Vallisneria natans (an eelgrass, no common name)

Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, September 2020
Revised, January 2021
Web Version, 4/8/2021

Organism Type: Plant
Overall Risk Assessment Category: Uncertain

Photo: Auckland Museum. Licensed under Creative Commons Attribution 4.0 International License. Available: https://commons.wikimedia.org/wiki/File:Vallisneria_._natans_(Lour.)_H.Hara_(AM_AK353348-3).jpg. (January 2021).

1 Native Range and Status in the United States

Native Range

From Zhuang (2011):

"China (Sichuan, Guangdong, Shandong, Jiangxi, Jiangsu, Zhejiang, Hunan, Hubei, Hebei, Yunnan, Guizhou, Jilin, Liaoning, Shanxi, Guangxi, Henan); India; Iraq; Japan; Korea, Democratic People's Republic of; Nepal; Russian Federation (Primoryi); Taiwan, Province of China (Taiwan, Province of China (main island)); Viet Nam"

Status in the United States

Vallisneria natans has not been introduced in the wild in the United States. No record of trade of this species was found.

Means of Introductions in the United States

Vallisneria natans has not been introduced to the United States.

Remarks

Information for this assessment was searched for by using the valid name *Vallisneria natans* and the synonym *Physkium natans*.

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

According to WFO (2021), *Vallisneria natans* (Lour.) H.Hara is the accepted name for this species.

From ITIS (2021):

Kingdom Plantae
Subkingdom Viridiplantae
Infrakingdom Streptophyta
Superdivision Embryophyta
Division Tracheophyta
Subdivision Spermatophytina
Class Magnoliopsida
Superorder Lilianae
Order Alismatales
Family Hydrocharitaceae
Genus *Vallisneria*
Species *Vallisneria natans* (Lour.) H. Hara

Size, Weight, and Age Range

From Ke and Li (2006):

"[…] may extend 2 m or more depending on water depth."

Environment

From Ke and Li (2006):

"It is a dioecious freshwater perennial plant […]"

From Flora of China (2020):

"Rivers, streams, ponds, lakes."

From Xiao et al. (2007):

"*V. natans* showed an optimal clonal growth at water depths of 110–160 cm, but at greater depths clonal growth was severely retarded."

Climate

From Ke and Li (2006):

"The temperature range (10–35 °C) and substratum types ideal for growth are wide."

"[…] a wide range of temperatures (25–35 °C) was favorable for germination of *V. natans* seeds."

Distribution Outside the United States

Native

From Zhuang (2011):

"China (Sichuan, Guangdong, Shandong, Jiangxi, Jiangsu, Zhejiang, Hunan, Hubei, Hebei, Yunnan, Guizhou, Jilin, Liaoning, Shanxi, Guangxi, Henan); India; Iraq; Japan; Korea, Democratic People's Republic of; Nepal; Russian Federation (Primoryi); Taiwan, Province of China (Taiwan, Province of China (main island)); Viet Nam"

Introduced

No introductions of *V. natans* have been reported outside of the native range.

Means of Introduction Outside the United States

No introductions have been reported.

Short Description

From Ke and Li (2006):

"It is a dioecious freshwater perennial plant with fibrous roots (Sun, 1992) […]"

From Flora of China (2020):

"Rhizome tuberous; stolons ca. 2 mm in diam., usually smooth. Leaves 0.2-2 m × 0.5-2 cm, veins 5-9, margin entire or inconspicuously serrulate, apex obtuse. Male spathe ovate-conic, 1.5-2 cm × 5-10 mm, with more than 200 male flowers; sepals strongly convex; stamens 1, filaments sometimes 2-lobed at apex, with hairs at base. Female spathe 1.5-2 cm; peduncle 30-50 cm or longer, slender; sepals greenish purple, 2-4 × ca. 3 mm, apex obtuse; petals white, minute; staminodes 3. Fruit cylindric, 5-30 cm × ca. 5 mm. Seeds narrowly obovoid, glandular hairy."

