

Vallisneria australis (a plant, no common name)

Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, March 2022
Revised, May 2022
Web Version, 8/22/2022

Organism Type: Plant
Overall Risk Assessment Category: Uncertain



Photo: Auckland Museum. Licensed under CC BY 4.0. Available:
[https://commons.wikimedia.org/wiki/File:Vallisneria_._australis_S.W.L.Jacobs_and_Les_\(AM_AK353346-3\).jpg](https://commons.wikimedia.org/wiki/File:Vallisneria_._australis_S.W.L.Jacobs_and_Les_(AM_AK353346-3).jpg) (May 13, 2022).

1 Native Range and Status in the United States

Native Range

From Les et al (2008):

“Grows at the higher altitudes of the eastern coast [of Australia] south from Theodore, Queensland (possibly introduced there), Armidale (Northern Tablelands of New South Wales)

and south of the Williams River on coastal N.S.W. [New South Wales], and south of the Qld [Queensland] border west of the ranges in N.S.W., to Victoria, South Australia, and Tasmania; [...]”

Status in the United States

GBIF-US (2022) has records of *Vallisneria australis* collected in northern Michigan. Due to the history of identification of this species as part of a *Vallisneria* species native to North America (Les et al. 2008; see remarks, below), and no other confirming source, the presence of *V. australis* in the United States cannot be confirmed.

Means of Introductions in the United States

No known introductions.

Remarks

Vallisneria australis is a relatively recently recognized species, previously having been thought to be part *V. americana*, a species native to North America (Les et al. 2008).

From Les et al. (2008):

“*Vallisneria australis* was included in *V. americana* by Lowden (1982) and this subsequently has been followed by several authors, mainly due to a lack of alternatives. Although it is clear that the Australian species differs from *V. americana* ecologically and physiologically there are few morphological characters that clearly distinguish them. The Australian species can produce longer and wider leaves than *V. americana* but this character is only visible in the largest of plants and, unfortunately, these are rarely represented in herbaria.”

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

According to WFO (2022), *Vallisneria australis* S.W.L.Jacobs & Les is the accepted name for this species.

From GBIF Secretariat (2022):

“Kingdom Plantae
Phylum Tracheophyta
Class Liliopsida
Order Alismatales
Family Hydrocharitaceae
Genus *Vallisneria* P.Micheli ex L.
Species *Vallisneria australis* S.W.L.Jacobs & Les”

Size, Weight, and Age Range

From Les et al. (2008):

“Leaves basal, to 3 m long [...]”

Environment

From Les et al. (2008):

“Grows at the higher altitudes [...]”

“Habitats include more or less perennial creeks, rivers, billabongs and dams.”

Climate

From Mesterházy et al. (2021):

“[*Vallisneria australis*] can adapt to the Atlantic climate [...]”

Distribution Outside the United States

Native

From Les et al (2008):

“Grows at the higher altitudes of the eastern coast [of Australia] south from Theodore, Queensland (possibly introduced there), Armidale (Northern Tablelands of New South Wales) and south of the Williams River on coastal N.S.W. [New South Wales], and south of the Qld [Queensland] border west of the ranges in N.S.W., to Victoria, South Australia, and Tasmania; [...]”

Introduced

From Verloove (2022):

“Based on molecular data Japanese records of invasive *Vallisneria* proved to belong to *V. australis* S. W. L. Jacobs & D. H. Les and a hybrid of *V. spiralis* and native *V. denseserrulata* Makino (Wasekura & al. 2016).”

From Les et al (2008):

“[...]; introduced in Western Australia.”

From Mesterházy et al. (2021):

“Based on our molecular research the investigated *Vallisneria* populations from Belgium, Germany, Hungary and Italy are all identified as *V. australis* S.W.L. Jacobs & Les, which is a recently described species originating from Australia (see Les et al., 2008) and introduced in China (Wasekura et al., 2016).”

“[...] *V. australis* has already become an invasive species in Japan (Wasekura et al., 2016).”

“Our study confirms that *V. australis* has become established in some parts of Europe. Firstly, this species naturalised in Hungary although in this country it only occurs in thermally heated canals. Later, this species was also recorded from Italy, Belgium and Germany where it occurs in strongly modified water bodies (rice fields, canals, gravel pits), but these are not thermally heated.”

Collas et al. (2012) reported that the introduced *Vallisneria* populations in New Zealand are correctly identified as *V. australis* instead of *V. spiralis* as originally reported.

