Eel Grass (*Vallisneria nana*)

Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, December 2016
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1 Native Range and Status in the United States

Native Range

From GISD (2006):

"*Vallisneria nana* is native to Australia."

Status in the United States

There are no records of *Vallisneria nana* in the United States.

Means of Introductions in the United States
There are no records of *Vallisneria nana* in the United States.

Remarks
From GISD (2006):

"*Vallisneria spiralis* and *Vallisneria nana* are both known as "eelgrass" (S. Jacobs, pers.comm., 2006). *V. nana* is referred to by its synonym *Vallisneria gigantea* in literature."

Searches for information were conducted under the name *Vallisneria nana* and the synonym *V. gigantea.*

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing
From Roskov et al. (2015):

"Kingdom Plantae
Phylum Tracheophyta
Class Liliopsida
Order Alismatales
Family Hydrocharitaceae
Genus *Vallisneria*
Species *Vallisneria nana* R.Br."

"Accepted scientific name: *Vallisneria nana* R.Br.
Synonyms: *Vallisneria gigantea* Graebn., *Vallisneria gracilis* F.M.Bailey"

Size, Weight, and Age Range
From GISD (2006):

"Eelgrasses are submerged aquatic plants that can grow up to five metres."

Environment
No information on the specific environment requirements of *Vallisneria nana* was found.

Climate/Range
No information on the specific climate range of *Vallisneria nana* was found.

Distribution Outside the United States

Native

From GISD (2006):

"*Vallisneria nana* is native to Australia."

Introduced

From deWinton et al. (2009):

"*Vallisneria gigantea* Graebner was known only from Lake Pupuke, Auckland region, since 1894 (Cheeseman 1896). Specimens cited by Healy & Edgar (1980) for Avon River (Canterbury region) and a pond at South Kaipara Head (Auckland region) were considered to be misidentifications."

From deWinton and Edwards (2009):

"Cheeseman (1886) recorded the early establishment of *Vallisneria gigantea* (as *V. spiralis*) in Lake Pupuke, although the species has not spread from this site."

From Lukács et al. (2014):

"In total, 48 alien aquatic vascular plants were recorded as established in Hungarian inland waters (Table I); 7 species (*Bacopa caroliniana*, *Houttuynia cordata*, *Hygrophila corymbosa*, *H. difformis*, *Limnophila sessiliflora*, *Rotala rotundifolia*, and *Vallisneria gigantea*) are new to the DAISIE list (DAISIE 2009)."

From Kadono (2004):

"A list of alien aquatic plants naturalized in Japan: […] Species with limited distribution: […] *Vallisneria gigantea* Graebn."

From Maxwell (2009):

"*Potamogeton crispus* L. (Potamogetonaceae), *Najas indica* (Willd.) Cham. (Najadaceae), *Hydrilla verticillata* (L.) Roy., and *Vallisneria gigantea* Greab. (both Hydrocharitaceae), all monocots, are prevalent [in Mekong River, Cambodia]."

Means of Introduction Outside the United States

From GISD (2006):

"*Vallisneria nana* is spread through aquarium release."

From Lukács et al. (2014):

"We have evidence concerning the introduction pathway of ornamental species (e.g., *Gymnocoronis spilanthoides*, *Houttuynia cordata*, *Hygrophila corymbosa*, *H. difformis*, *Vallisneria gigantea*, *V. spiralis*) showing that they were deliberately introduced to thermal areas for breeding/propagation purposes then sold to Western markets."

Short Description

From GISD (2006):

"Eelgrasses are submerged rhizomatous (but not tuberous) aquatic plants, producing rosettes of long strap-like leaves which can vary in length from a few centimetres to 5.5 metres in deep water. Rooted or anchored in sediment they have no leafy stem; leaves all arise from a basal rosette at the sediment surface. Leaves have many small longitudinal veinlets and cross-septa, from 0.4-1cm wide. Plants form stout rhizomes that extend from the sediments. Numerous roots, up to 40cm long, sprout at each leaf-bearing node on the rhizomes (Greater Wellington Regional Council 2004b). The sexes are on different plants, the male flowers released and free-floating and the female with a spiral peduncle.
Juvenile or sterile specimens may be difficult to distinguish (Warrington 1994)."