The following information pertains to the genius *Vallisneria* and not specifically *Vallisneria natans*.

From Ocean Aquaria (2020):

"*Vallisneria* sp. is a genus of freshwater aquatic plant, commonly called eelgrass, tape grass or vallis. It is a submerged plant that spreads by runners and sometimes forms tall underwater meadows. Leaves arise in clusters from their roots. The leaves have rounded tips, and definite raised veins."

Biology

From Xiao et al (2007):

"[…] stoloniferous submersed macrophyte *Vallisneria natans* […]"

From Ke and Li (2006):

"*Vallisneria natans* is relatively fecund and produces a large amount of seeds every year, each fruit containing about 350–600 seeds. As most of the ripe fruits float on the water surface, large numbers of seeds can be easily and quickly collected. *V. natans* also reproduces by rhizome and is therefore capable of both sexual and asexual reproduction."

From Wang et al. (2020):

"*Vallisneria natans* (*V. natans*) is a common perennial submerged plant with wide adaptability and high tolerance to pollution."

According to Encyclopedia of Life (2020), this species is a photoautotroph.

Human Uses

From Ke and Li (2006):

"[…] the use of *V. natans* for the purpose of vegetation restoration is attractive (Yan et al., 1995)."

From Zhuang (2011):

"*Vallisneria* spp. are used in aquariums. It is not clear whether this particular species is being used too. This species however is used as a medicinal plant against sore throat in Viet Nam."

Diseases

No information on diseases associated with this species was found.

Threat to Humans

No information on threats to humans was found.

3 Impacts of Introductions

Vallisneria natans has not been reported as introduced outside of its native range, therefore no impacts of introduction have been found.

4 History of Invasiveness

Vallisneria natans has not been reported as introduced anywhere outside of its native range, therefore no impacts of introduction have been reported. No specific information on trade was found for this species. There are indications that it may be in the aquarium trade and it is used as a medicinal plant in Vietnam. The history of invasiveness is No Known Nonnative Population.

5 Global Distribution

Figure 1. Known global distribution of *Vallisneria natans*. Observations are reported from Japan, North Korea, South Korea, China, Hong Kong, Vietnam, India, Papua New Guinea, and New Zealand. Map from GBIF Secretariat (2020). Location in New Zealand will not be included in the climate match as it represents a specimen that was grown in a freshwater aquarium and therefore does not represent an established population. Location in Papua New Guinea will not be included in the climate match as the report comes from a botanical garden and no further information can be found to indicate a wild, established population in this location.

Vallisneria natans is also reported as native to Iraq but no georeferenced observations were available to represent that portion of the range in the climate match.

6 Distribution Within the United States

This species has not been reported as introduced or established in the United States.

7 Climate Matching

Summary of Climate Matching Analysis

The climate match for the contiguous United States was generally medium. Small areas of high match was primarily found in the central Midwest, central Great Plains, coastal North Carolina, and the Gulf Coast of Florida. Low match was found throughout the West, interior southeast, upper Midwest, and coastal New England. Everywhere else had a medium match. The overall Climate 6 score (Sanders et al. 2018; 16 climate variables; Euclidean distance) for the contiguous United States was 0.183, a high match (scores greater than or equal to 0.103 are classified as high). The following States had a high individual Climate 6 score: Colorado, Florida, Georgia, Iowa, Illinois, Indiana, Kansas, Maryland, Missouri, North Carolina, Nebraska, New Jersey, New Mexico, Ohio, Oklahoma, Pennsylvania, South Carolina, South Dakota, Virginia, and West Virginia. The following States had a medium individual Climate 6 score: Alabama, Arkansas, Delaware, Kentucky, Michigan, Minnesota, New York, Texas, and Wyoming. All remaining States received low individual climate scores.