Means of Introduction Outside the United States

From Mesterházy et al. (2021):

“All known populations probably resulted from plant remains released in drainage water from aquariums.”

Short Description

From Les et al. (2008):

“Submerged tufted, stoloniferous perennial. Leaves basal, to 3 m long, 11–35 mm wide; apex obtuse; 5–7 major longitudinal nerves. Male spathe ovate, 10–25 mm long; flowers < 0.5 mm long; sepals 3, subequal, curved, ca. 0.6 mm long; anthers 2; filaments fused for ca. 50% of their length (like 'Y'); staminode minute. Female spathe enclosing 1(–4) sessile flowers, thin, translucent, 10–30mm long; flowers (1.9–) 2.5–4 mm long; sepals 3, triangular to semiorbicular, ca. 3mm long; petal rudiments minute or absent; stigmas 3, ca. 3 mm long, bifid for 50–70% of their length; staminodes absent or ca. 0.2 mm long, just below notch on outer surface of stigma. Fruit cylindrical, (15–)20–160 mm long, ca. 2–5 mm wide. Seed narrow ovoid to ellipsoid, 1.5–2.0 mm long, (0.2–) 0.4–0.8 mm diam., smooth surface with a dense coat of short–medium length hairs.”

Biology

From Les et al. (2008):

“Flowers and fruits are produced during the summer months.”

Human Uses

From Wasekura et al. (2016):

“On the other hand, considering the results of the homology search [...], the nrITS sequences of the accessions traded commercially [in Japan] as *V. gigantea* were identified as that of *V. australis* [...].”

From Les et al. (2008):

“[...] highly valued commercially as ornamental aquarium specimens (Kasselmann 2003). Because *Vallisneria* is cultivated so widely, the potential for introductions to nonindigenous regions is high (Lowden 1982); however, a more reliable means of identifying species and cultivars is necessary before this possibility can be evaluated with confidence.”

Diseases

No information on diseases of *Vallisneria australis* was found.

Threat to Humans

No information found.

3 Impacts of Introductions

From Mesterházy et al. (2021):

“According to our experience in Hungarian populations, this species [*Vallisneria australis*] is a very strong competitor and can replace other submerged invasive species (*Hydrilla verticillata* (L.f.) Royle, *Cabomba caroliniana* A. Gray) in thermal water canals. It always forms monodominant stands.”

From Champion et al. (2012):

“Six species of submerged plants (*Hydrilla verticillata* (L.f.) Royle, *Ceratophyllum demersum* L., *Egeria densa* Planch., *Lagarosiphon major* (Ridley) Moss, *Vallisneria australis* S.W.L.Jacobs & Les and *V. spiralis* L.) were banned from sale [in New Zealand] in 1983 under the *Noxious Plants Act (1978)*.”

4 History of Invasiveness

Vallisneria australis has a history of nonnative introductions resulting in established populations in multiple locations. One statement was found stating that *V. australis* outcompeted other invasive aquatic plants in Hungary. No information was found regarding any impacts on native species in areas with nonnative populations of *V. australis*. Some information may be present in the literature but published under a different name given the revision history of the systematic of the *Vallisneria* genus (see Remarks). Due to the lack of information regarding impacts on native species, the history of invasiveness for *Vallisneria australis* is classified as Data Deficient.

5 Global Distribution



Figure 1. Known global distribution of *Vallisneria australis*. Observations are reported from Australia, New Zealand, Japan, Germany, Belgium, and the United States. Map from GBIF Secretariat (2022). The location in the United States was not used in the climate match due to uncertainty in the identification of the species.

Additional observations in Hungary, Belgium, Germany, and Italy were reported in Mesterházy et al. (2021). Observations reported from Hungary were not used in the climate match as Mesterházy et al. (2021) indicates those populations are in thermally regulated waters, a condition which cannot be accounted for by the climate matching program. Wasekura et al. (2016) reported additional populations of *V. australis* in Japan.

No georeferenced observations were found for the introduction in China (Mesterházy et al. 2021).

6 Distribution Within the United States



Figure 2. Reported distribution of *Vallisneria australis* in the United States. Map adapted from GBIF-US (2022). The location in northern Michigan was not used in the climate match. The specimens were collected in the 1950s and originally identified as *V. spiralis*, then *V. americana* before being identified as *V. australis* (GBIF Secretariat 2022). No other source confirms the presence of *V. australis* in North America at any point.

