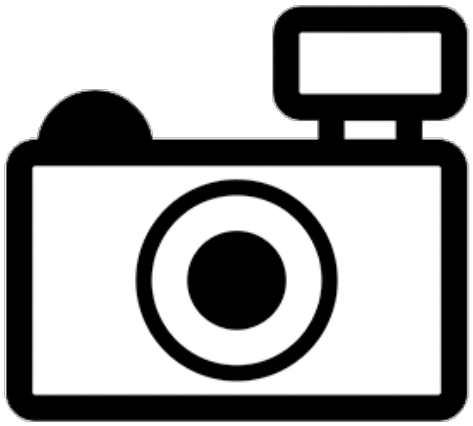
Najas chinensis (a plant, no common name)

Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, July 2020
Revised, January 2021
Web Version, 3/25/2021

Organism Type: Plant
Overall Risk Assessment Category: Uncertain



1 Native Range and Status in the United States

Native Range

From POWO (2021):

"China South-Central, China Southeast, Hainan, Japan, Korea, Manchuria, Primorye [Russia], Taiwan"

From Triest and Uotila (1986):

"*Najas orientalis* is evidently native to Honshu (Japan), Manchuria (China) and to the Ussuri Region (U.S.S.R.). Perhaps the species also occurs in Korea and in Taiwan."

Status in the United States

Najas chinensis has not been reported or established in the United States. No information on trade was found for this species in the United States.

Means of Introductions in the United States

Najas chinensis has not been reported in the United States.

Remarks

Information for this assessment was searched for using the valid name *Najas chinensis* and the synonyms *Caulinia orientalis* and *Najas orientalis* (POWO 2021; World Flora Online 2021).

Not all literature available on *Najas chinensis* was able to be reviewed due to not being available in English.

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

According to World Flora Online (2021), *Najas chinensis* is an accepted name in the Hydrocharitaceae family.

From Govaerts et al. (2020):

Kingdom Plantae
Phylum Tracheophyta
Class Liliopsida
Order Alismatales
Family Hydrocharitaceae
Genus *Najas*
Species *Najas chinensis*

Size, Weight, and Age Range

From Triest and Uotila (1986):

"Plant submerged, monoecious, slender. Stems unarmed, about 0.5-0.7 mm in diameter, often plumose above because of closely packed leaves. Leaves […] 15-25(-35) mm long, flat, acute, linear-lanceolate, 0.5-.8(-1.0) mm wide (incl. teeth on both sides), 0.3-0.5(-0.7) mm wide (excl. teeth on both sides), margins serrulate with 6-20 conspicuous spiny teeth on triangular excrescences; leaf teeth 0.11-0.20 mm long, the ratio of tooth length to leaf breadth being 0.25-0.37; midrib without spines; septa visible in the largest leaves; fibres absent; leaf sheath sloping, (1.9-)2.2-2.4 by (1.8-)2.4-2.7 mm (ratio = 0.8-1.3), serrulate with 5-10 (-15) spine cells on each side."

Environment

From Miki (1937):

"It grows usually in a shallow pond or lake laid in alluvial plane [sic], where seasonal flood can easily take place."

From Triest and Uotila (1986):

"In its native area *N. orientalis* chiefly grows in rice fields (Miki 1935a)."

Climate

No information on the specific climate requirements of *Najas chinensis* could be found.

Distribution Outside the United States

Native

From POWO (2021):

"China South-Central, China Southeast, Hainan, Japan, Korea, Manchuria, Primorye [Russia], Taiwan"

From Triest and Uotila (1986):

"*Najas orientalis* is evidently native to Honshu (Japan), Manchuria (China) and to the Ussuri Region (U.S.S.R.). Perhaps the species also occurs in Korea and in Taiwan."

Introduced

From POWO (2021):

"Introduced into: Greece, North Caucasus [western Russia], Turkey-in-Europe"

From Triest and Uotila (1986):

"The find from European Turkey must be considered as an introduction."

