

# Creeping Primrose-willow (*Ludwigia repens*)

## Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, May 2021  
Revised, June 2021  
Web Version, 8/10/2021

Organism Type: Plant  
Overall Risk Assessment Category: Uncertain



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## 1 Native Range and Status in the United States

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### Native Range

The information presented in Peng et al. (2005) combines information for what WFO (2021) considers three different valid species in addition to *Ludwigia repens*. Information on the native range of *L. repens* that did not include information for other valid species was not found.

From Peng et al. (2005):

“*Ludwigia repens* occurs primarily on the Atlantic and Gulf Coastal Plains of the United States, from North Carolina south through Florida, and west to Texas and northeastern Mexico (Nuevo León), with outlier populations in New Jersey, Oklahoma, southern Arizona, New Mexico, Nevada, California, and Oregon. It also is widespread in the savannas of central Texas and the Edwards Plateau region, extending southwest into the Mexican states of Nuevo Leon, Coahuila, Chihuahua, and Sonora, and south into San Luis Potosi, Mexico, Morelos, and Puebla. *Ludwigia repens* also occurs in the Caribbean region, including Cuba, Haiti, Dominican Republic, the Bahamas, and Bermuda. Although *L. repens* is considered endangered in Missouri (Wilson, 1984) based on a record from Green County (Steyermark, 1963; as *L. natans* Ell.), we could not locate a voucher specimen to verify this report.”

## Status in the United States

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*Ludwigia repens* is widely found for sale online by aquarium plant retailers in the United States. LiveAquaria (2021), based out of Rhinelander, Wisconsin, lists *Ludwigia repens* for sale for \$3.49.

## Means of Introductions in the United States

No nonnative introductions in the United States have been reported.

## Remarks

The information presented in Peng et al. (2005) combines information for what WFO (2021) considers three different valid species in addition to *Ludwigia repens*. Peng et al. (2005) includes the following names as synonyms in their treatment of *L. repens*: *L. natans*, *L. fluitans*, *L. natans* var. *rotundata*, *L. repens* var. *stipitata*, *L. natans* var. *stipitata*, *Isnardia repens*, *I. natans*, *I. repens* var. *rotundata*, and *I. intermedia*.

From Peng et al. (2005):

“*Ludwigia repens* forms natural hybrids with *L. brevipes* [...], *L. arcuata* [...], and *L. palustris*.

*Ludwigia repens* frequently co-occurs with *L. palustris* in the field, and natural hybrids are found scattered in Florida, North Carolina, Great Bahama, and Mexico. Like both putative parents, the hybrids are highly variable in morphology, especially in leaf shape. The hybrids also have a variable number (0 to 4) of vestigial petals. The ovaries are oblongobpyramidal like those of *L. repens* but somewhat smaller, and these typically abort after anthesis. The percentage of stainable pollen is usually very low, less than 10%. The most diagnostic characters for these hybrids in fact are abortive capsules and/ or very sterile pollen. Because their morphology is intermediate between that of two variable species, these hybrids would be difficult to identify without flowers and fruits, which they commonly lack in their aquatic or semiaquatic habitats.”

From NSW WeedWise (2021):

“This plant is a water weed”

The taxonomic authority used for plants by this screening process, World Flora Online (WFO 2021), considers *Ludwigia repens* a valid species. Other sources (e.g. Peng et al. 2005; GBIF Secretariat 2021; Lady Bird Johnson Wildflower Center 2021) have considered other names as part of this species, which are considered separate species or synonyms of other species by WFO (2021). Every effort has been made to only consider information pertaining to *L. repens* and not another valid species in this screening. When this could not be accomplished, the information is annotated to make it clear that it includes other species.

## 2 Biology and Ecology

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### Taxonomic Hierarchy and Taxonomic Standing

From WFO (2021):

“*Ludwigia repens* J.R. Forst”

“This name is reported by Onagraceae as an accepted name in the genus *Ludwigia* (family Onagraceae).”

From ITIS (2021):

Kingdom Plantae  
Subkingdom Viridiplantae  
Infrakingdom Streptophyta  
Superdivision Embryophyta  
Division Tracheophyta  
Subdivision Spermatophytina  
Class Magnoliopsida  
Superorder Rosanae  
Order Myrtales  
Family Onagraceae  
Genus *Ludwigia*

Species *Ludwigia repens* J.R. Forst.