7 Climate Matching

Summary of Climate Matching Analysis

Much of the contiguous United States had a high climate match for *Vallisneria australis*. West of the Rockies, from the Pacific Northwest down the coast and along through Texas all recorded a high match. Florida and up the East Coast to New York and across to the Great Lakes area and then through parts of the Midwest back down to Texas all recorded high matches. Other parts of the Midwest recorded medium matches as well as parts of the Northeast. The low matches were recorded in northern Minnesota, the Dakotas, and eastern Montana. Low matches were also found along the mid and northern Pacific Coast. The overall Climate 6 score (Sanders et al. 2021; 16 climate variables; Euclidean distance) for the contiguous United States was 0.667, high (scores of 0.103 and above, are classified as high). The following States had low individual Climate 6 scores: North Dakota. The following states had medium Climate 6 scores: Minnesota and South Dakota. The rest of the states had high Climate 6 scores.

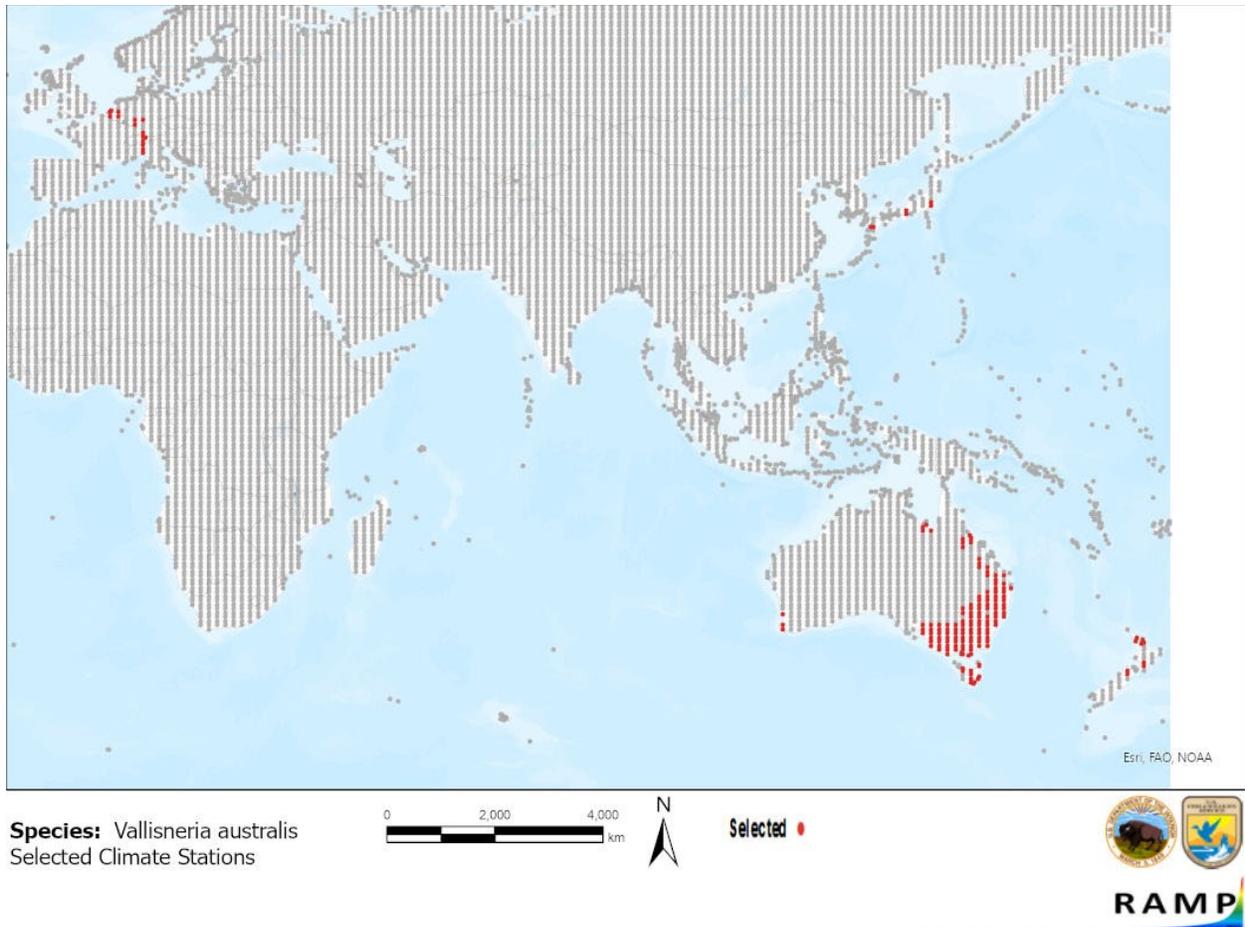


Figure 2. RAMP (Sanders et al. 2021) source map showing weather stations in Australia selected as source locations (red; Belgium, Netherlands, Germany, Switzerland, Italy, Japan, Australia, New Zealand) and non-source locations (gray) for *Vallisneria australis* climate matching. Source locations from Wasekura et al. (2016), Mesterházy et al. (2021), and GBIF Secretariat (2022). Selected source locations are within 100 km of one or more species occurrences, and do not necessarily represent the locations of occurrences themselves.