Biology

From GISD (2006):

"*Vallisneria nana* has been reported to flower abundantly in Auckland, New Zealand from November to March (Coffey and Clayton 1987). However, please note that in New Zealand there is no evidence of viable seed being produced (Greater Wellington Regional Council 2004b)."

"Coastal and inland wetlands, lakes, and rivers."

"They grow in still or flowing water and form a dense monoculture that dominates from the bed of the water-body to the surface."

Human Uses

From GISD (2006):

"*Vallisneria* is a popular aquarium plant in New Zealand (Coffey and Clayton 1987)."

Diseases

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

Threat to Humans

No records of threats to humans from *Vallisneria nana* were found.

3 Impacts of Introductions

From GISD (2006):

"Dense infestations may restrict recreational activities, cause flooding and silting and reduce the aesthetic appeal of a body of water."

4 Global Distribution

Figure 1. Known global Distribution of *Vallisneria nana* as reported by GBIF Secretariat (2015). Locations are in Japan, China, Malaysia, Papua New Guinea, and Australia.

Locations in China and Taipei could not be verified as established populations and were not included in the climate match.

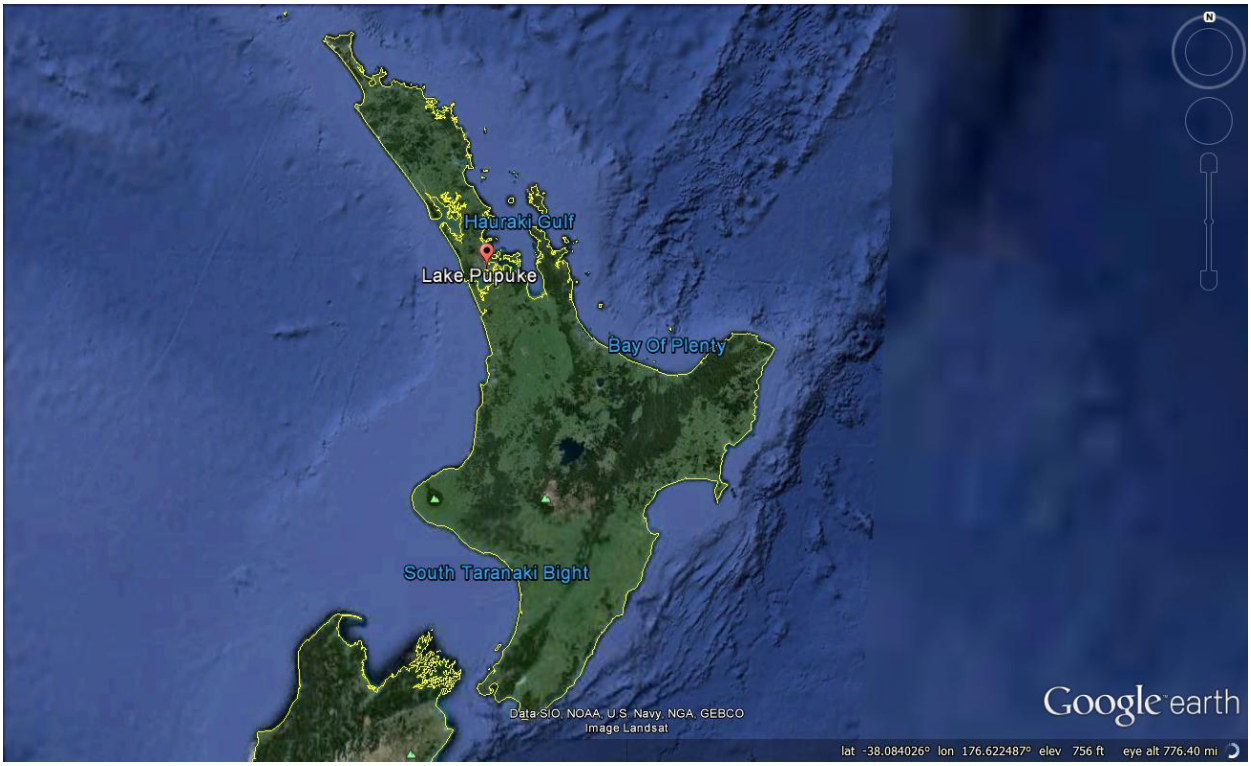

Figure 2. Map of Lake Pupuke, Auckland, New Zealand (Google 2011). *Vallisneria nana* is reported in Lake Pupuke by deWinton (2009).