According to GBIF Secretariat (2021), Turkey, Italy, and Greece have reported *Najas chinensis* as introduced.

Lansdown et al. (2016) reports *Najas chinensis* as present but status unknown in Greece.

Means of Introduction Outside the United States

No means of introduction were found for *Najas chinensis.*

Short Description

From Na and Choi (2009):

"*N. orientalis* is distinct from other *Najas* species in having rounded leaf sheaths and raised testa in the cell walls, and in that this species occurs in the Southern region of Korea (Gimhae, Gangjin)."

From Triest and Uotila (1986):

"Inflorescences axillary, male and female flowers on the same branch and in the same axil on the top of the plant, often two female flowers of different age together with one male flower. Male flower […] enclosed in a spathe, c. 1.8-2.2 (inch spathe neck) by 0.8-1.0 mm, the neck of the spathe being c. 0.3-0.4 mm, tapering at the top, bearing brownish spine cells on the apex; inner envelope protruding c. 0.1 mm above the anther; anther c. 1.5-1.8 by 0.6-0.8 mm, 4-locular. Female flower naked; ovary c. 1.5 by 0.5 mm; style and stigma 2-lobed. Fruit with thin, membraneous pericarp and with the withered remains of the style. Seed […] (2.0-)2.4-2.8 by 0.63-0.85 mm, elliptical oblong; testa pitted in 20-30 length rows of areolae, arranged regularly; aerolae squarrish or somewhat irregularly, (0.09-) 0.11-0.13 mm long, cell walls raised."

Biology

From Miki (1937):

"*Najas* is highly adapted to aquatic life as may be seen from those characters mentioned below: the undifferentiated epidermal cells, the single uncuticularised pollen membrane, the reduced development of roots in contrast with densely branched shoots. The verticillate leaves seem also to be associated with stagnant water, just as are those of *Ambulia*, *Hydrilla*, *Ceratophylinn* and others. […] The delicate shoots of these submerged plants then separate easily at their nodes and flow away, whereas those tightly fixed water plants such as Nyniphaeaceae and others are deprived of light and ultimately are ruined. After this habit they may be called "semifloating plants."

Human Uses

No human uses were recorded for *Najas chinensis*.

Diseases

No information on diseases was found for *Najas chinensis*.

Threat to Humans

No threats to humans have been reported.

3 Impacts of Introductions

Najas chinensis has been reported as introduced into a few countries but no information on the impacts of introductions was found.

4 History of Invasiveness

Najas chinensis has been reported as introduced outside of its native range by POWO (2021) and others. Reports have been made of this species being found in Greece, Italy, Turkey, and western Russia. No information was found on how the species was transported, if it became established, or what impacts the introduction of this species has, if any, on the environment. With limited

information available the history of invasiveness is classified as No Known Nonnative Population.

5 Global Distribution

Figure 1. Known global distribution of *Najas chinensis*. Observations are reported from Central Japan, Northern Taiwan and South Korea. Map from GBIF Secretariat (2020). Native, established, populations are also reported from South Eastern China, and Primorye, Russia (POWO 2021). Exact coordinates were not given for these locations so a general range was used to select source points.

Najas chinensis has been reported to be introduced into Greece, Italy, and Turkey but there is no evidence that these reports resulted in established populations. Therefore, these locations will not be used in the climate match analysis.

6 Distribution Within the United States

Najas chinensis has not been reported as introduced in the United States.

7 Climate Matching

Summary of Climate Matching Analysis

The overall climate match for the contiguous United States was High. Areas of high match were found in the upper Midwest, the southern Atlantic Coast, and Florida. Much of the East, the rest of the Midwest, and Great Plains had medium match. Areas of low match were found across the West, the Southwest, inland areas of the Southeast, and New England. The overall Climate 6 score (Sanders et al. 2018; 16 climate variables; Euclidean distance) for the contiguous United States was 0.197, high (scores 0.103 and greater, are classified as high). The following States had high individual Climate 6 scores: Florida, Georgia, Iowa, Illinois, Indiana, Maryland, Michigan, Minnesota, Missouri, North Carolina, North Dakota, New Jersey, Ohio, Oklahoma, Pennsylvania, South Carolina, South Dakota, Virginia, Wisconsin, and West Virginia. States that had medium individual scores included Arkansas, Colorado, Delaware, Kansas, Kentucky,

Montana, Nebraska, New Mexico, New York, Texas, and Wyoming. All other States had low matches.

