Longleaf Ludwigia (*Ludwigia longifolia*)

Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, March 2022
Revised, April 2022
Web Version, 8/12/2022

Organism Type: Plant
Overall Risk Assessment Category: Uncertain

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1 Native Range and Status in the United States

Native Range

From Weeds Australia (2022):

"Native to South America (i.e. southern Brazil, Paraguay, Uruguay and northern Argentina)."

Status in the United States

USDA NRCS (2022) lists *Ludwigia longifolia* as introduced to Florida. According to Wunderlin et al. (2022), *Ludwigia longifolia* is established in Seminole County, Florida.

Means of Introductions in the United States

No information on means of introduction to the United States for *Ludwigia longifolia* was found.

Remarks

From Weeds of Australia (2022):

"Long-leaved willow primrose (*Ludwigia longifolia*) is very similar to Peruvian water primrose (*Ludwigia peruviana*) and native willow primrose (*Ludwigia octovalvis*) and relatively is similar to water primrose (*Ludwigia peploides* subsp. *montevidensis*)."

"This species is declared under legislation in the following states and territories:

New South Wales: Class 4 - a locally controlled weed. The growth and spread of this species must be controlled according to the measures specified in a management plan published by the local control authority and the plant may not be sold, propagated or knowingly distributed (in a large number of local authority areas). Class 5 - a restricted weed which must not be sold, bought or knowingly distributed (throughout the entire state)."

"Western Australia: Prohibited - on the prohibited species list and not permitted entry into the state."

From Petroeschevsky et al. (2008):

"List of aquatic ornamental plant species recommended for a national ban from sale in Australia. […] *Ludwigia longifolia*"

"Common Names […] longleaf primrose willow, longleaf primrose-willow, longleaf willow primrose, long-leaved willow primrose, primrose willow"

According to World Flora Online (2022), synonyms for *Ludwigia longifolia* include *Jussiaea longifolia* DC. and *Jussiaea peruviana* var. *longifolia* (DC.) H.Lév. All synonyms were used to search for information during this risk assessment.

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

According to World Flora Online (2022), *Ludwigia longifolia* is the accepted name for this species.

From CABI (2022):

Domain: Eukaryota
  Kingdom: Plantae
    Phylum: Spermatophyta
      Subphylum: Angiospermae

Class: Dicotyledonae
Order: Myrtales
Family: Onagraceae
Genus: *Ludwigia*
Species: *Ludwigia longifolia*"

Size, Weight, and Age Range

From Weeds of Australia (2022):

"A small upright (i.e. erect) shrub or large herbaceous plant usually growing 0.5-2 m tall, but occasionally reaching up to 3 m in height. It can be short-lived (i.e. annual) or relatively long-lived (i.e. perennial)."

Environment

From Weeds of Australia (2022):

"Long-leaved willow primrose (Ludwigia longifolia) is currently a weed of waterways and wetlands (e.g. swamps, marshes, drains, gullies, channels and riparian vegetation) […]"

Climate

From Weeds of Australia (2022):

"[…] in the warmer temperate and sub-tropical regions of Australia. It also has the potential to spread further northwards into tropical regions."

Distribution Outside the United States

Native

From Weeds of Australia (2022):

"Native to South America (i.e. southern Brazil, Paraguay, Uruguay and northern Argentina)."

Introduced

From Weeds Australia (2011):

"Long-leaved Water Primrose has become a significant problem in the Port Stephens and Gosford areas on the New South Wales Central Coast. In more recent times it has also become increasingly common in the Sydney region, and there have been confirmed sightings in the Pittwater area since 2002. In the last couple of years a few small infestations have been found along a drain and a creek in Toowong in Brisbane. Additional infestations have recently been detected along several kilometres of Ithaca Creek in northern Brisbane (The Weed Society of Queensland 2007; AVH 2007; Harden 2007)."

From Saiki (2016):

"*Ludwigia longifolia* (DC.) H. Hara, an annual or perennial onagraceous herb native to Brazil and northern Argentina is reported first as naturalized in Tateyama, Chiba Pref., Japan. The plant is established in the habitat since 2013, and may naturalize widely in wet habitats of Japan in future. It has already naturalized widely in the East Coast of Australia from the 1990's."

