes, and streams, sometimes in water 3-4 feet deep."

From Jacono (2014):

"*H. amplexicaulis* prefers seasonally inundated, open habitats such as lowland floodplain marshes and savannas, marsh ponds, isolated depressions and the sunny margins of swamps, rivers, lakes and streams."

"In agricultural and urbanized areas it can colonize flooded fields of rice and sugar cane and the ditches, canals, and dams that serve it. Even in its native range, it is not unusual to find *H. amplexicaulis* in natural wetlands habitats that are adjacent to cultivated land."

"This species grows best under fluctuating systems of shallow water up to 1.5 m deep. In permanent wetlands the species will persist if water levels do not exceed 1.2 m."

Climate

From WFO (2022):

"Tropics of both hemispheres"

From Wearne et al. (2010):

"This area [where *Hymenachne amplexicaulis* is native] lies between the northernmost herbarium record of the plant at Tabasco, Mexico (latitude 19°N) and the southernmost record in southern Paraguay (28°S) (approximate latitudes) […]"

Distribution Outside the United States

Native

According to USDA (2022), *Hymenachne amplexicaulis* is native to Mexico, Barbados, Cuba, Dominica, Dominican Republic, Guadeloupe, Haiti, Jamaica, St. Lucia, Martinique, Puerto Rico, Belize, Costa Rica, Guatemala, Honduras, Nicaragua, Panama, El Salvador, French Guiana, Guyana, Suriname, Venezuela, Brazil, Bolivia, Colombia, Ecuador, Peru, Paraguay, and Uruguay.

Wearne et al. (2010) also lists Argentina as part of the native range for *Hymenachne amplexicaulis*.

Introduced

From Plants of the World Online (2022):

"Introduced into:
Andaman Is. [India], Assam [India], Bangladesh, Borneo [Indonesia, Malaysia, Brunei], China South-Central, East Himalaya [India], […] Hainan [China], India, Jawa [Indonesia], Malaya [Malaysia], Myanmar, Nepal, New Guinea, New South Wales [Australia], Nicobar Is. [India], Northern Territory [Australia], Philippines, Queensland [Australia], Sri Lanka, Taiwan, Tasmania [Australia], Thailand, Victoria [Australia], Vietnam, Western Australia [Australia]"

From Wearne et al. (2010):

"*Hymenachne amplexicaulis* has spread considerably in the last two decades [in Australia] and is now widely distributed within waterways and wetlands across coastal and subcoastal Queensland and the Northern Territory. Small populations extend to northern New South Wales […]"

Means of Introduction Outside the United States

From Jacono (2014):

"*H. amplexicaulis* was purposefully introduced to Australia for planting in impounded systems called 'ponded' pastures, especially where the created water levels became too deep for the preferred wet pasture para grass *Urochloa mutica*."

"Seeds prove the highest risk for long distance and new introductions, whether through biotic, climactic, or human mediated means […]"

Short Description

From WFO (2022):

"Coarse aquatic perennial; culms succulent, slender or usually rather thick, sparingly branching, glabrous, the base creeping, rooting at the nodes, 1-2 m. long, or even longer; sheaths usually shorter than the internodes, glabrous or sometimes ciliate on the margins; blades commonly 15-35 cm. long, 1.5-3 cm. wide, or smaller on some of the branches, acuminate, gradually narrowed from the cordate- clasping base, the margins scabrous, more or less papillose-hispid-ciliate at the base; panicles 20-50 cm. long, sometimes shorter, 8-15 mm. thick, dense, spike-like, the lower branches often distant; spikelets 3-4 mm. long, acuminate, the second glume and sterile lemma rather prominently scabrous on the nerves, the lemma often awn-pointed."

From Wearne et al. (2010):

"It grows rooted in the substratum and its stems float out into deep water. The glabrous stems are erect or ascending from a prostrate base and are filled with white pith (aerenchyma). Roots are produced from the lower nodes. […] Flowering culms are 80–95 cm tall, sparingly branched, with up to four nodes."

Biology

From Jacono (2014):

"In agricultural and urbanized areas it can colonize flooded fields of rice and sugar cane and the ditches, canals, and dams that serve it. Even in its native range, it is not unusual to find *H. amplexicaulis* in natural wetlands habitats that are adjacent to cultivated land."

"This species grows best under fluctuating systems of shallow water up to 1.5 m deep. In permanent wetlands the species will persist if water levels do not exceed 1.2 m. Populations have been known to remain growing and rooted in depths of 3 m for at least nine months […] floodplain marshes and the margins of hardwood swamps, of the typically expansive and low elevation river basins of central and south central Florida."

From Wearne et al. (2010):

"*Hymenachne amplexicaulis* reproduces from seed and stolons. It can grow vegetatively from a stem containing a single node (Sellers *et al*. 2008). Growth of plants can occur throughout the year, provided there is adequate soil moisture. However, a major fl ush of biomass occurs during the wet season (January – April) in the tropics, presumably as a result of increased humidity and flooding (L. Wearne unpublished data)."