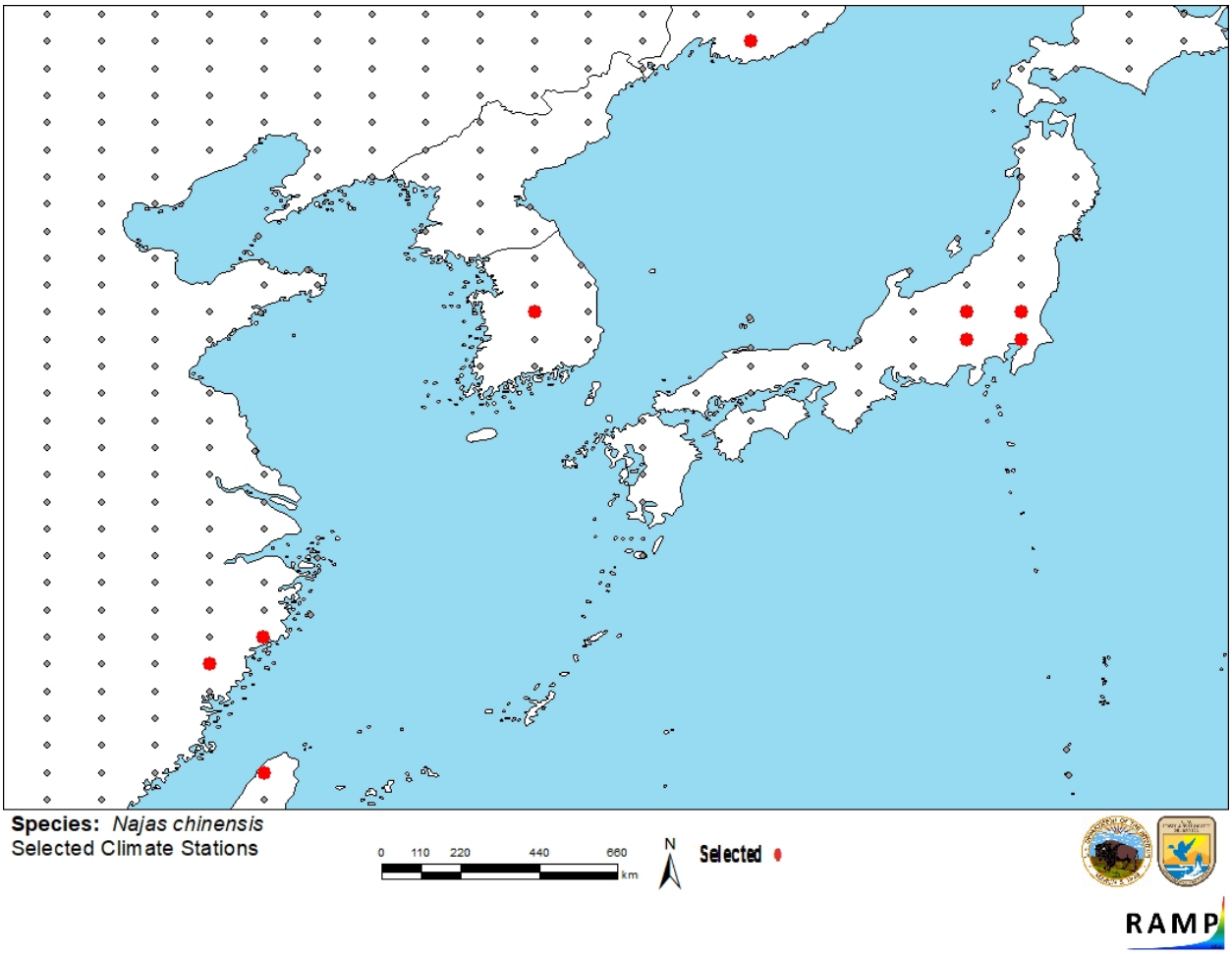


Figure 2. RAMP (Sanders et al. 2018) source map showing weather stations in Eastern Asia as source locations (red; Japan, Taiwan, South Korea, China, and Russia) and non-source locations (gray) for *Najas chinensis* climate matching. Source locations from GBIF Secretariat (2021) and POWO (2021). Selected source locations are within 100 km of one or more species occurrences, and do not necessarily represent the locations of occurrences themselves.

