

# Manchurian Wildrice (*Zizania latifolia*)

## Ecological Risk Screening Summary

U.S. Fish and Wildlife Service, March 2023

Revised, March 2023

Web Version, 4/28/2025

Organism Type: Flowering Plant

Overall Risk Assessment Category: High



Photo: Chaoborus. Licensed under Creative Commons Attribution-Share Alike 3.0 Unported. Available: <https://commons.wikimedia.org/wiki/File:Zizania-latifolia-2.jpg> (March 2023).

## 1 Native Range and Status in the United States

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### Native Range

According to GISD (2023), *Zizania latifolia* is native to China, India, Republic of Korea, Myanmar, Russian Federation, Taiwan, and Vietnam.

POWO (2023) lists *Zizania latifolia* native to India (Assam), China (including Hainan, Manchuria), Japan (including the Ryukyu Islands), Korea, Mongolia, Myanmar, Russia (Amur, Chita, Khabarovsk, Kuril Islands, Primorye), and Taiwan.

From Terrell and Batra (1982):

“Distribution of *Z. latifolia* is rather widespread in eastern Asia, [...]. In the USSR it is indigenous in the Dahuria region of eastern Siberia and in the Udsu, Ussuri, and Zeya-Bureya regions in the Soviet Far East (Komarov, 1936; Tzvelev, 1976); these regions are north of Manchuria and Mongolia. [...] Also, it occurs in Japan, Okinawa, Korea, Taiwan, northeast India, Burma, Malaya, Viet Nam or Indo-China (sensu lato).”

## Status in the United States

From Plant Pono (2025):

“Reported to be naturalized or persisting on Kauai, Oahu, and Hawaii (Hawaiian Islands) [...].”

From Terrell and Batra (1982):

“*Zizania latifolia* has been introduced into the United States approximately 11 times (USDA Plant Inventory records). The only surviving introductions are the plants growing in shallow water in Snowden Pond at the Patuxent Wildlife Research Center of the U.S. Department of the Interior near Laurel, Maryland [...]. This accession was established in the 1920s after being introduced under the aegis of C. E. Chambliss, U.S.D.A. scientist, from an unknown source and locality in Asia (Dore, 1969, p. 21). The plants have been shifted from one locality to another within the Center, [...]. A few plants transplanted to a greenhouse at Beltsville, Maryland, flowered rarely, but produced a few "seeds" by self-pollination. Plants from the Patuxent population were sent to W. H. P. Emery, Department of Biology, Southwest Texas State University, San Marcos, Texas, and later Emery sent plants to James Percich and R. L. Bowden, Department of Plant Pathology, University of Minnesota, St. Paul. Accordingly, there are 3 known plantings now in the United States.”

*Zizania latifolia* is in trade in the United States. For example, Amazon (2023) lists 70 *Z. latifolia* seeds for \$11.99.

## Regulations

*Zizania latifolia* is regulated in California (CDFA 2021). Please refer back to state agency regulatory documents for details on the regulations, including restrictions on activities involving this species. While effort was made to find all applicable regulations, this list may not be comprehensive. Notably, it does not include regulations that do not explicitly name this species or its genus or family, for example, when omitted from a list of authorized species with blanket regulation for all unnamed species.

## Means of Introductions within the United States

From Terrell and Batra (1982):

“This accession [at Patuxent Wildlife Research Center, Maryland] was established in the 1920s after being introduced under the aegis of C. E. Chambliss, U.S.D.A. scientist, from an unknown source and locality in Asia (Dore, 1969, p. 21).”

## Remarks

This ERSS was previously published in September 2021. Revisions were completed to incorporate new information and conform to updated standards.

Ministry of Primary Industries (2020) lists *Zizania latifolia* among the pest plants that are banned from sale, propagation, and distribution in New Zealand.

## 2 Biology and Ecology

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### Taxonomic Hierarchy and Taxonomic Standing

From ITIS (2023):

Kingdom Plantae  
  Subkingdom Viridiplantae  
    Infrakingdom Streptophyta  
      Superdivision Embryophyta  
        Division Tracheophyta  
          Subdivision Spermatophytina  
            Class Magnoliopsida  
              Superorder Lilianae  
                Order Poales  
                  Family Poaceae  
                    Genus *Zizania* L.  
                      Species *Zizania latifolia* (Griseb.) Turcz. ex Stapf

According to WFO (2025), *Zizania latifolia* (Griseb.) Hance ex F.Muell is the current valid name for this species.