## Size, Weight, and Age Range

From Sharpe (2018):

“The plant typically grows to a height of 12–20 inches, and the width of each sprig is about two to three inches, based on leaf growth.”

From Uddin et al. (2011):

“The leaves are oppositely arranged and up to 4 or 5 centimeters long. The flower has four yellow petals no more than 3 millimeters long [...]”

## Environment

From Sharpe (2018):

“*Ludwigia repens* is an amphibious plant that will grow either partially or fully submerged in the tank.”

“*Ludwigia repens* grows well in both very soft and hard water, although soft, slightly acidic water is best. The optimum growth temperature is 75–79 Fahrenheit, although it can grow in temperatures as low as 59 degrees Fahrenheit.”

From Uddin et al. (2011):

“It is found in the shallow waters of streams and lakes and freshwater [...]”

“It grows rapidly in slightly acidic waters at 19-28°C.”

## Climate

From Sharpe (2018):

“*Ludwigia repens* is found in the tropical waters of North and Central America.”

## Distribution Outside the United States

### Native

The information presented in Peng et al. (2005) combines information for what WFO (2021) considers three different valid species in addition to *Ludwigia repens*. Information on the native range of *L. repens* that did not include information for other valid species was not found.

From Peng et al. (2005):

“*Ludwigia repens* occurs primarily on the Atlantic and Gulf Coastal Plains of the United States, from North Carolina south through Florida, and west to Texas and northeastern Mexico (Nuevo León), with outlier populations in New Jersey, Oklahoma, southern Arizona, New Mexico,

Nevada, California, and Oregon. It also is widespread in the savannas of central Texas and the Edwards Plateau region, extending southwest into the Mexican states of Nuevo Leon, Coahuila, Chihuahua, and Sonora, and south into San Luis Potosi, Mexico, Morelos, and Puebla. *Ludwigia repens* also occurs in the Caribbean region, including Cuba, Haiti, Dominican Republic, the Bahamas, and Bermuda. Although *L. repens* is considered endangered in Missouri (Wilson, 1984) based on a record from Green County (Steyermark, 1963; as *L. natans* Ell.), we could not locate a voucher specimen to verify this report.”

## Introduced

From NSW WeedWise (2021):

“Red lugwigia [*Ludwigia repens*] has naturalized along the Lane Cove river in Greater Sydney [Australia].”

From Uddin et al. (2011):

“The plant *L. repens* was collected from Hajee para village, Chittagong district, Bangladesh in 2011.”

From Srivastava et al. (2009):

“Seven most common aquatic weeds viz., [...]. and *Ludwigia repens* were collected from the wetlands of Aurawan, and Banthra of Lucknow district of Uttar Pradesh India.”

From Tharmili et al. (2017):

“*Ludwigia repens* is [...] cultivated in Green Farms (Pvt) Ltd., Marawila in Sri Lanka [...]”

## Means of Introduction Outside the United States

From Tharmili et al. (2017):

“*Ludwigia repens* is the most popular ornamental aquarium plant cultivated in Green Farms (Pvt) Ltd., Marawila in Sri Lanka for export purpose.”

No further information on means of introduction was found.

## Short Description

From Gibson (2021):

“[...] fibrous-rooted, mat-forming, procumbent with ascending to spreading branches from horizontal axes, < 16 cm tall; shoots with cauline leaves, essentially glabrous, not glutinous on young growth; adventitious roots nodal”

“Stems cylindric, to. 3.5 mm diameter, green wit [sic] reddish tinge and short white streaks (crystal aggregates), internodes to 30 mm long.”

“Leaves opposite decussate, simple, petiolate, with stipules; stipules 2, attached to base of petiole, ± ovate, 0.3—0.4 mm long, not secreting liquid, mostly purplish red, withering; petiole hemicylindric to flattened on upper side, < 5 mm long and indistinct from leaf blade, glabrescent; blade obovate (elliptic), < 10—35+ × 3—19 mm, long-tapered at base, entire or minutely toothed on margins above midblade, acute at tip lacking a small glandular point on the lower surface, cpinnately veined with principal veins slightly raised on lower surfaces, surfaces ± glossy green with narrow reddish margins, glabrous.”