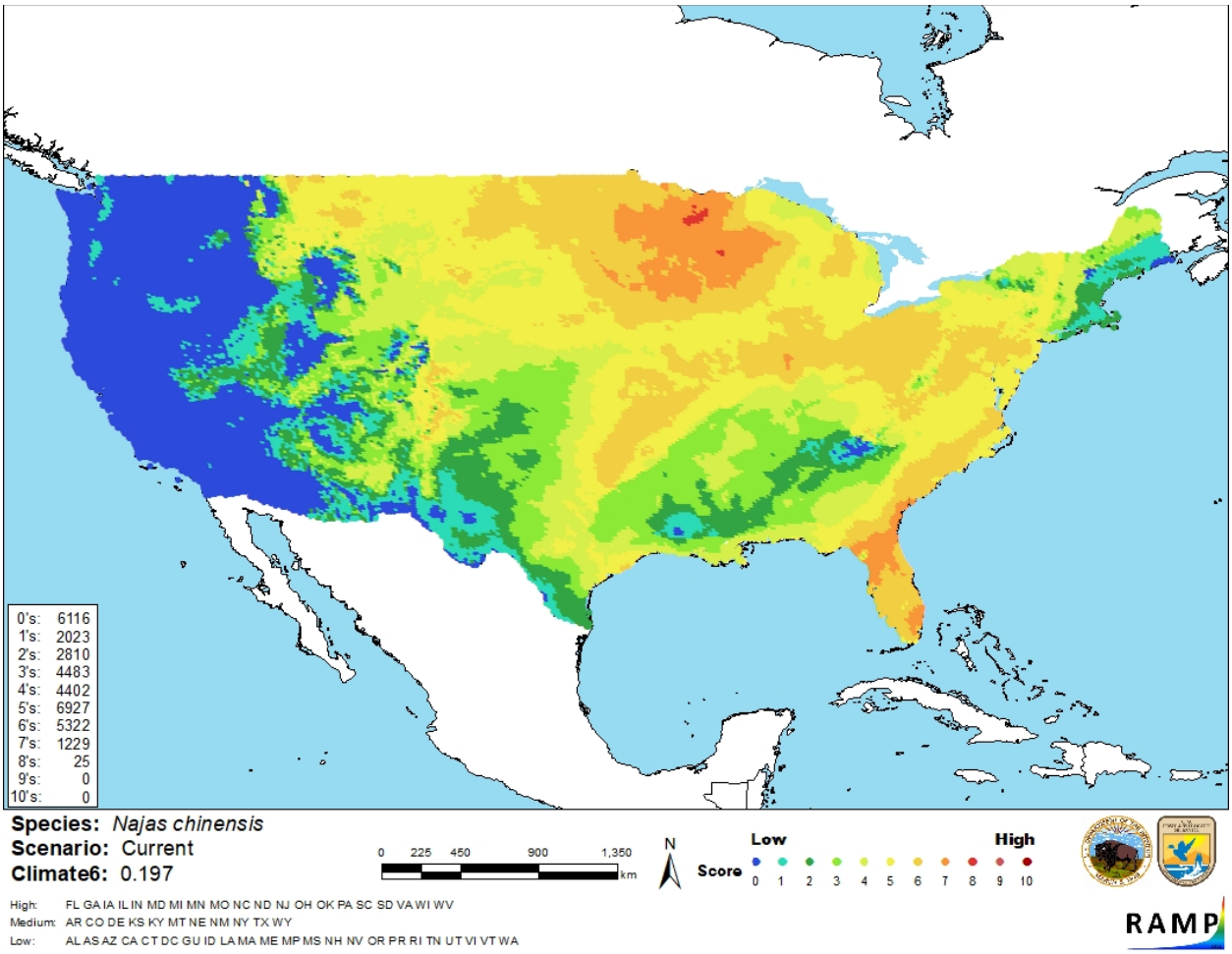


Figure 3. Map of RAMP (Sanders et al. 2018) climate matches for *Najas chinensis* in the contiguous United States based on source locations reported by GBIF Secretariat (2020). Counts of climate match scores are tabulated on the left. 0/Blue = Lowest match, 10/Red = Highest match.

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

Najas chinensis has been reported as introduced outside its native range, however there is no information indicating that there are established populations. No information was found on its impact on the environment. General information about the species was available but was not available in English. Therefore, the certainty of this assessment is Low.

9 Risk Assessment

Summary of Risk to the Contiguous United States

Najas chinensis is a freshwater plant species that is native to Eastern Asia (Japan, Korea, Taiwan, and parts of eastern China and Russia). There are reports of introductions in Greece, Italy, Turkey and western Russia. The History of Invasiveness is No Known Nonnative Population since there was no evidence that there were established nonnative populations. The overall climate match for the contiguous United States was High. The Midwest and Southeast coast were areas where the climate match was the highest. The certainty of this assessment is Low. The overall risk assessment category for *Najas chinensis* is Uncertain.

Assessment Elements

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

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

GBIF Secretariat. 2021. GBIF backbone taxonomy: *Najas chinensis* N.Z.Wang Dandy. Copenhagen: Global Biodiversity Information Facility. Available: https://www.gbif.org/species/5329463 (January 2021).