"Flowering is primarily triggered by short days (Diaz et al. 2009). However, other factors such as soil moisture and temperature are thought to play a role. In Australia, peak flowering of *H. amplexicaulis* populations occurs for 1–2 weeks during April and May (late autumn) (Wearne *et al*. 2008). Populations can continue to produce flowers beyond this period, although at a much reduced rate. *H. amplexicaulis* has been observed flowering multiple times during a single year in northern Queensland, with plant stems often able to produce two flowering spikes in the same flowering period (L. Wearne personal observation 2007). […] Plants will continue to produce flowers throughout the year, although at a much reduced rate, if soil moisture is available (L. Wearne unpublished data). In Florida, flowering and seed set also occur in autumn, which coincides with the end of the wet season (Hill 1996)."

"A seed burial trial conducted over eight years (1999–2007) compared the effects of time and depth of burial on *H. amplexicaulis* seed bank longevity. […] Results indicate that *H. amplexicaulis* seed is persistent, with up to 21% of seed on the surface (0–2 cm) still viable after six years, and 8–24% viable after eight years […]"

Human Uses

From Jacono (2022):

"*H. amplexicaulis* has been planted in northern Australia as a culm species in low fertility, ponded pasture systems for cattle grazing […]"

"The species has shown to be valuable to cattle production in ponded pasture systems in Queensland and on alluvial flood plains of Northern Territory, Australia. Although it escapes to wetlands, watercourses and other unexpected wet areas, many landholders are reluctant to implement control due to the forage benefits it is believed to have and the expense and large efforts required for control. Meanwhile the authorities report that cattle largely ignore *H. amplexicaulis* in Australia when other food sources are available (Australian Government, Dept. of Env., 2014)."

"The plant is a highly valued forage in its native range in Mexico, Cuba and Venezuela (Diaz et al., 2008). Producers indicated that *H.amplexicaulis* [sic] is beneficial for milk production compared with other forage grasses growing in flooded tropical savanna conditions (Enriquez-Quiroz et al., 2006), and it has been shown to provide high protein and digestible matter when grown under wet conditions (Kalmbacher et al., 1998)."

From Wearne et al. (2010):

"The species was also used to suppress seedling growth of *Mimosa pigra* (Paynter 2004)."

Diseases

From Jacono (2014):

"*H. amplexicaulis* have been associated with the increased abundance of two species of mosquitoes, one of which vectors the Ross River virus. The association is believed to be a response of the inability of fish to feed on mosquito larvae in thick monocultures."

Threat to Humans

From Jacono (2014):

"*H. amplexicaulis* have been associated with the increased abundance of two species of mosquitoes, one of which vectors the Ross River virus. The association is believed to be a response of the inability of fish to feed on mosquito larvae in thick monocultures. Subsequent herbicide treatment of dense stands presents the alternative risk of degrading the quality of public water stores (Australian Weeds Committee, 2012)."

"The plant's tendency to produce large, monospecific stands that acclimate to hydrological fluctuations severely impacts hydroelectric systems in urbanized regions within its native range (Silva et al., 2012). *H. amplexicaulis* has impacted engineered rivers at hydroelectric dams in Rio Dulce and Rio de Janeiro."

3 Impacts of Introductions

From Jacono (2014):

"The incomes of barramundi (*Lates calcarifer*) fisheries are threatened by the degradation of barramundi wetland nurseries following invasion of *H. amplexicaulis* (Australian Weeds Committee, 2012)."

"In the Fitzroy River backwaters of central Queensland, Australia, the replacement of extensive zones of floating-attached and submergent native vegetation by monoculture stands of *H. amplexicaulis* resulted in a 30-fold increase in wetland plant biomass, but a significant decline in the number of plant species. These changes in vegetation structure were found to influence macroinvertebrate and fish faunal composition. Macroinvertebrates communities were significantly reduced, except for the order Coleoptera, which were more abundant. Populations of the introduced fish *Xiphophorus maculatus* comprised 75% of the fish captured in *H. amplexicaulis* beds, compared with 0% of the fish species captured in native plant beds (Houston and Duivenvoorden, 2002), suggesting the presence of *H. amplexicaulis* monocultures also encouraged invasive fish populations."

"Dissolved oxygen levels within dense aquatic stands of *H. amplexicaulis* have been measured at 17% saturation, well below the minimum 30% required to prevent acute stress in local fish species (Australian Weeds Committee, 2012). In addition, fish movement is likely impeded by the physical barrier of the dense plant populations (Australian Weeds Committee, 2012)."

"In the following conservation areas in Florida *H. amplexicaulis* can be found altering the species composition and structure of open, seasonal marsh and floodplain communities: The Myakka Wild and Scenic River […] Six Mile Cypress Preserve […] Lake Okeechobee, Fisheating Bay […] St. Johns Marsh and Reedy Creek Swamp […] Wingate Creek State Preserve and Deer Prairie Creek Preserve"

"The invasion of *H. amplexicaulis* into natural wetland habitats of the tropics of northern Australia has resulted in hybridization with the indigenous species *H. acutigluma* (although The

Plant List lists *H. acutigluma* as a synonym of *H. amplexicaulis*). Hybridization events, initially detected by intermediacy in morphological character traits from plants at Abattoir Swamp and Beatrice Creek, Northern Territory, were confirmed by molecular analysis and concluded by the formal description of the new hybrid *H.* x *calamitosa* (Clarkson et al., 2011). The hybrid *H.* x *calamitosa* has the propensity to be at least as invasive and environmentally destructive under Australian conditions as is *H. amplexicaulis* (Clarkson et al., 2011). Because hybridization has been detected between the exotic and indigenous species at two widely spaced locations, it may be occurring as a common event (Clarkson et al., 2011) across the Australian range of *H. acutigluma*, wherever the two species coexist. The corruption of an indigenous genotype is a direct and measurable loss to global biodiversity, and while the production of a new hybrid species may be considered an addition to the global tally, its conservation significance ranks very low."