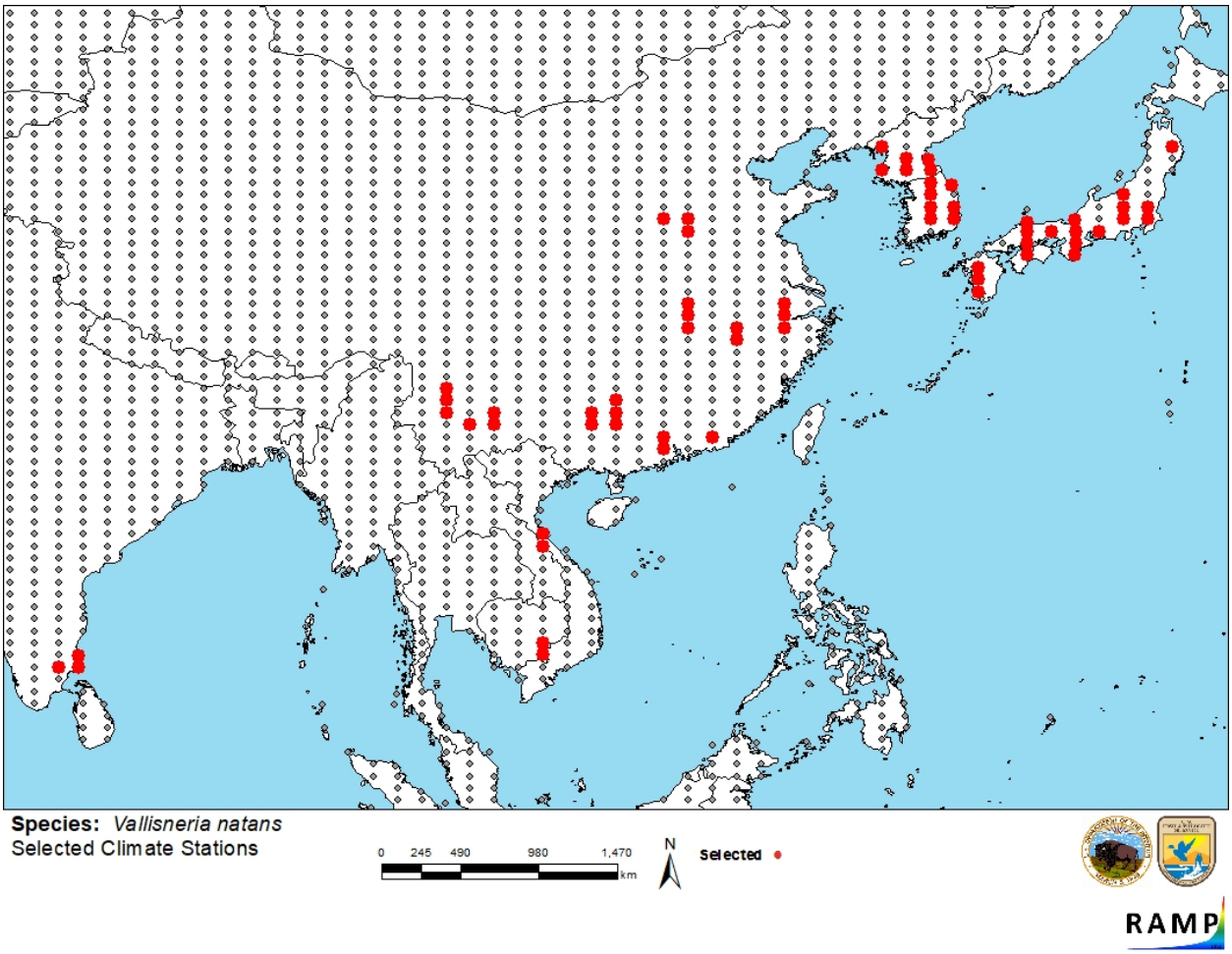

Figure 2. RAMP (Sanders et al. 2018) source map showing selected source locations (red; Japan, North Korea, South Korea, China, Hong Kong, India, Vietnam) and non-source locations (gray) for *Vallisneria natans*. Source locations from GBIF Secretariat (2020). Selected source locations are within 100 km of one or more species occurrences, and do not necessarily represent the locations of occurrences themselves.