5 Distribution Within the United States

There are no records of *Vallisneria nana* in the United States.

6 Climate Matching

Summary of Climate Matching Analysis

The climate match for *Vallisneria nana* was high in along the southern Atlantic coast from Virginia to Florida; it was also high for most of Texas and parts of the south west. The Climate 6 score (Sanders et al. 2014; 16 climate variables; Euclidean distance) for the contiguous United States was 0.121, high. The following states had individually high climate scores: Arizona, Florida, Georgia, Massachusetts, Missouri, North Carolina, Oklahoma, South Carolina, Texas, Virginia, and West Virginia.

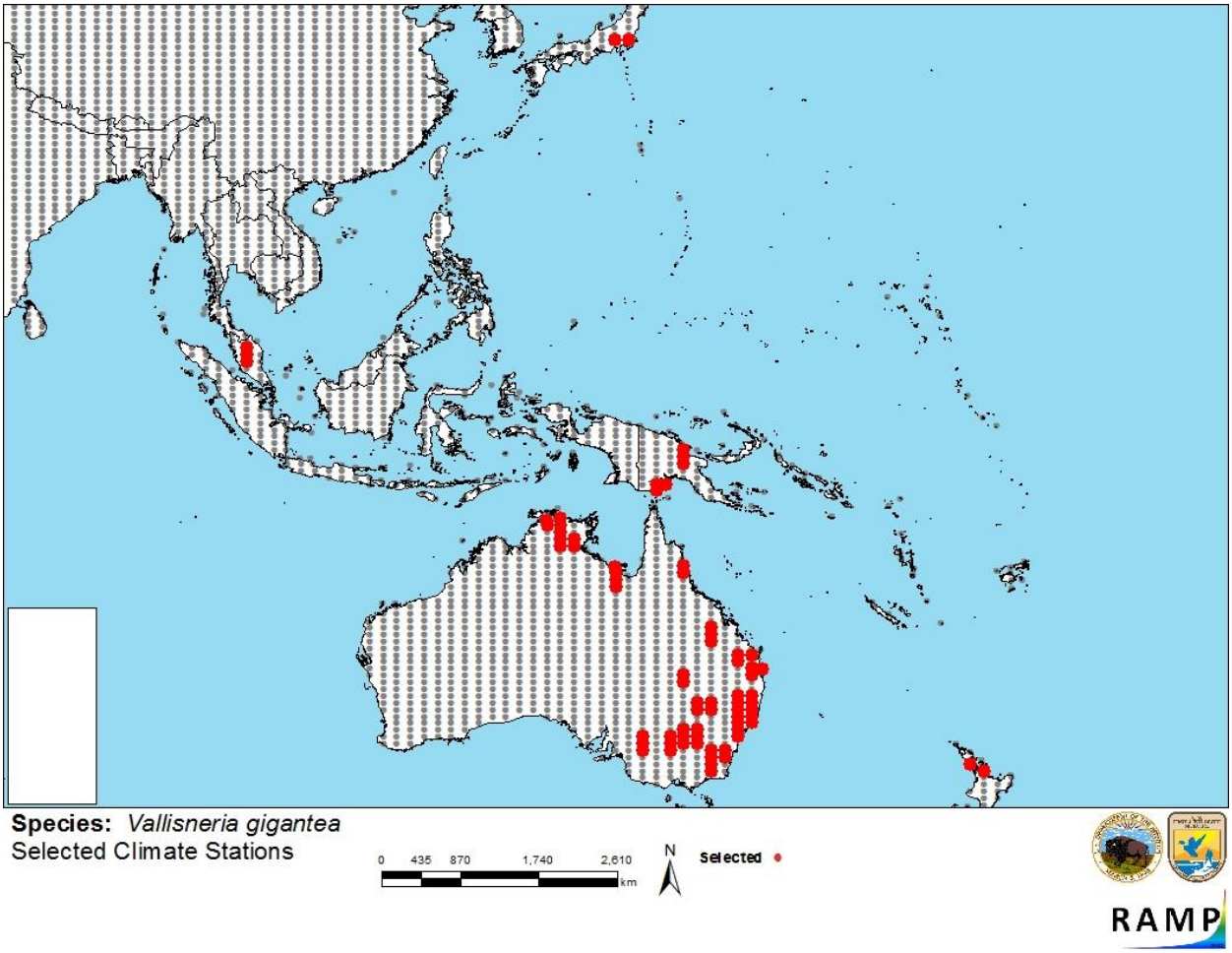

Figure 3. RAMP (Sanders et al. 2014) source map showing weather stations selected as source locations (red; Japan, Malaysia, Papua New Guinea, Australia; New Zealand) and non-source locations (grey) for *Vallisneria nana* climate matching. Source locations are from deWinton (2009) and GBIF Secretariat (2015).

Location data was not available for the reported population in Hungary. The locations in China and Taipei reported by GBIF Secretariat (2015) could not be confirmed and were not included in the climate match.