"*H. amplexicaulis* have been associated with the increased abundance of two species of mosquitoes, one of which vectors the Ross River virus. The association is believed to be a response of the inability of fish to feed on mosquito larvae in thick monocultures. Subsequent herbicide treatment of dense stands presents the alternative risk of degrading the quality of public water stores (Australian Weeds Committee, 2012)."

From IFAS (2022):

"West Indian marsh grass has been found to be displacing native maidencane (*Panicum hemitomon)* communities in central and south Florida. It forms dense colonies and has become increasingly difficult to control, especially long drainage canals of south central Florida."

From Wearne et al. (2010):

"Although the north Queensland sugar industry suggests that productivity can be decreased through direct competition from *H. amplexicaulis*, there are limited data to support this view. The true economic cost to the sugar cane industry appears to arise from the cost of control. *H. amplexicaulis* has been shown to block drainage/irrigation channels and water storages that supply irrigation water to cane farms. […] Although there has been no overall cost placed on losses as a result of *H. amplexicaulis*, some cane farmers reportedly suffer losses of $A80 000–$A100 000 y^{-1} due to poor drainage (Csurhes et al. 1999)."

"Other potential problems and costs relate to damage of infrastructure. This is a particular problem during floods when large rafts of *H. amplexicaulis* are deposited against bridges and barrages. The species also has caused havoc with boats, when in 2007 fast moving floodwaters resulted in large masses of *H. amplexicaulis* catching on moored boats, snapping their anchoring and sweeping the vessels downstream (The Morning Bulletin, Rockhampton 2007)."

"In Florida (USA), *H. amplexicaulis* colonized the deeper part of the marshes and formed floating mats. Native plant species were absent from areas dominated by *H. amplexicaulis*. During flooding events, the only plant emerging from the water was *H. amplexicaulis*, hence demonstrating its potential for outcompeting native species (Overholt *et al*. 2006)."

"Turtle and waterbird richness were found to increase following removal of *H. amplexicaulis* in the Fitzroy Catchment. However, other factors, including breeding responses, 'sightability' early in the study, and the delayed effects of flooding on the ecosystem may have influenced this result (Kinnear *et al*. 2008)."

"Additional impacts of *H. amplexicaulis* include impediment of fish passage due to physical barriers (dense *H. amplexicaulis* infestations) and/or low dissolved oxygen (physiological barrier) (Challen and Long 2004)."

No species-specific regulations for this species were found.

4 History of Invasiveness

This species has become established in many areas outside of its native range, altering vegetation composition and negatively impacting the native aquatic organisms in areas where it establishes. Economic impacts in sugar cane production and property damage also occur in areas with nonnative populations. The History of Invasiveness for *Hymenachne amplexicaulis* is classified as High.

5 Global Distribution

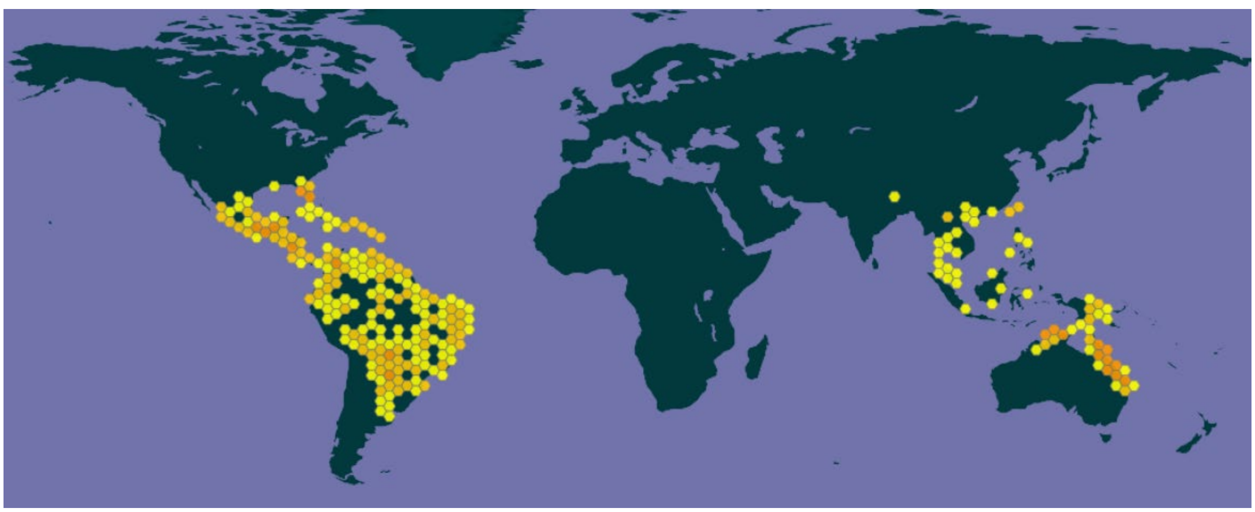

Figure 1. Reported global distribution of *Hymenachne amplexicaulis*. Map from GBIF Secretariat (2022). Observations are reported from most of South America, Central America, and Mexico, the southern United States, and the Caribbean. It is also recorded in northern Australia and Southeast Asia. The isolated point in Nepal is not known to indicate an established population and was not used in the climate matching analysis.