### Size, Weight, and Age Range

From GISD (2023):

“*Zizania latifolia* is a perennial aquatic grass, which grows up to 4m tall [...]”

“[...] tall and upright with 2-3cm wide leaves up to 2.5m long [...]”

## Environment

From GISD (2023):

“*Z. Latifolia* is a relatively hardy plant that can grow in both fresh and salt water (Environment Waikato, 2002). Yamaguchi (1990) states that, "*Zizania latifolia* can be grown in stagnant ponds and in poorly drained soils." It does well in sandy, loamy or clayey soils; in acid, neutral or alkaline soils and can grow in full sun or semi-shade (Plants for the future, 2000).”

## Climate

GISD (2023) suggests that *Zizania latifolia* occurs in tropical and temperate climates.

## Distribution Outside the United States

### Native

According to GISD (2023), *Zizania latifolia* is native to China, India, Republic of Korea, Myanmar, Russian Federation, Taiwan, and Vietnam.

POWO (2023) lists *Zizania latifolia* native to India (Assam), China (including Hainan, Manchuria), Japan (including the Ryukyu Islands), Korea, Mongolia, Myanmar, Russia (Amur, Chita, Khabarovsk, Kuril Islands, Primorye), and Taiwan.

From Terrell and Batra (1982):

“Distribution of *Z. latifolia* is rather widespread in eastern Asia, [...]. In the USSR it is indigenous in the Dahuria region of eastern Siberia and in the Udsu, Ussuri, and Zeya-Bureya regions in the Soviet Far East (Komarov, 1936; Tzvelev, 1976); these regions are north of Manchuria and Mongolia. [...] Also, it occurs in Japan, Okinawa, Korea, Taiwan, northeast India, Burma, Malaya, Viet Nam or Indo-China (sensu lato).”

### Introduced

GISD (2023) lists *Zizania latifolia* as alien, invasive, and established in New Zealand and alien, invasiveness unspecified, and established in the United Kingdom.

POWO (2023) lists *Zizania latifolia* as introduced into Belarus, Russia (Central European Russia, East European Russia, Northwest European Russia, North Caucasus), Indonesia (including Borneo and Java), Kazakhstan, Malaysia (including Borneo), New Zealand, Transcaucasus (Armenia, Azerbaijan, Georgia), and Vietnam.

NOBANIS (2023) lists *Zizania latifolia* as invasive and established in European parts of Russia. It is also listed as introduced in Estonia and Latvia but status is reported as not known.

From Terrell and Batra (1982):

“Distribution of *Z. latifolia* is rather widespread in eastern Asia, but it may have been introduced in southeastern Asia and parts of China and the USSR. [...] It is introduced in western USSR. [...] In China it is in Manchuria and several provinces, often introduced for cultivation (Thrower

and Chan, 1980). [...] and has been introduced in Europe, New Zealand, and rarely in North America (see below).”

“Dore (1969) stated that plants of *Z. latifolia* from Japan were established in a botanic garden and greenhouse at the Plant Research Institute, Agriculture Canada, Ottawa, Ontario, where it has never flowered. Stapf (1909) noted that plants grown at Kew, England, never flowered”

From NIWA (2023):

“The current distribution of Manchurian wild rice is predominantly in the Kaipara District of Northland [New Zealand] centred around its site of introduction, the Northern Wairoa River (near Dargaville) and associated waterways. Smaller infestations occur within the Whangarei and Far North Districts, as well as in Rodney and Waitakere Districts (Auckland), Hauraki Plains (Waikato), and Kapiti Coast (Wellington).”

## **Means of Introduction Outside the United States**

From GISD (2023):

“It is often cultivated as a food crop in East Asia and is often grown as cover for wild fowl along the sides of lakes in Britain (Plants for a Future, 2000).”

From NIWA (2023):

“A native of Asia, Manchurian wild rice was originally introduced to New Zealand around the turn of the last century in the ballast carried by timber ships, which was discarded on the banks of the Northern Wairoa River. Although introduced accidentally (one of the few aquatic weeds not introduced deliberately – for example, as an ornamental pond plant), it has also been deliberately planted in the Hauraki Plains area, supposedly to stabilise stop-banks.”

From Morozova (2014):

“*Zizania latifolia* was introduced in the fifties of the last century in many water reservoirs in various regions of European Russia as a fodder plant in hunter farms.”

## **Short Description**

From GISD (2023):

“*Zizania latifolia* is a perennial aquatic grass, which grows up to 4m tall, with spreading rhizomes. The flowers are hermaphrodite (have both male and female organs). *Z. latifolia* is tall and upright with 2-3cm wide leaves up to 2.5m long and a stout midrib. The flower head is 40-60cm long, and is purplish or red brown in colour (Environment Waikato, 2002); National Pest Plant Accord, 2001; Plants for a Future, 2000).”