Means of Introduction Outside the United States

From Chandrasena (2005):

"Long-leaf Willow Primrose (*Ludwigia longifolia* (DC.) Hara) was first recorded in NSW, Australia in 1991 as an escapee from nurseries […]."

Short Description

From Weeds of Australia (2022):

"a small upright shrub usually growing 0.5-2 m tall. […] its hairless stems are conspicuously square in cross-section and usually also somewhat winged. […] its elongated leaves are hairless or almost hairless (5-35 cm long and 4-25 mm wide) and glossy in appearance. […] its bright yellow flowers have four greenish or reddish sepals and four, or rarely five, bright yellow petals. […] its hairless fruit are sharply four-angled (10-42 mm long and 4-8 mm wide) and contain large numbers of tiny dust-like seeds."

Biology

From Weeds of Australia (2022):

"Flowering occurs throughout the year, but is most common during summer and autumn."

"This species generally only reproduces by seed, however branches that are detached during floods can take root and develop into new plants. The small seeds can be dispersed by water, wind, animals or human activities (e.g. in contaminated soil or dumped garden waste)."

From Chandrasena (2005):

"McCall (2004) reported that a L. longifolia plant, one year old, produced about 5 capsules, equivalent to 35,000 seeds. A more mature plant can average 35 capsules stem-2 and with 6–10 stems plant-1, this equates to ≈ 2.45 Million seeds plant-1. Annual seed production of heavily infested sites (10 plants m-2) can reach 25 Million seeds m-2."

Human Uses

From Chandrasena (2005):

"[…] *L. longifolia* can be relatively easily controlled by the non-slective [sic] glyphosate and highly selective 2,4-D Amine."

From Ferreira et al. (2020):

"*Ludwigia* species have several pharmacological applications, but their insecticidal proprieties have not been tested. This research thus aimed to study the effects of aqueous extracts on the biological characteristics of *Plutella xylostella*. We noted that the […] L. longifolia […] extracts were active. These species showed the best results regarding their ability to control *P. xylostella* populations, due to the presence of substances that inhibit food consumption and interfere in the morphological and physiological transformations of the offspring and adult oviposition."

From Weeds of Australia (2022):

"This species was introduced as a garden ornamental for aquatic situations, though it is not common in cultivation."

Diseases

No information on diseases was found for *Ludwigia longifolia*.

Threat to Humans

No information on threats to humans was found for *Ludwigia longifolia*.

3 Impacts of Introductions

Although there are records of introductions for *Ludwigia longifolia* outside of its native range, literature documenting these impacts was not found during this assessment. The following are potential impacts of introductions.

From Chandrasena (2005):

"McCall (2004) noted that the near pristine state of the Mambo Wetlands was under threat by *L. longifolia* as it increased the risk of flooding and sedimentation of the Wetlands, and the reduced the Wetlands' recreational values."

From Weeds of Australia (2022):

"Long-leaved willow primrose (*Ludwigia longifolia*) is regarded as an environmental weed in New South Wales and as an emerging environmental weed in south-eastern Queensland. It was also recently listed as a priority environmental weed in two Natural Resource Management regions. This species can form very dense colonies and if allowed to spread unmanaged it can dominate wetlands and riparian vegetation, replacing native species that grow in such environments. Because of its invasiveness and ability to form dense single species populations, it is considered to be a major weed within its native range."

"Long-leaved willow primrose (*Ludwigia longifolia*) is still in the early stages of its spread throughout the coastal districts of eastern Australia. It is thought to have the potential to become a problem species throughout the wetter tropical, sub-tropical and warmer temperate regions of Australia."

"The dense growth of long-leaved willow primrose (*Ludwigia longifolia*) also obstructs water flow and has the potential to reduce the usefulness and enjoyment of public aquatic areas."

Ludwigia longifolia is a regulated species in Australia (Weeds of Australia 2022).

4 History of Invasiveness

Ludwigia longifolia has been introduced beyond its native range and become established in Florida, Australia, and Japan. Although not found for sale during this assessment, introductions have occurred via releases from nurseries. Information regarding the volume and duration of trade, however, was not available. Only potential impacts of introductions for *L. longifolia* were discussed in the literature. Due to the lack of information on actual impacts of introduction, the history of invasiveness is classified as Data Deficient.