“Inflorescence flowers solitary and axillary (leafy spike), subsessile, at each node having 1 flower, 2 flowers, or eventually 2 branches, glabrous; pedicel at anthesis < 0.5 mm long increasing to < 1.5 mm long in fruit and constricted at base, with 2 opposite bracteoles at base of ovary, bracteoles oblanceolate-linear to linear with swollen base, at anthesis 3—4.5 × 0.45—0.6 mm increasing slightly in fruit (to 5 × 1 mm in fruit), green with 2 minute purple-red stipules concealed on inner side ± 0.2 mm long, acuminate at tip, not wet or secreting, ± persistent in fruit.”

“Flower bisexual, radial, ca. 6 mm across; hypanthium < 0.6 mm long, aging red where petals formerly attached, nectary 4-lobed, yellowish green, glabrous, producing copious nectar on top of ovary; sepals 4, spreading, acute-triangular to deltate, 3 mm long increasing slightly in fruit, green, with 3 parallel veins, glabrous; petals 4, obovate to elliptic, to 3.1 × 1.5—1.8 mm, yellow with raised white midvein, rounded and not shallowly notched at top, glabrous, 1-veined; stamens 4 in 1 whorl, opposite sepals; filaments ± 1.5 mm long, pale green, leaning inward and tapered from base; anthers dorsifixed, dithecal, 0.8—1 mm long, ± cream-colored with broad connective, longitudinally and inwardly dehiscent; pollen white, permanently united in tetrads, sticky and held in a mass by minute threads (viscin threads); pistil 1; ovary inferior, funnel-shaped strongly 4-sided and 4-angled, ca. 1.5 mm long, green, with rib on each face and short hairs curled upward along angles, 4-chambered, each chamber with many small ovules; style < 2 mm long, pale green; stigma at same level as and touching anthers, subspheroid and inconspicuously 4-lobed, ca. 0.6 mm diameter, yellow-green.”

“Fruit capsule, irregularly dehiscent, many-seeded, bell-shaped and 4-sided, 6—7.5 × 3.5—4 mm, each face with a broad rib, top truncate and 4-lobed but lacking hairs, glabrescent; sepals persistent, erect to ascending or folded over fruit, 3-veined; style abscised.”

“Seed± ellipsoid, 0.4—0.8 × ± 0.4 mm, tannish.”

From Sharpe (2018):

“When fully submerged, leaf color ranges from dark green to brownish red or deep red. The tops of the leaves are usually olive green while the undersides contain the red pigments.”

## **Biology**

From Gibson (2021):

“Aquatic perennial herb, fibrous-rooted, mat-forming, [...]”

From NSW WeedWise (2021):

“Red ludwigia [*Ludwigia repens*] is a water weed with stems that can float or rise out of the water.”

## Human Uses

From Tharmili et al. (2017):

“*Ludwigia repens* is the most popular ornamental aquarium plant cultivated in Green Farms (Pvt) Ltd., Marawila in Sri Lanka for export purpose.”

*Ludwigia repens* is widely found for sale online by aquarium plant retailers in the United States. LiveAquaria (2021), based out of Rhinelander, Wisconsin, lists *Ludwigia repens* for sale for \$3.49.

## Diseases

According to Poelen et al. (2014), *Ludwigia repens* is a host of *Allodus ludwigiae* and *Puccinia jussiaeae*.

From Tharmili et al. (2017):

“The infection of *Curvularia* spp. on *L. repens* was confirmed through Koch’s postulates.”

## Threat to Humans

From NSW WeedWise (2021):

“Red ludwigia [*Ludwigia repens*] has the potential to form dense infestations [*sic*] that can clog waterways [...].”

## 3 Impacts of Introductions

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From NSW WeedWise (2021):

“Red ludwigia [*Ludwigia repens*] has the potential to form dense infestations [*sic*] that can clog waterways and displace native plants.”

The information presented in Peng et al. (2005) combines information for what WFO (2021) considers three different valid species in addition to *Ludwigia repens*.

From Peng et al. (2005):

“The natural intrasectional hybrids, such as [...] *L. arcuate* X *L. repens*, and some intersectional hybrids, such as *L. repens* X *L. simpsonii* [...], grow with unusual vigor, sometimes even to the local exclusion of their progenitor species.”