## Biology

From GISD (2023):

“The flowers are hermaphrodite (have both male and female organs).”

“*Zizania latifolia* grows symbiotically with the fungus *Ustilago esculenta* which causes the stem to enlarge (Bruinsa *et al.* 1998).”

“Shaw and Allen (2003) report that In New Zealand, "*Zizania latifolia* has been recorded from lagoons, river banks, tidal flats, roadside ditches, and damp paddocks.”

From Han *et al.* (2018):

“Perennial herb [*Zizania latifolia*] that sprouts fast in early spring with increasing water level at the beginning of the flood season. It reaches maximum coverage when the lake reaches its maximum water level. After the flood season, the plant gradually dies. The growth of the ZI [*Zizania latifolia*] community can be significantly restricted under flooding years due to insufficient oxygen influx (Yamasaki, 1984).”

## Human Uses

From GISD (2023):

“It is often cultivated as a food crop in East Asia and is often grown as cover for wild fowl along the sides of lakes in Britain (Plants for a Future, 2000).”

According to Morozova (2014), *Z. latifolia* was used as a fodder plant in hunter farms.

From Dong *et al.* (2012):

“*Z. latifolia*, is one of the most important aquatic and economic vegetable crops cultivated in the Southeast China since ancient time (Guo [et al.], 2007). Nowadays, around 100 thousands hectares of *Z. latifolia* were planted in more than ten provinces in China (Chen, 1991; Zhai *et al.*, 2001).”

From Terrell and Batra (1982):

“Grains of *Z. latifolia* have been used for food, sometimes in the form of flour, and the grains and rhizomes have been used as diuretics and as medicines for anemia, heart disease, and liver disease (Stapf, 1909; Camus, 1950). In Europe the plants have been used for forage and to make paper (Camus, 1950). In New Zealand the species is a troublesome weed which is not eaten by livestock (Cumberland, 1966).”

“Ancient Chinese herbals and encyclopedias refer to the cultivation of *Z. latifolia* as a vegetable back at least to the 10th century (Stapf, 1909; Camus, 1950). *Zizania latifolia* was also used as a grain in ancient times, but later came to be used primarily as a vegetable. Grain of *Z. latifolia* was used in rituals of the Chou dynasty according to Chou Ui (written about 1100 B.C.) or Ritual

of the Chou Dynasty (also mentioned by Huang, 1978). A recent book (Chang, 1977) concerning foods in Chinese culture includes [...] a poem dating back to the Chou dynasty (12th century B.C.-221 B.C.) which refers to "corn of zizania." In this case, corn means the *Zizania* grains. In Europe Osbeck (1757), a Swede and a pupil of Linnaeus, gave one of the earliest accounts of the use by the Chinese of the plant as a vegetable.”

## Diseases

According to Poelen et al. (2014), *Z. latifolia* is a host to the fungi *Drechslera zizaniae*, *Uromyces coronatus*, and *Helminthosporium oryzae*.

According to Poelen et al. (2014), *Z. latifolia* is a host to the parasite *Anagrus nilaparvatae*.

## Threat to Humans

No information was found on threats to humans from *Zizania latifolia*.

# 3 Impacts of Introductions

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From GISD (2023):

“The Auckland Regional Council (2002) reports that, *Zizania latifolia* is a very invasive plant. It can invade pastures causing good land to become waterlogged and form swampy areas. The rhizomes of the plant can also penetrate into and through stopbanks, opening them up and eventually destroying them. It can damage lakes and streamside plant communities by overtopping and suppressing other marginal species. *Z. latifolia* is difficult to eradicate because any root or rhizome fragments will regrow. Herbicides are the most effective control measure, but use of these is restricted because many chemicals can affect waterways. There are concerns that the spread of *Z. latifolia* could seriously affect the use of farmland, and freshwater and estuarine ecosystems. (The Auckland Regional Council 2002; Environment Waikato, 2002; The Northland Regional Council, 2002).”

From Champion and Hofstra (2010):

“Plants form dense, mono specific vegetation in wetlands and on the margins of water bodies, also invading flood-prone pasture and cropping land. Obstruction of drains by this plant promotes flooding and expands the habitat available to it.”

From NIWA (2023):

“*Zizania latifolia*, [...] is a giant semi-aquatic grass that has smothered riverbanks, invaded pastures, and run rampant through drainage channels as it continues its invasion of our waterways.”