6 Distribution Within the United States

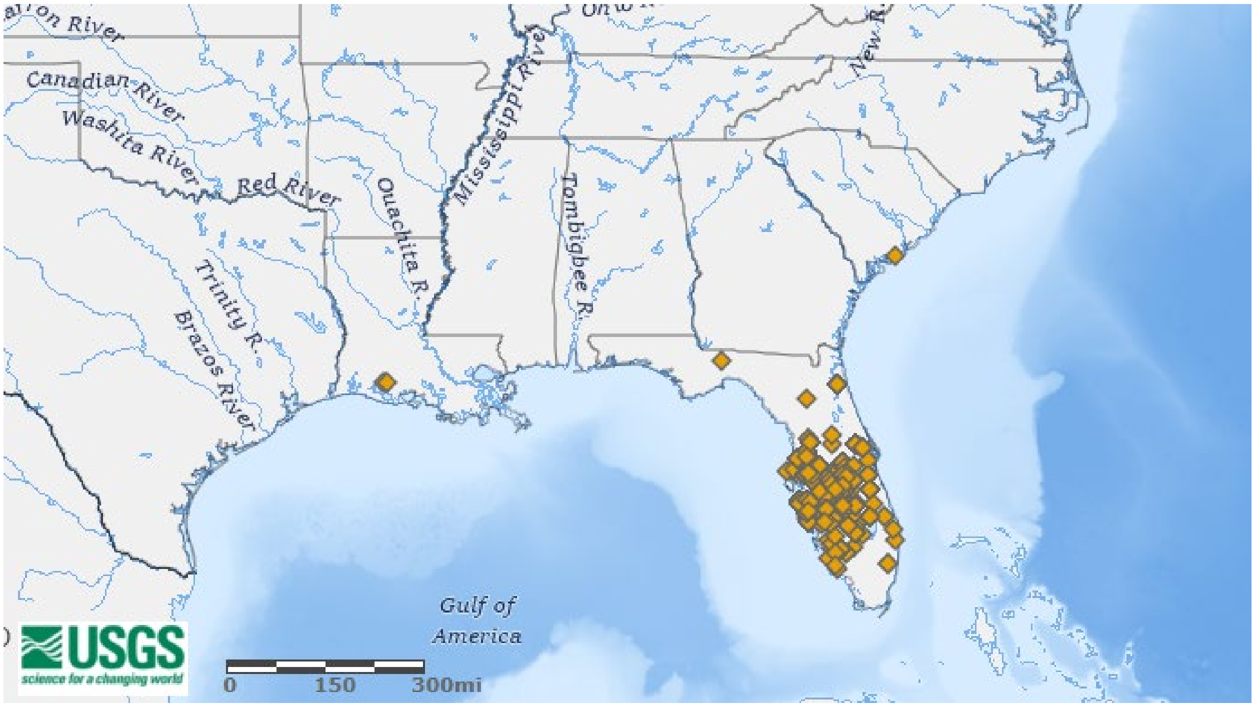

Figure 2. Reported distribution of *Hymenachne amplexicaulis* in the United States. Map from GBIF-US (2022). Observations are reported from Florida, Louisiana, and South Carolina.

Figure 3. Reported distribution of *Hymenachne amplexicaulis* in Puerto Rico. Map from GBIF-US (2022). Observations are reported throughout Puerto Rico.

7 Climate Matching

Summary of Climate Matching Analysis

The climate match for *Hymenachne amplexicaulis* to the contiguous United States was high in the Southeast, Southern Plains and into the Mid-Atlantic and Midwest. The areas with low match included New England, the Northern Pacific Coast, Western Mountains, the Great Basin, and Colorado Plateau along with the northern Great Plains. The overall Climate 6 score (Sanders et al. 2023; 16 climate variables; Euclidean distance) for the contiguous United States was 0.442, 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 *Hymenachne amplexicaulis* (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.