5 Global Distribution

Figure 1. Known global distribution of *Ludwigia longifolia*. Observations are reported from North America (Florida and California), South America (Brazil, Argentina, Uruguay, Paraguay, Bolivia, and Colombia), and eastern Australia. Map from GBIF Secretariat (2022). Occurrences in California, Colombia, Bolivia, and northern Brazil were not used to select source points for the climate match as they do not represent currently established wild populations. Georeferenced occurrences were not available from Japan where *L. longifolia* has been introduced and is established.

6 Distribution Within the United States

Figure 2. Known distribution of Ludwigia longifolia in the United States. Map from GBIF-US (2022). The location in southern California was not used for the climate matching analysis as it was not found to represent an established population.

7 Climate Matching

Summary of Climate Matching Analysis

The climate match for *Ludwigia longifolia* was generally medium to high for the contiguous United States with the largest area of high match found in the southeastern portion of the country stretching from Texas to the New Jersey. Small, isolated areas of high match were also found in the Southwest and in the Great Lakes basin. Much of the Northeast and interior portion of the contiguous United States had a medium match. Low matches were restricted to the upper Midwest, portions of the Intermountain West, and throughout much of the Pacific Coast States. The overall Climate 6 score (Sanders et al. 2021; 16 climate variables; Euclidean distance) was 0.456, High (scores greater than 0.103 are classified as high). Most States had high individual Climate 6 scores. Colorado, Idaho, Maine, Montana, Nebraska, New Hampshire, Oregon, Utah, Vermont, and Washington had medium individual scores. California, Minnesota, North Dakota, Nevada, South Dakota, and Wyoming had low individual scores.