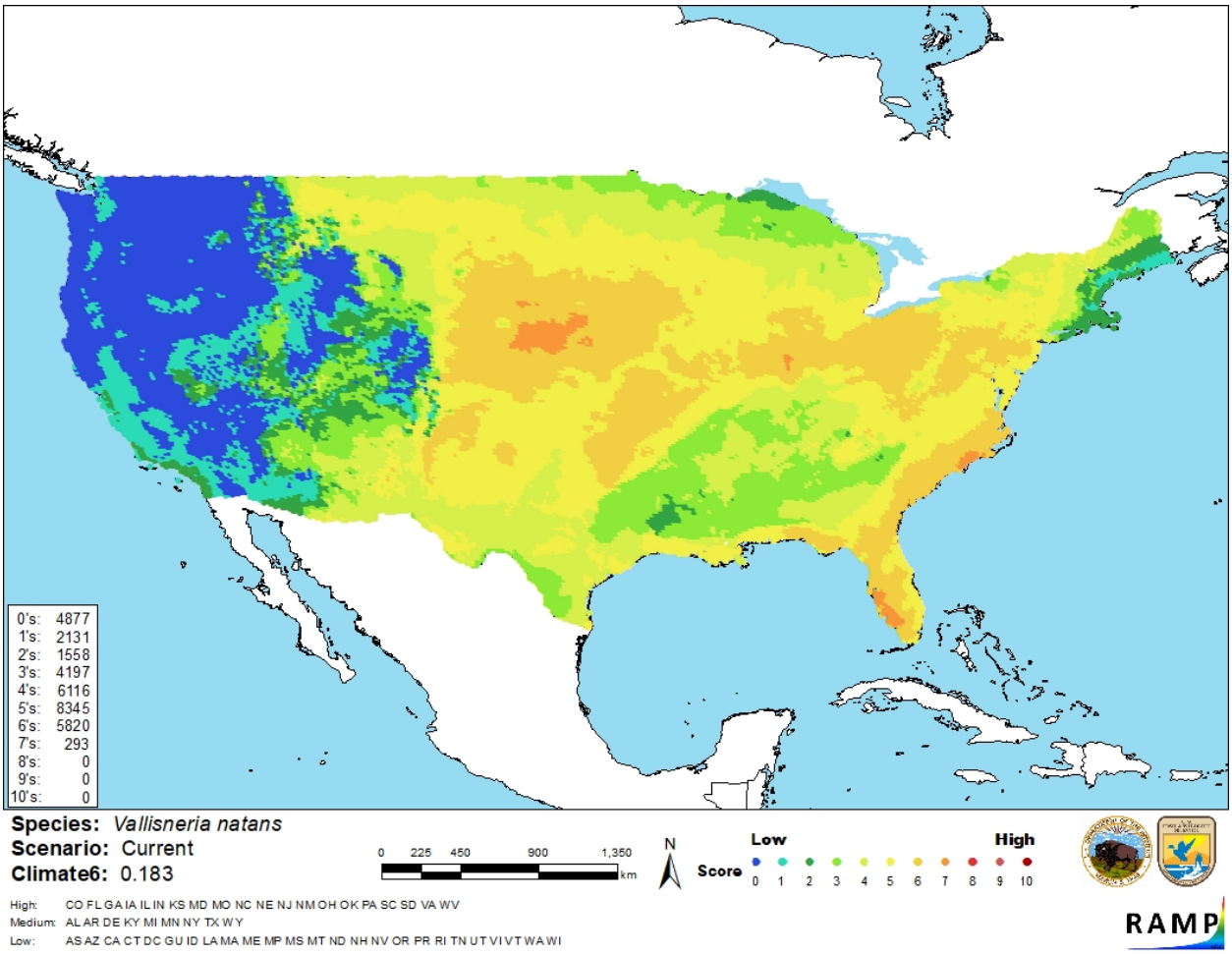

Figure 3. Map of RAMP (Sanders et al. 2018) climate matches for *Vallisneria natans* in the contiguous United States based on source locations reported by GBIF Secretariat (2020). Counts of climate match scores are tabulated on the left. 0/Blue = Lowest match, 10/Red = Highest match.