## 4 History of Invasiveness

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The history of invasiveness is classified as Data Deficient. *Ludwigia repens* has been reported as introduced in multiple countries outside of its native range. This species is reported to be established in India, Bangladesh, and Australia, however no information on actual impacts of introduction was available. There is some information on possible impacts of introduction. This species is cultivated in Sri Lanka for ornamental purposes. *L. repens* is widely available in the aquarium trade, however no specific trade volume or duration information was available.

## 5 Global Distribution

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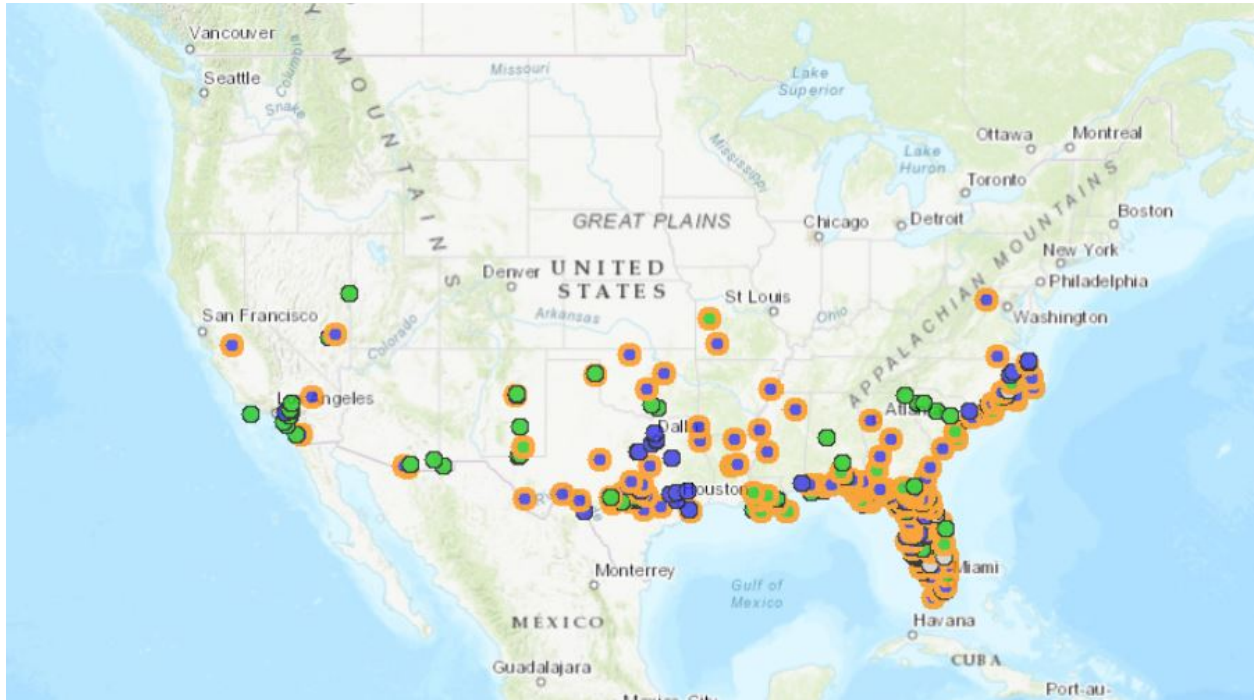


**Figure 1.** Known global distribution of *Ludwigia repens*. Observations are reported from North, Central, and South America, Africa, Europe, Asia, and Australia. Map from GBIF Secretariat (2021). Locations in the Northeast United States, South America, Africa, Europe, China, and western Australia will not be used in the climate match as no evidence was found to indicate wild established populations at these locations. GBIF Secretariat (2021) synonymizes multiple names under *Ludwigia repens* that belong to other species according to WFO (2021). The observations shown here are those reported using the name *Ludwigia repens* and not a synonym.

This species has been documented in literature as naturalized in India and Bangladesh, however no georeferenced locations were available.