“Although introduced accidentally [...], it has also been deliberately planted in the Hauraki Plains area, supposedly to stabilise stop-banks. However, rather than stabilise banks, Manchurian wild rice can in the longer term cause them to slump and encourage erosion of bank material. Commonly found growing in soft mud, its growth intensifies the wet soft soil conditions that



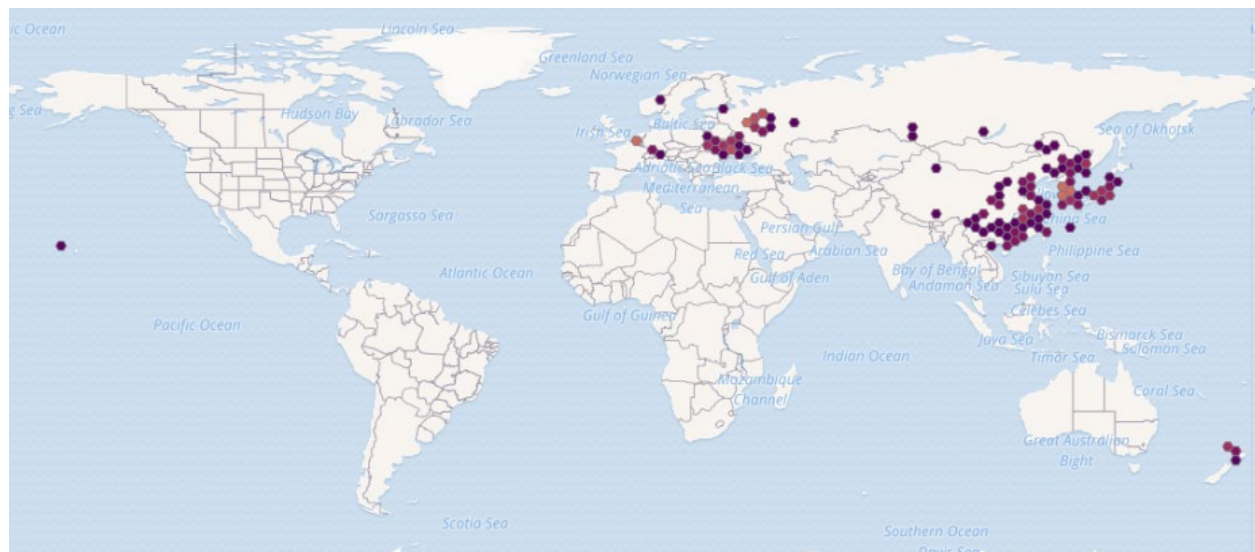
may cause the deterioration of stop-banks. In addition to stop-bank slumping, Manchurian wild rice causes a host of other problems wherever it is present in New Zealand. For example, it invades drainage channels, preventing access to them and impeding water flow and in turn increasing the likelihood of flooding. Unless intensive grazing is maintained in pastures adjacent to Manchurian wild rice-filled drains, it will also invade these areas, encouraged by the flooding it causes by blocking the drains. This plant is extremely invasive in native vegetation and appears to reduce the diversity of vegetation it invades, displacing small-stature species and enveloping taller vegetation. In general, species enveloped by dense growths of this grass are unable to reproduce and sustain themselves under those conditions, resulting in long-term monocultures of Manchurian wild rice.”

*Zizania latifolia* is regulated in California (CDFA 2021); see section 1.

## 4 History of Invasiveness

*Zizania latifolia* has been introduced in several localities throughout the world both intentionally as an ornamental, for ecological restoration purposes, and accidentally via ballast water. Introductions have resulted in confirmed established wild populations in New Zealand, Europe, and Russia. In New Zealand, *Z. latifolia* is reported to have a negative impact on local ecology by encouraging bank erosion, impeding water flow in drainage channels, and suppressing native species. Due to known established wild populations and multiple sources listing specific negative impacts, the history of invasiveness is classified as High.

## 5 Global Distribution



**Figure 1.** Reported global distribution of *Zizania latifolia*. Map from GBIF Secretariat (2025). Observations are reported from Hawaii (United States), Switzerland, Belgium, Germany, Norway, Belarus, Ukraine, Russia, New Zealand, China, Vietnam, North Korea, South Korea, Japan, and Taiwan. The reported observation in Norway is of a cultivated specimen and therefore was not used to select source points for the climate matching analysis.