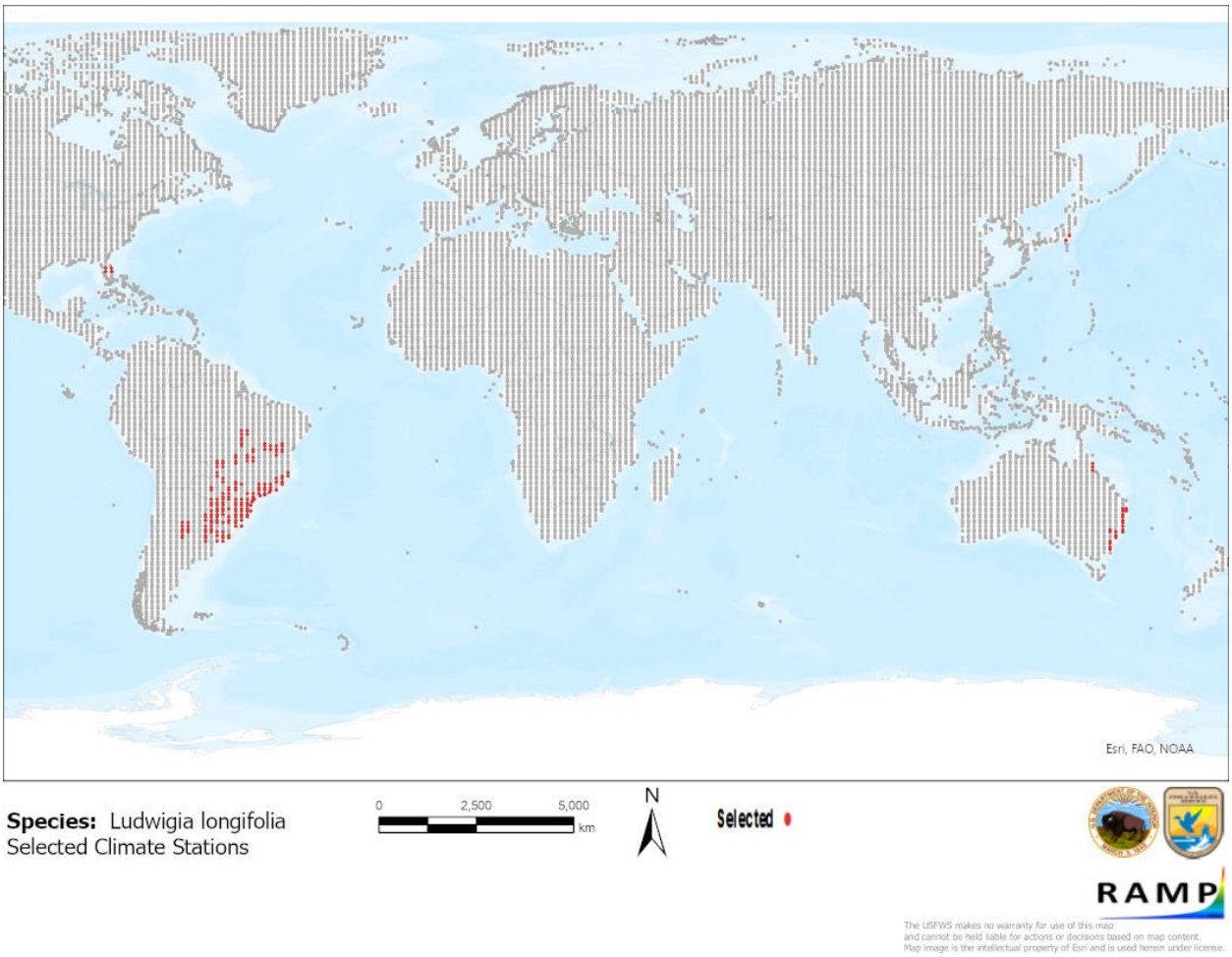

Figure 3. RAMP (Sanders et al. 2021) source map showing weather stations in North America, South America and Australia selected as source locations (red; United States [Florida], Brazil, Argentina, Uruguay, Paraguay, Australia, Japan) and non-source locations (gray) for *Ludwigia longifolia* climate matching. Source locations from GBIF Secretariat (2022) and Saiki (2016). Selected source locations are within 100 km of one or more species occurrences, and do not necessarily represent the locations of occurrences themselves. Source locations in Japan are based on the general geographic region where this species is established, as reported by Saiki (2016).