## 6 Distribution Within the United States

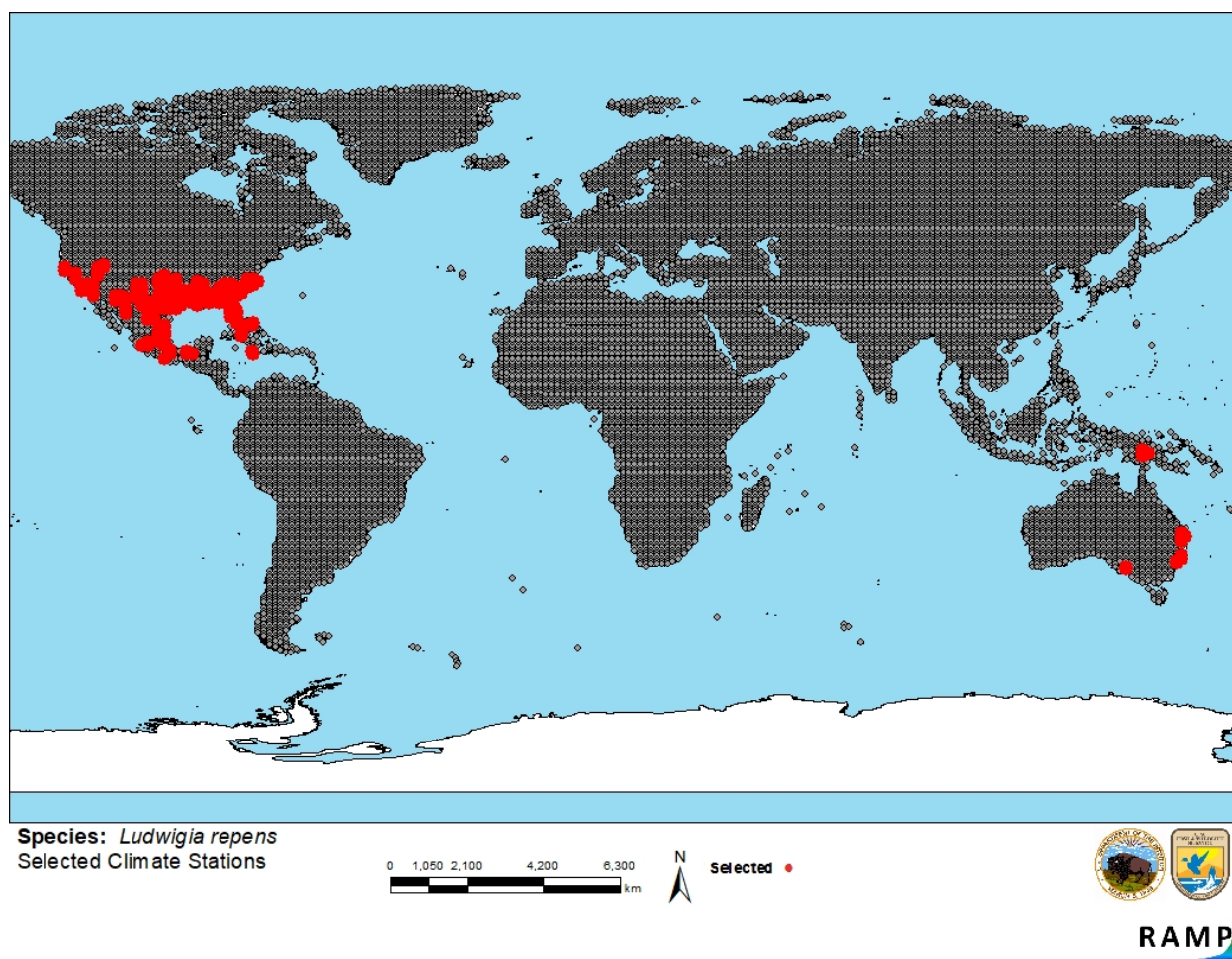


**Figure 2.** Known distribution of *Ludwigia repens* in the United States. Map from BISON (2021). Locations are found in Alabama, Arizona, Arkansas, California, Florida, Georgia, Louisiana, Mississippi, Missouri, Nevada, New Mexico, North Carolina, Oklahoma, South Carolina, Texas, and Virginia. The observations in Missouri and Virginia were not used for the climate match; extant populations in those locations were not corroborated in the literature.