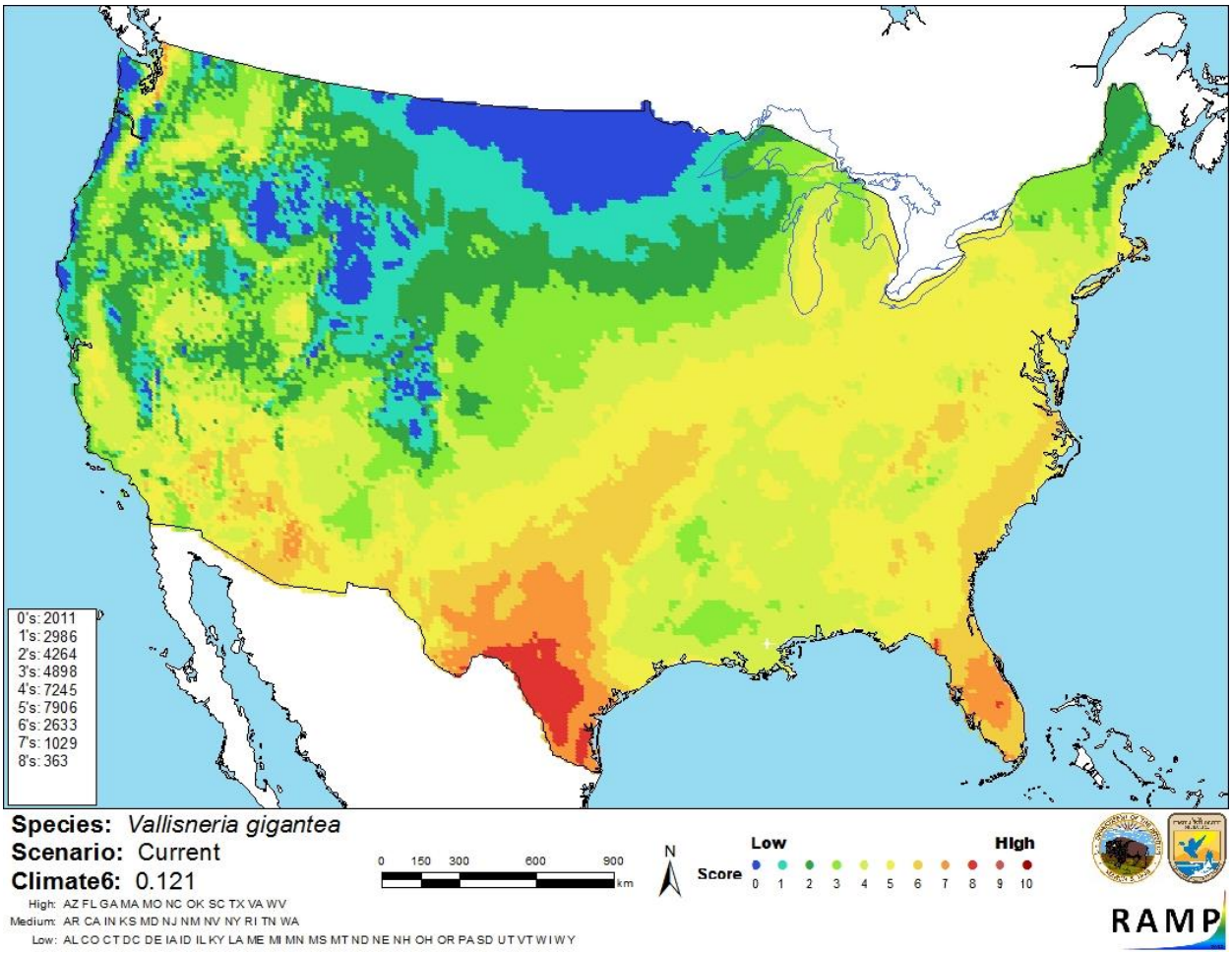

Figure 4. Map of RAMP (Sanders et al. 2014) climate matches for *Vallisneria nana* in the contiguous United States based on source locations reported by deWinton (2009) and GBIF Secretariat (2015). 0 = Lowest match, 10 = Highest match. Counts of climate match scores are tabulated on the left side of the map.

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

Climate 6: Proportion of (Sum of Climate Scores 6-10) / (Sum of total Climate Scores)	Climate Match Category
0.000≤X≤0.005	Low
0.005<X<0.103	Medium
≥0.103	High

7 Certainty of Assessment

The certainty of assessment is low. There is minimal information about *Vallisneria nana* including introduction records. There is a lack of demonstrated impacts but this species has been present in some locations for over 100 years.

8 Risk Assessment

Summary of Risk to the Contiguous United States

The history of invasiveness is not documented. There are records of a few introductions going back over 100 years but there have not been documented significant impacts or scientifically credible studies showing a lack of impact. The climate match is high; it is especially high for southern Texas. The certainty of assessment is low. The overall risk assessment category is uncertain due to the combination of an undocumented history of invasiveness but a high climate match.

Assessment Elements

- **History of Invasiveness (Sec. 3): None Documented**
- **Climate Match (Sec. 6): High**
- **Certainty of Assessment (Sec. 7): Low**
- **Remarks/Important additional information** No additional remarks.