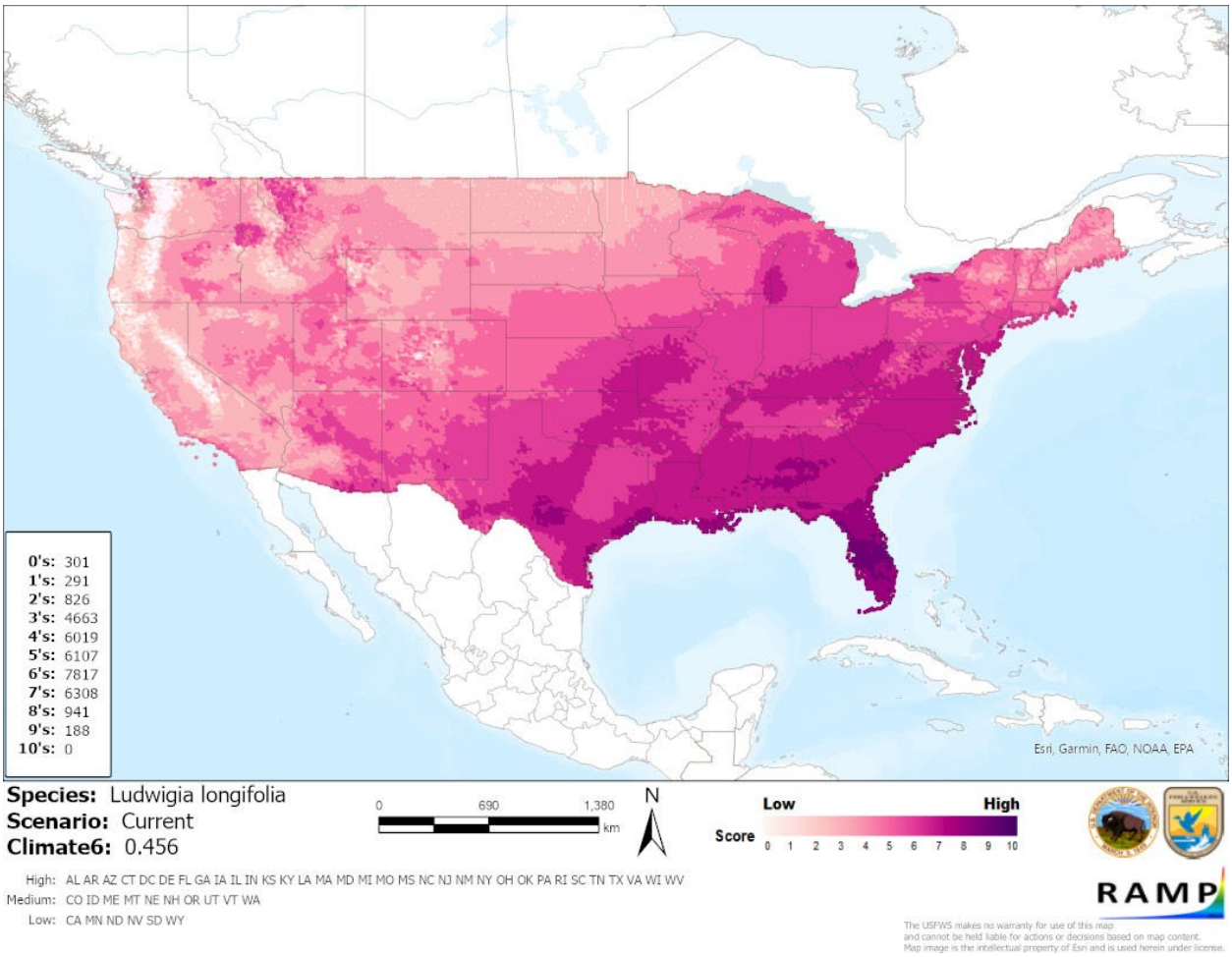

Figure 4. Map of RAMP (Sanders et al. 2021) climate matches for *Ludwigia longifolia* climate in the contiguous United States based on source locations reported by GBIF Secretariat (2022) and Saiki (2016). Counts of climate match scores are tabulated on the left. Counts of climate match scores are tabulated on the left. 0/Light Pink = Lowest match, 10/Dark Purple = 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≤X≤0.005	Low
0.005<X<0.103	Medium
≥0.103	High

8 Certainty of Assessment

Information about the biology, ecology, and distribution of *Ludwigia longifolia* is available. However, most information appears to come from this species' introduced range in Australia where it is established. Although potential negative impacts are reported from these established

populations, verified impacts are currently lacking in the scientific literature. Due to a lack of information regarding the impacts of introductions, the certainty of this assessment is Low.

9 Risk Assessment

Summary of Risk to the Contiguous United States

Longleaf Ludwigia (*Ludwigia longifolia*) is a semi-aquatic plant native to South America. This species has been present in the ornamental plant trade and has become established outside its native range via accidental releases from nurseries. Established nonnative populations have been reported from Florida, Australia, and Japan. Although several sources indicate potential adverse ecological effects from these introductions, verified impacts are currently lacking in the scientific literature. The history of invasiveness is thus classified as Data Deficient. The overall Climate 6 score for the contiguous United States was High, with high matches primarily found throughout the Southeast. The certainty of this assessment is Low due to a lack of information regarding the impacts of introductions. The overall risk assessment category 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 remarks.
- **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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Wunderlin RP, Hansen BF, Franck AR, Essig FB. 2022. *Ludwigia longifolia*. Atlas of Florida. Tampa, Florida: Institute for Systematic Botany, University of South Florida. Available: https://florida.plantatlas.usf.edu/plant.aspx?id=2192 (April 2022).

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.

[AVH] Australia's Virtual Herbarium. 2007. Council of Heads of Australian Herbaria. Available: http://www.chah.gov.au/avh/index.jsp.

Harden GJ. 2007. *Ludwigia longifolia* (DC.) H.Hara. Sydney, Australia: PlantNET - The Plant Information Network System of Botanic Gardens Trust. Available: http://plantnet.rbgsyd.nsw.gov.au/cgi-bin/NSWfl.pl?page=nswfl&lvl=sp&name=Ludwigia~longifolia.

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