Govaerts R, Ower G, Orrell T, Nicolson D, Bailly N, Kirk PM, Bourgoin T, DeWalt RE, Decock W, van Nieukerken EJ, Penev L, editors. 2020. *Najas chinensis* (A.Braun ex Magnus) Magnus. Species 2000 and ITIS Catalogue of Life. Leiden, Netherlands: Species 2000. Available: https://www.catalogueoflife.org/data/taxon/45L39 (January 2021).

Lansdown RV, Anastasiu P, Barina Z, Bazos I, Çakan H, Caković D, Delipetrou P, Matevski V, Mitić B, Ruprecht E, Tomović G, Tosheva A, Király G. 2016. Review of alien freshwater vascular plants in South-east Europe. ESENIAS Scientific Reports 1:137–154.

Miki S. 1937. The origin of *Najas* and *Potamogeton*. Shibata Commemoration 40.

Na HR, Choi H-K. 2009. Two unrecorded species of *Najas L.* (Hydrocharitaceae) from Korea flora: *N. orientalis* and *N. oguraensis.* Korean Plant Taxonomy 30(2):107–113. [Abstract Only]

[POWO] Plants of the World Online. 2021. *Najas chinensis* (A.Braun ex Magnus) Richmond, United Kingdom: Royal Botanic Gardens, Kew. Available: http://www.plantsoftheworldonline.org/taxon/urn:lsid:ipni.org:names:906732-1#distribution-map (January 2021).

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

Triest L, Uotila P. 1986. *Najas orientalis*, a rice field weed in the Far East and introduced in Turkey. Annales Botanici Fennici 23:169–171.

World Flora Online. 2021. World Flora Online – a project of the World Flora Online Consortium. Available: www.worldfloraonline.org (March 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.

Miki S. 1935. New water plants in Asia Orientalis. Botany Magazine 49(586): 687–693.