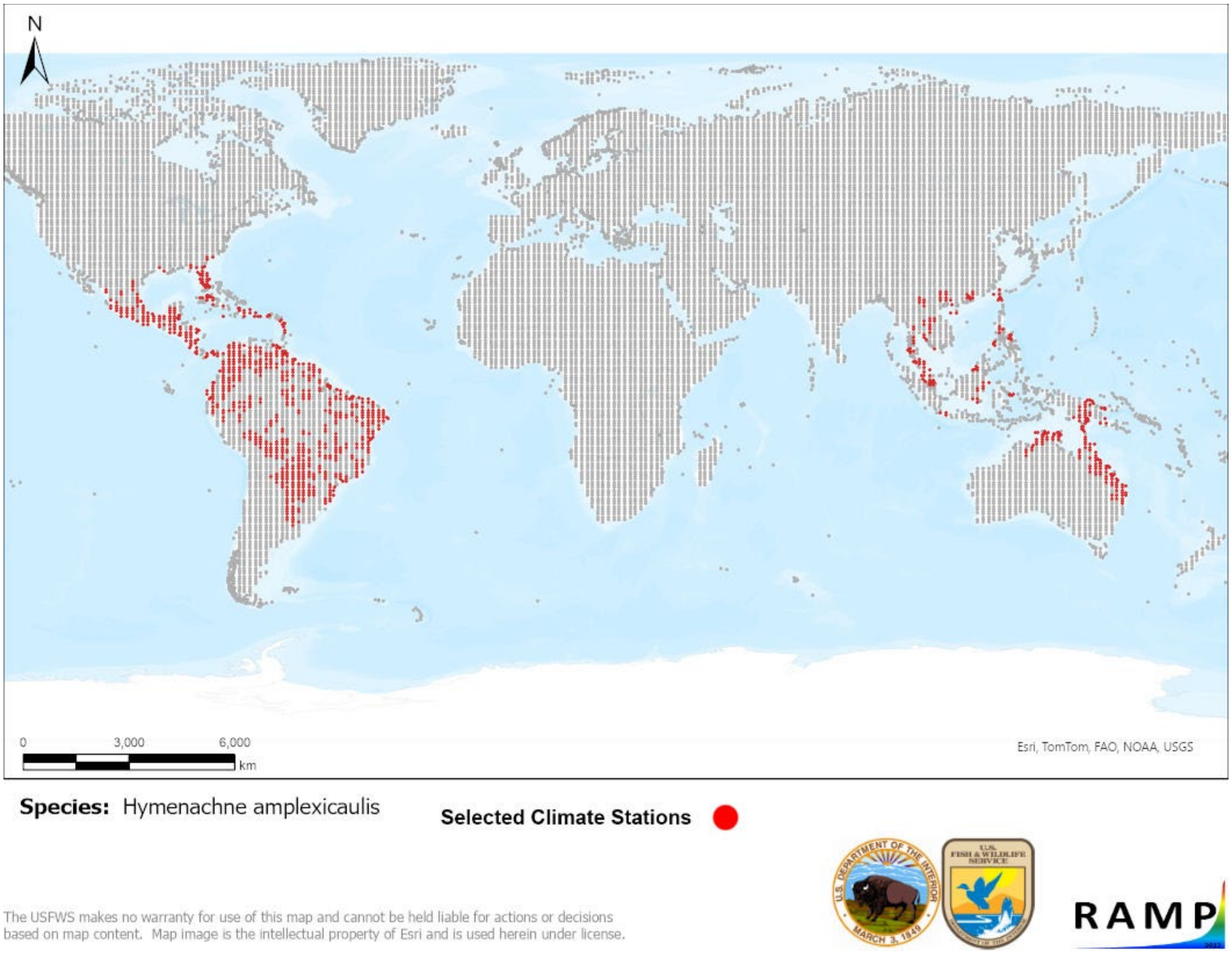

Figure 4. RAMP (Sanders et al. 2023) source map showing global weather stations in selected as source locations (red; north and east portions of Australia, as well as the Pacific Islands and portions of South-east Asia, and the majority of central and northern South America extending to central Mexico and Florida and a lot of the Caribbean Islands) and non-source locations (gray) for *Hymenachne amplexicaulis* climate matching. Source locations from GBIF Secretariat (2022) and Howard (2025). Selected source locations are within 100 km of one or more species occurrences, and do not necessarily represent the locations of occurrences themselves.