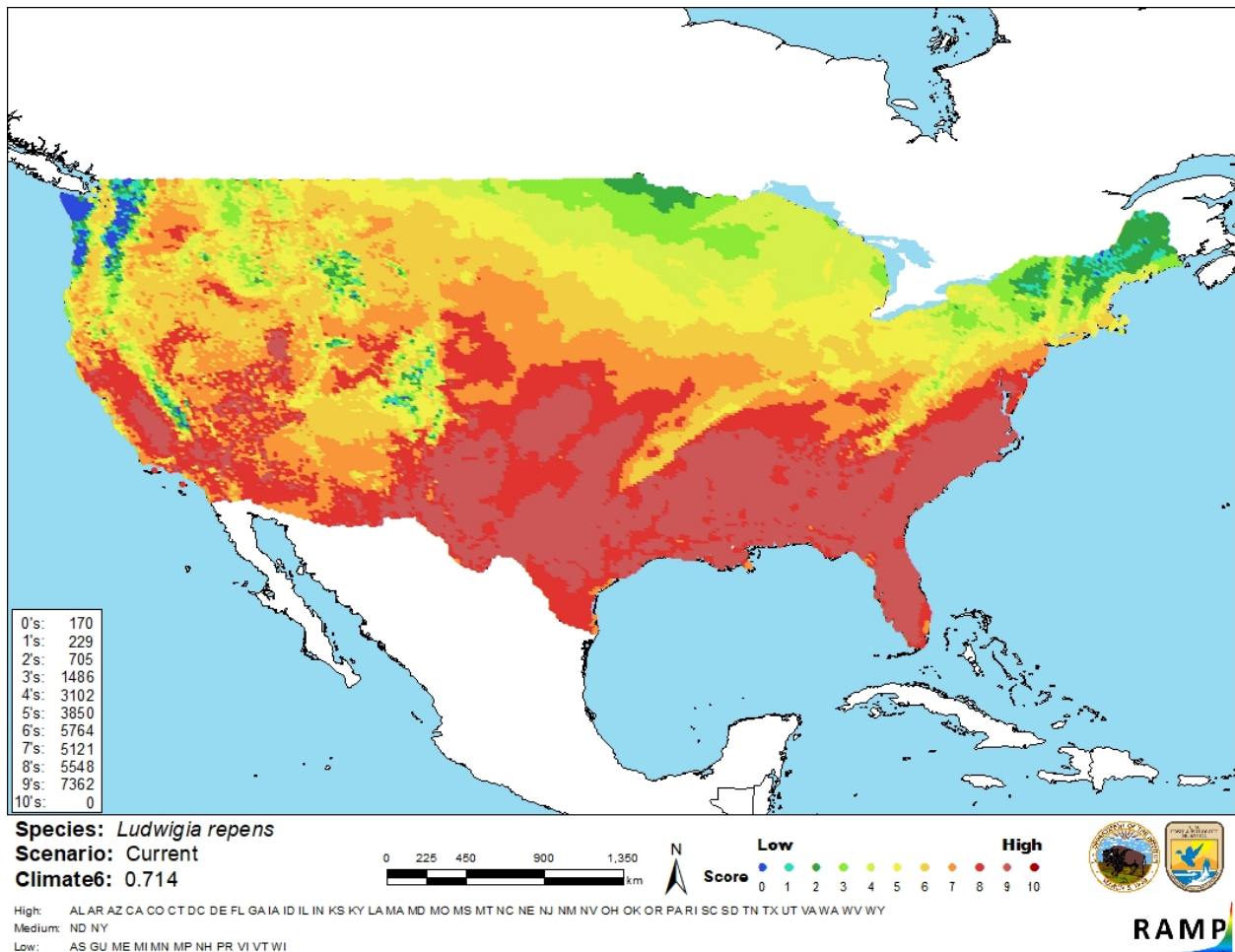
## 7 Climate Matching

### Summary of Climate Matching Analysis

The climate match for the contiguous United States is generally very high. High match is found throughout the South, where *Ludwigia repens* is native. High matches are also found just outside the native range of this species in the West and Midwest. Areas of low match are found in the New York and New England, and parts of the northern Midwest, northern Great Plains, and Pacific Northwest. Small areas of low match are also scattered throughout the Rocky Mountains. The overall Climate 6 score (Sanders et al. 2018; 16 climate variables; Euclidean distance) for the contiguous United States was 0.714, high. (Scores greater than or equal to 0.103, are classified as high.) Most States received high individual Climate 6 scores. The following States had medium individual Climate 6 scores: North Dakota and New York. Maine, Michigan, Minnesota, New Hampshire, Vermont, and Wisconsin received low individual Climate 6 scores.