- **Overall Risk Assessment Category: Uncertain**

9 References

Note: The following references were accessed for this ERSS. References cited within quoted text but not accessed are included below in Section 10.

deWinton, M. D., P. D. Champion, J. S. Clayton, and R. D. S. Wells. 2009. Spread and status of seven submerged pest plants in New Zealand lakes. New Zealand Journal of Marine and Freshwater Research 43(2):547–561.

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Lukács, B. A., A. Mesterházy, R. Vidéki, and G. Király. 2014. Alien aquatic vascular plants in Hungary (Pannonian ecoregion): historical aspects, data set and trends. Plant Biosystems.

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Sanders, S., C. Castiglione, and M. Hoff. 2014. Risk assessment mapping program: RAMP. U.S. Fish and Wildlife Service.

10 References Quoted But Not Accessed

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.

Cheeseman. 1886. [Source material did not give full citation for this reference]

Cheeseman, T. F. 1896. Notice of the establishment of *Vallisneria spiralis* in Lake Takapuma, together with some remarks on its life-history. Transactions of the New Zealand Institute 29:386–390.

Coffey, B. T., and J. S. Clayton. 1987. Submerged macrophytes of Lake Pupuke, Takapuna, New Zealand. New Zealand Journal of Marine and Freshwater Research 21(21):193–198.

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Healy, A. J., and E. Edgar. 1980. Flora of New Zealand: Volume III. Government Printer, Wellington, New Zealand.

Warrington. 1994. [Source material did not give full citation for this reference]