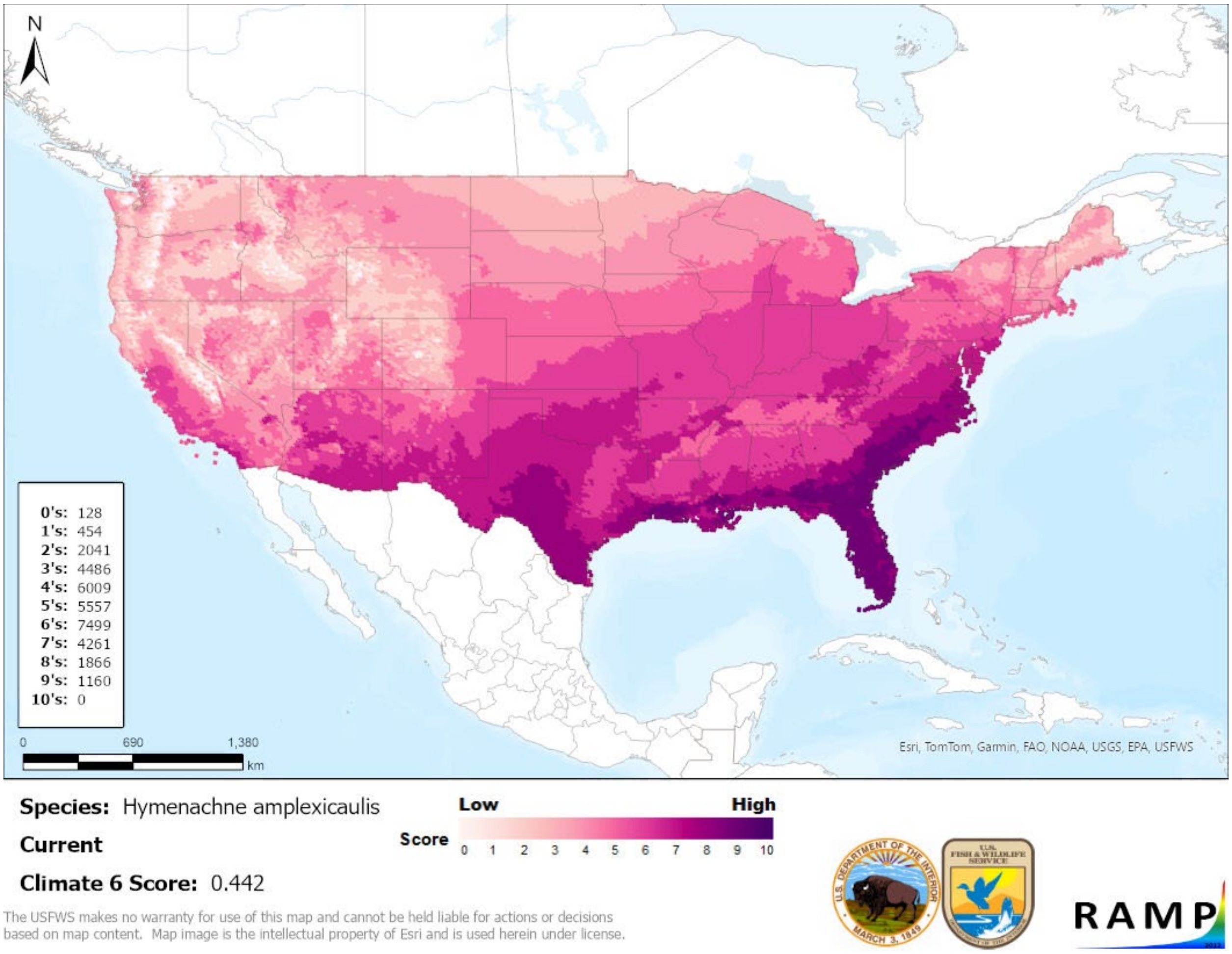

Figure 5. Map of RAMP (Sanders et al. 2023) climate matches for *Hymenachne amplexicaulis* in the contiguous United States based on source locations reported by GBIF Secretariat (2022) and Howard (2025). Counts of climate match scores are tabulated on the left. 0/Pale Pink = Lowest match, 10/Dark Purple = Highest match.

8 Certainty of Assessment

The Certainty of Assessment for *Hymenachne amplexicaulis* is classified as High. The distribution, biology, and ecology of the species is well documented. There are also well documented introductions and records of negative impacts in regions where it is not native.

9 Risk Assessment

Summary of Risk to the Contiguous United States

Hymenachne amplexicaulis, Western Indian Marsh Grass, is a plant that is native from Central Mexico through much of South America. This species is a perennial grass that has been introduced and established populations in the United States, Australia, and southeast Asia. It can outcompete native vegetation due its ability to reproduce quickly and survive in a wide array of conditions. The species also has impacts on native fauna, water flows, and crop economics. The History of Invasiveness for *Hymenachne amplexicaulis* is classified as High due to the documentation of negative impacts. The climate matching analysis for the contiguous United States indicates establishment concern for this species. The southeastern United States already has established populations and the climate match for this area was the highest; the climate match was the lowest in the Rocky Mountain Region. The Certainty of Assessment is classified as High due to the quantity and quality of information available regarding the assessment elements. The Overall Risk Assessment Category for *Hymenachne amplexicaulis* in the contiguous United States is High.

Assessment Elements

- **History of Invasiveness (see section 4): High**
- **Establishment Concern (see section 7): Yes**
- **Certainty of Assessment (see section 8): High**
- **Remarks, Important additional information: 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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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 Howard (2025).

Under the future climate scenarios (figure A1), on average, high climate match for *Hymenachne amplexicaulis* was projected to occur in the Gulf Coast, Mid-Atlantic, Southern Atlantic Coast, and Southern Florida regions of the contiguous United States. Areas of high match tended to be smaller in time step 2085 than in time step 2055. The Climate 6 scores for the individual future scenario models (figure A2) ranged from a low of 0.390 (model: MPI-ESM1-2-HR, SSP5, 2085) to a high of 0.570 (model: IPSL-CM6A-LR, SSP3, 2085). All future scenario Climate 6 scores were above the Establishment Concern threshold, indicating that Yes, there is establishment concern for this species under future scenarios. The Climate 6 score for the current climate match (0.442, figure 5) 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 Northeast saw a large increase in the climate match relative to current conditions. Additionally, areas within the Appalachian Range, Colorado Plateau, Great Basin, Great Lakes, Northern Pacific Coast, Northern 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, Great Basin, Gulf Coast, Southeast, Southern Atlantic Coast, Southern Florida, and Southwest saw a moderate decrease in the climate match relative to current conditions. No large decreases were observed regardless of time step and climate scenarios. Additional, very small areas of large or moderate change may be visible on the maps (figure A3).