**Figure 3.** RAMP (Sanders et al. 2018) source map showing weather stations selected as source locations (red; southern United States, Mexico, Cuba, Dominican Republic, the Bahamas, Guatemala, El Salvador, Papua New Guinea, and Australia) and non-source locations (gray) for *Ludwigia repens* climate matching. Source locations from BISON (2021) and GBIF Secretariat (2021). 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. 2018) climate matches for *Ludwigia repens* in the contiguous United States based on source locations reported by BISON (2021) and GBIF Secretariat (2021). Counts of climate match scores are tabulated on the left. 0/Blue = Lowest match, 10/Red = Highest match.

The High, Medium, and Low Climate match Categories are based on the following table:

Climate 6: (Count of target points with climate scores 6-10)/ (Count of all target points)	Overall Climate Match Category
$0.000 \leq X \leq 0.005$	Low
$0.005 < X < 0.103$	Medium
$\geq 0.103$	High

## 8 Certainty of Assessment

Limited information is available on the biology and ecology of *Ludwigia repens*. Adequate information is available on the native range. Records of introductions and establishment were found. Limited information is available on impacts of introduction. This species is widely found

in the aquarium trade; however, no substantial trade information has been found. The certainty of this assessment is Low.

## 9 Risk Assessment

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### Summary of Risk to the Contiguous United States

Creeping Primrose-Willow, *Ludwigia repens*, is an aquatic plant native to the Atlantic and Gulf Coastal areas of southern United States and south to El Salvador. It is also native to areas of the Caribbean. The history of invasiveness is classified as Data Deficient. This species has been introduced and is reported as naturalized in India, Bangladesh, and Australia. In Australia, it is considered an aquatic weed. Limited information on actual impacts of introduction was available. It is reported that *L. repens* can form dense mats, which have the potential to clog waterways and exclude native plants. This species can also hybridize with other species of the genus. *L. repens* is widely found in the aquarium trade in the United States and internationally. No substantial trade information was available. The overall climate match for the contiguous United States was High, with high match being found throughout the South in the native range, as well as expanding beyond the native range in the West and Midwest. The certainty of assessment is Low due to limited available information. The overall risk assessment category for *Ludwigia repens* is Uncertain.

### Assessment Elements

- **History of Invasiveness (Sec. 4): Data Deficient**
- **Overall Climate Match Category (Sec. 7): High**
- **Certainty of Assessment (Sec. 8): Low**
- **Remarks, Important additional information: No additional information**
- **Overall Risk Assessment Category: Uncertain**

## 10 Literature Cited

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

BISON. 2021. Biodiversity Information Serving Our Nation. U.S. Geological Survey. Available: <https://bison.usgs.gov> (June 2021).

GBIF Secretariat. 2021. GBIF backbone taxonomy: *Ludwigia repens* Forst. Copenhagen: Global Biodiversity Information Facility. Available: <https://www.gbif.org/species/5421030> (June 2021).

Gibson AC. 2021. Vascular plants of Williamson County: *Ludwigia repens* [Onagraceae] Creeping primrose willow, Creeping water primrose. Available: <http://w3.biosci.utexas.edu/prc/K12/pages/Ludwigia%20repens.html> (June 2021).

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- Uddin ME, Islam AMT Chowdhury MAU, Rahman MK, Islam MS, Islam MR. 2012. Sedative and analgesic activities of *Ludwigia repens*. *Phytopharmacology* 2(2):202–211.
- [WFO] World Flora Online 2021. World Flora Online— a project of the World Flora Online Consortium. Available: [worldfloraonline.org/taxon/wfo-0001087434](http://worldfloraonline.org/taxon/wfo-0001087434) (March 2021).

## **11 Literature Cited in Quoted Material**

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**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.**

Steyermark JA. 1963. Flora of Missouri. Ames: Iowa State University Press.

Wilson JH, editor. 1984. Rare and endangered species of Missouri. Missouri Department of Conservation.