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≤X≤0.005	Low
0.005<X<0.103	Medium
≥0.103	High

8 Certainty of Assessment

The certainty of assessment is Low. Limited information is available on the biology and ecology of this species. *Vallisneria natans* has not been reported as introduced anywhere outside of its native range, therefore no information on the impacts of introduction has been found.

9 Risk Assessment

Summary of Risk to the Contiguous United States

Vallisneria natans is an aquatic plant species native to East Asia (Japan, North Korea, South Korea, China, Taiwan, Hong Kong, Vietnam, and India) and Iraq. *V. natans* may be used in the ornamental or aquarium trade. It is also used as a medicinal plant in Vietnam. *Vallisneria natans* has not been reported outside of its native range, therefore no impacts of introduction have been reported. The history of invasiveness is classified as No Known Nonnative Population. The climate match for the contiguous United States is High, with high match primarily being found in the Midwest, central Great Plains, Mid-Atlantic, and Southeast regions of the country. The certainty of assessment is Low due to a lack of information. The overall risk assessment category for *Vallisneria natans* is Uncertain.

Assessment Elements

- **History of Invasiveness (Sec. 4): No Known Nonnative Population**
- **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.

Encyclopedia of Life. 2020. *Vallisneria natans* (Lour.) H. Hara. Available: https://eol.org/pages/1089037 (September 2020).

Flora of China. 2020. *Vallisneria natans*. Page 99 in Flora of China Volume 23. Available: http://www.efloras.org/florataxon.aspx?flora_id=2&taxon_id=242353901 (September 2020).

GBIF Secretariat. 2020. GBIF backbone taxonomy: *Vallisneria natans* (Lour.) H.Hara. Copenhagen: Global Biodiversity Information Facility. Available: https://www.gbif.org/species/2865504 (September 2020).

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Ke X, Li W. 2006. Germination requirement of *Vallisneria natans* seeds: implications for restoration in Chinese lakes. Hydrobiologia 559:357–362.

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Sanders S, Castiglione C, Hoff M. 2018. Risk Assessment Mapping Program: RAMP. Version 3.1. U.S. Fish and Wildlife Service.

Wang N, Li Q, Jiang M, Zhang W, Zhang H, Song Q, Hu Z, Zhang J, Zheng Z. 2020. Effects of distinct revegetation methods on growth and microbial properties of *Vallisneria natans*. Water 12(5):1294.

[WFO] World Flora Online. 2021. World Flora Online – a project of the World Flora Online Consortium. Available: www.worldfloraonline.org (April 2021).

Xiao K, Yu D, Wu Z. 2007. Differential effects of water depth and sediment type on clonal growth of the submersed macrophyte *Vallisneria natans*. Hydrobiologia 589:265–272.

Zhuang X. 2011. *Vallisneria natans*. The IUCN Red List of Threatened Species 2011: e.T168709A6528459. Available: https://dx.doi.org/10.2305/IUCN.UK.2011-1.RLTS.T168709A6528459.en (January 2021).

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.

Sun XZ. 1992. Flora Reipublicae Popularis Sinicae Tomus 8. China: Science Press.

Yan GA, Ren N, Ma JM, Tan ZQ, Li YJ. 1995. Study on aquatic vegetation and its restoration East Lake, Wuhan. Journal of Plant Resources and Environment 4:21–27.