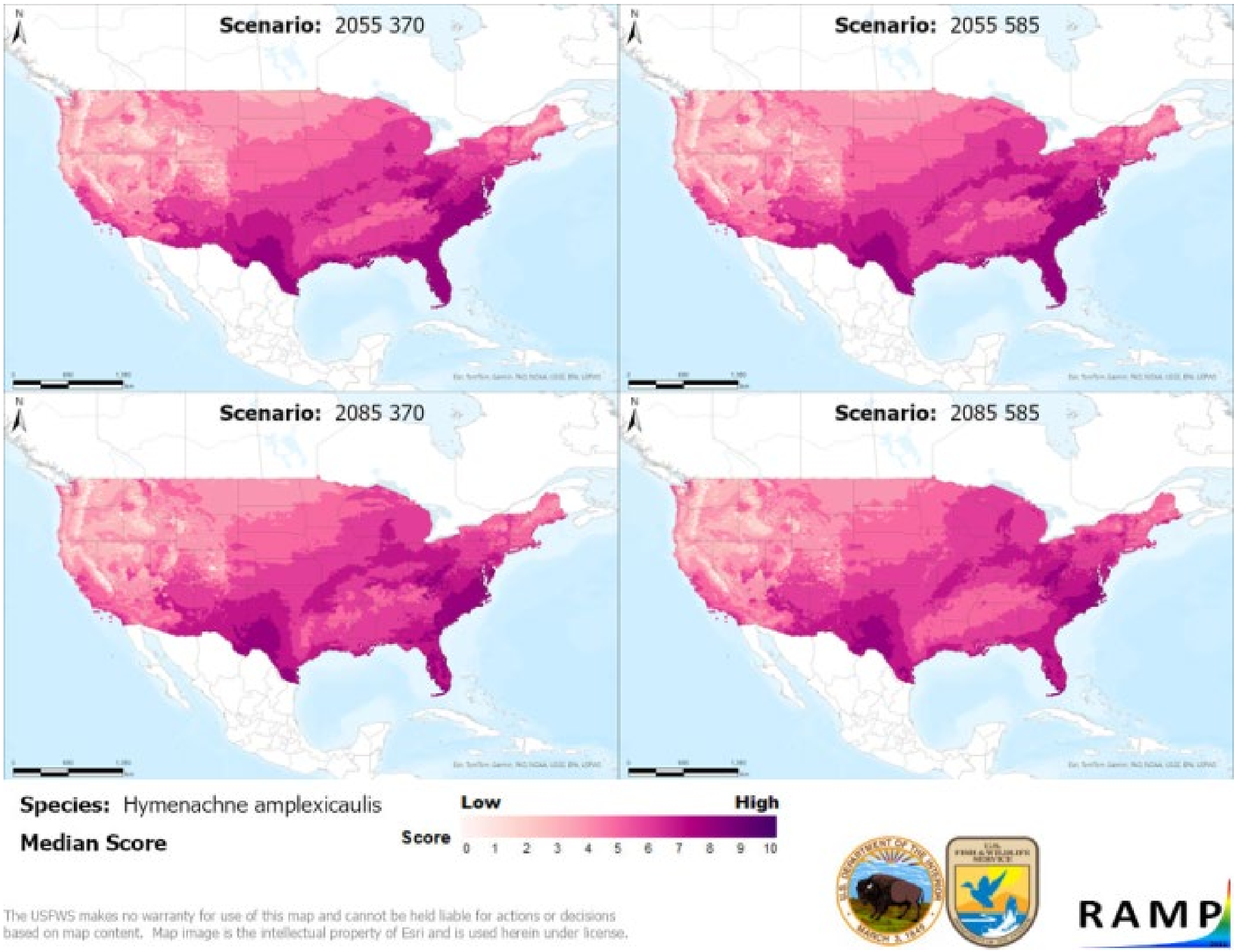

Figure A1. Maps of median RAMP (Sanders et al. 2023) climate matches projected under potential future climate conditions using five global climate models for *Hymenachne amplexicaulis* in the contiguous United States. Climate matching is based on source locations reported by GBIF Secretariat (2022) and Howard (2025). 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.