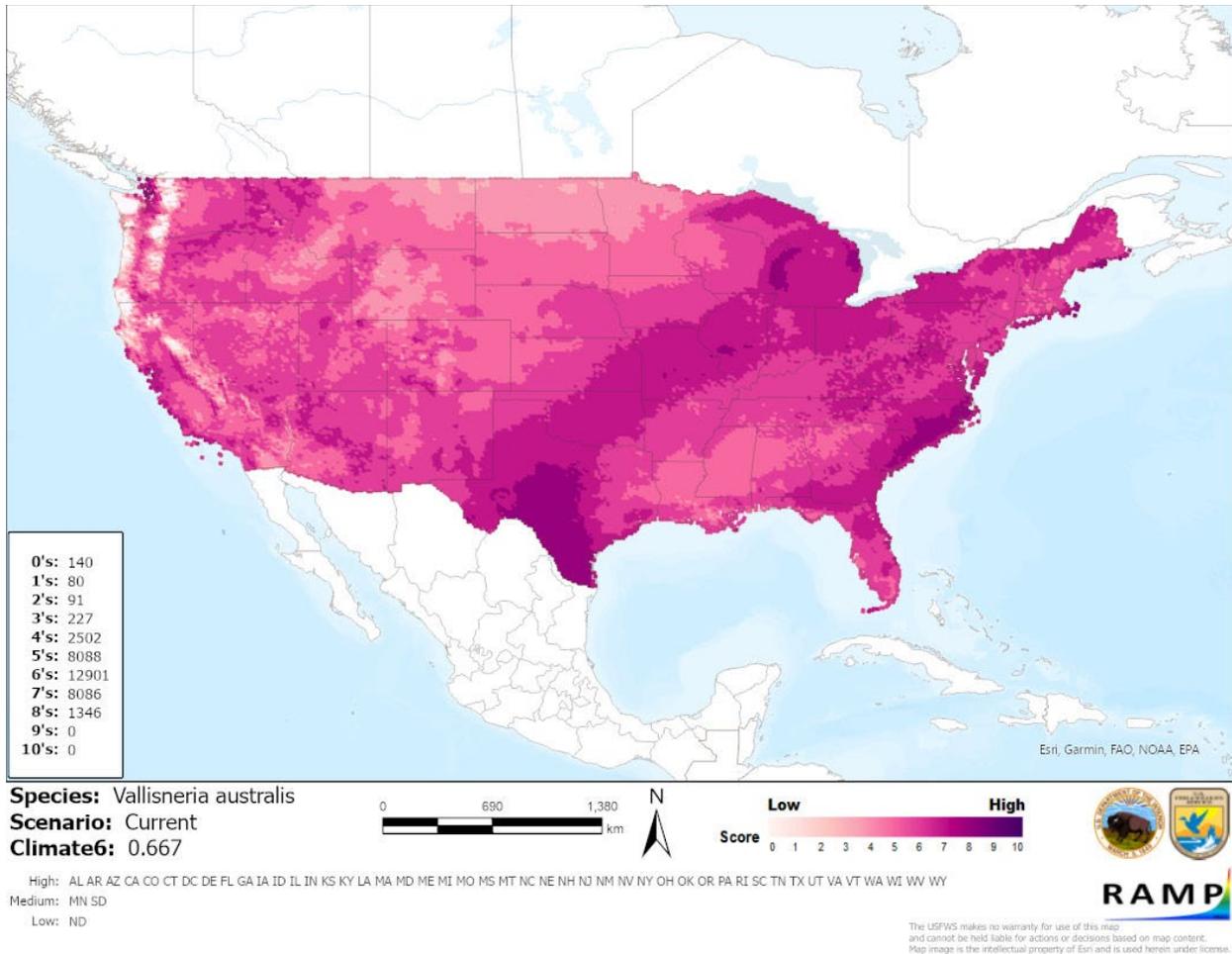


Figure 3. Map of RAMP (Sanders et al. 2021) climate matches for *Vallisneria australis* in the contiguous United States based on source locations reported by Wasekura et al. (2016), Mesterházy et al. (2021), and GBIF Secretariat (2022). Counts of climate match scores are tabulated on the left. 0/Light 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
$0.000 \leq X \leq 0.005$	Low
$0.005 < X < 0.103$	Medium
≥ 0.103	High

8 Certainty of Assessment

There is a general lack of information regarding *Vallisneria australis*. Some biological and ecological information was found. Information regarding the native and introduced ranges of this species is complicated by the systematic history of the *Vallisneria* genus (see Remarks). Records of introductions and established populations were found but there was no information regarding

impacts of the introductions on native species, ecosystems, or human or economic well-being. The certainty of assessment for *V. australis* is Low.

9 Risk Assessment

Summary of Risk to the Contiguous United States

Vallisneria australis is a submerged aquatic plant that is thought to be native to Southeastern Australia. There is little information pertaining to this species as it was formally described and differentiated from other *Vallisneria* species within the last 20 years. This species is in the aquarium and pond trade. Records of introductions and established populations were found; however, there was no information on impacts from those introductions. The history of invasiveness is classified as Data Deficient. The overall climate match was High with the contiguous United States with most of the United States having locally high climate matches. The upper Midwest and areas along the mid and northern Pacific Coast recorded low matches. The certainty of assessment is Low due to the history of systematic changes in the *Vallisneria* genus and lack of information regarding the history of invasiveness for *V. australis*. 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.