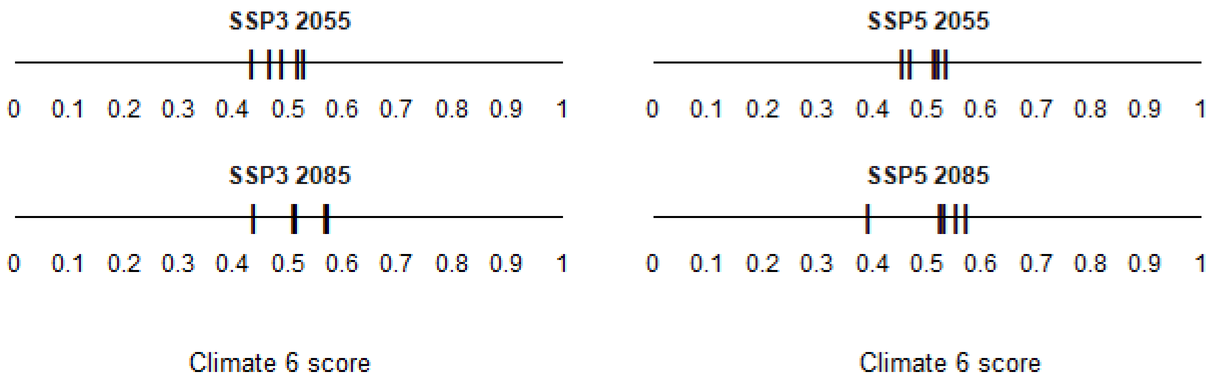

Figure A2. Comparison of projected future Climate 6 scores for *Hymenachne amplexicaulis* in the contiguous United States for each of five global climate models under four combinations of Shared Socioeconomic Pathway (SSP) and time step. SSPs used (from left to right): SSP3, SSP5 (Karger et al. 2017,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

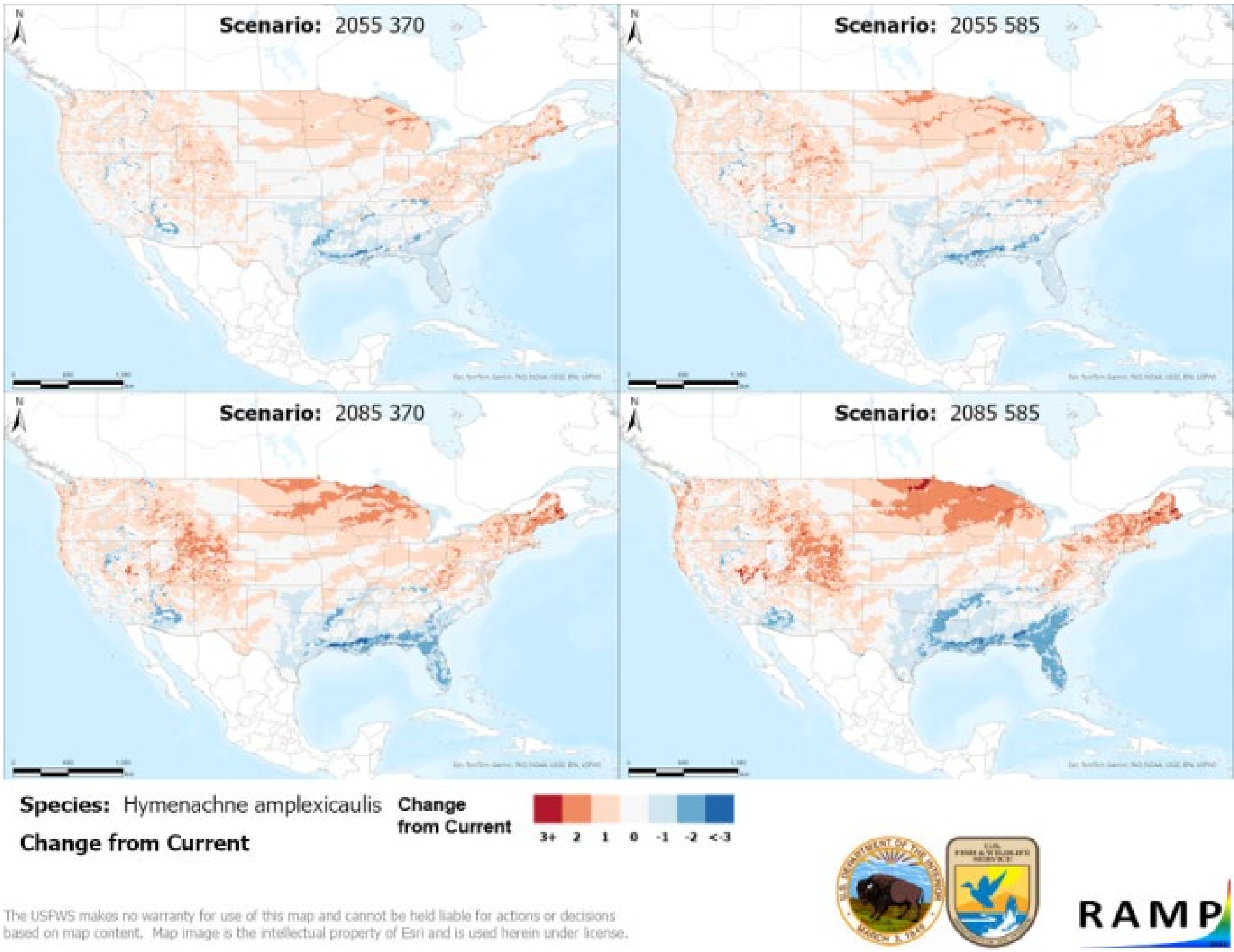

Figure A3. RAMP (Sanders et al. 2023) maps of the contiguous United States showing the difference between the current climate match target point score (figure 5) and the median target point score for future climate scenarios (figure A1) for *Hymenachne amplexicaulis* based on source locations reported by GBIF Secretariat (2022) and Howard (2025). 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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