- Champion PD, Clayton JS, Petroschevsky A, Newfield M. 2010. Using the New Zealand aquatic weed risk assessment model to manage potential weeds in the aquarium/pond plant trade. *Plant Protection Quarterly* 25(2):49–51.
- Collas FPL, Beringen R, Koopman KR, Matthews J, Odé B, Pot R, Sparrius LB, van Valkenburg JLCH, Verbrugge LNH, Leuven RSEW. 2021. Knowledge document for risk analysis of the non-native Tapegrass (*Vallisneria spiralis*) in the Netherlands. Report of FLORON & Roelf Pot Research and Consultancy, Radboud University Nijmegen to Invasive Alien Species Team, Netherlands Food and Consumer Product Safety Authority.
- GBIF Secretariat. 2022. GBIF backbone taxonomy: *Vallisneria australis* S.W.L.Jacobs & Les. Copenhagen: Global Biodiversity Information Facility. Available: <https://doi.org/10.15468/dl.ctv2xp> (February 2022).

- GBIF-US. 2022. Species occurrences: *Vallisneria australis* S.W.L.Jacobs & Les. Available: <https://doi.org/10.15468/dl.bk6rvv> (May 2022).
- Les DH, Jacobs SWL, Tippery NP, Chen L, Moody ML, Wilstermann-Hildebrand M. 2008. Systematics of *Vallisneria* (Hydrocharitaceae). *Systematic Botany* 33:49–65.
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- Sanders S, Castiglione C, Hoff M. 2021. Risk Assessment Mapping Program: RAMP. Version 4.0. U.S. Fish and Wildlife Service.
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- Wasekura H, Horie S, Fujii S, Maki M. 2016. Molecular identification of alien species of *Vallisneria* (Hydrocharitaceae) species in Japan with a special emphasis on the commercially traded accessions and the discovery of hybrid between nonindigenous *V. spiralis* and native *V. denseserrulata*. *Aquatic Botany* 128:1–6.
- [WFO] World Flora Online. 2022. *Vallisneria australis* S.W.L.Jacobs & Les. World Flora Online – a project of the World Flora Online Consortium. Available: <http://www.worldfloraonline.org/taxon/wfo-0000837146> (March 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.

- Kasselmann C. 2003. Aquarium plants. Malabar, Florida: Krieger Publishing.
- Lowden RM. 1982. An approach to the taxonomy of *Vallisneria* L. (Hydrocharitaceae). *Aquatic Botany* 13:269–298.
- Sculthorpe CD. 1967. The biology of aquatic vascular plants. London: Edward Arnold.