## 6 Distribution Within the United States

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**Figure 2.** Reported distribution of *Zizania latifolia* in the contiguous United States. Map from GBIF-US (2023). Observations are reported from Maryland and Virginia. The locations in Maryland and Virginia do not represent established wild populations and were not included in the climate matching analysis.



**Figure 3.** Reported distribution of *Zizania latifolia* in Hawaii, United States. Map from GBIF-US (2023). Observations are reported from the islands Kauai and Hawaii.

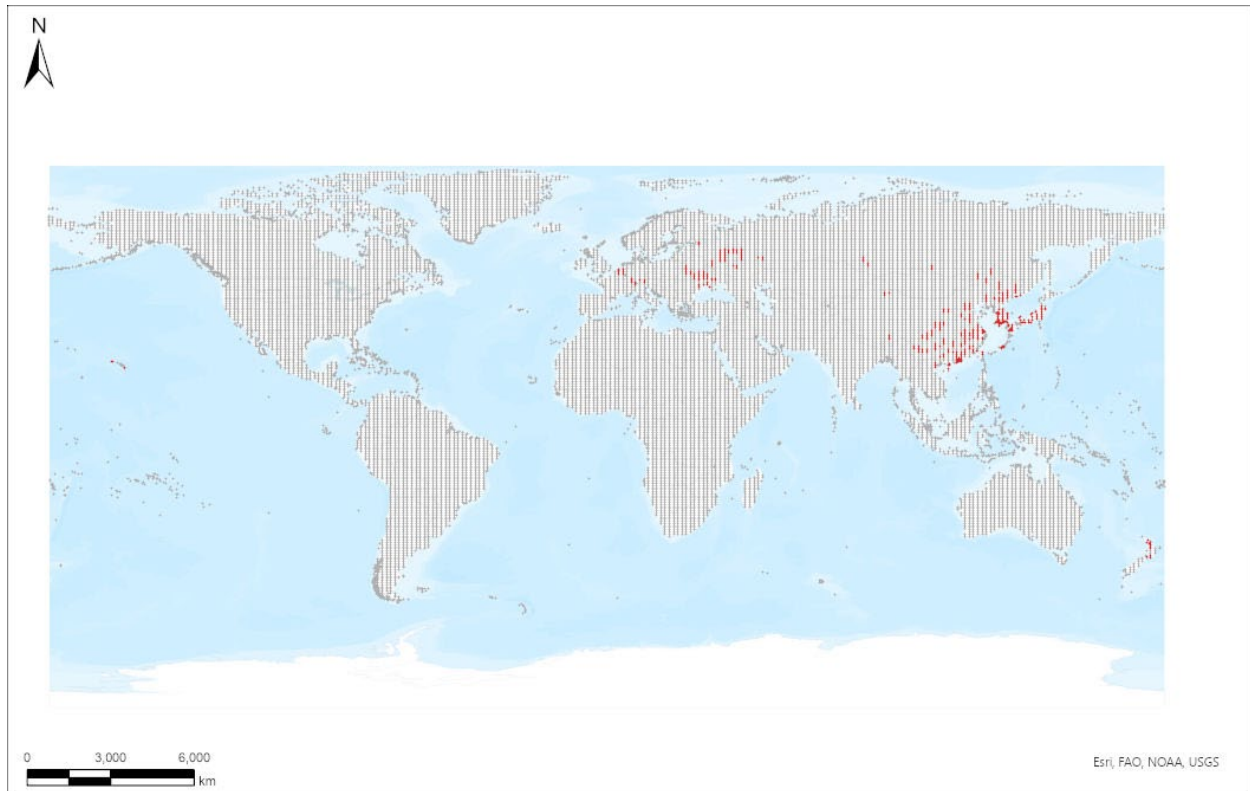
## 7 Climate Matching

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### Summary of Climate Matching Analysis

The climate match for *Zizania latifolia* was generally high throughout much of the contiguous United States. Areas with high climate match were located along the East Coast, States surrounding the Great Lakes Basin, and in patches in the Great Basin and Western Mountains. Areas with low climate match were along the Pacific Coast, the Desert Southwest, and in patches in the Western Mountains. The overall Climate 6 score (Sanders et al. 2023; 16 climate variables; Euclidean distance) for the contiguous United States was 0.814, indicating establishment concern for this species. The Climate 6 score is calculated as: (count of target points with scores  $\geq 6$ )/(count of all target points). Establishment concern is warranted for Climate 6 scores greater than or equal to 0.002 based on an analysis of the establishment success of 356 nonnative aquatic species introduced to the United States (USFWS 2024).

Projected climate matches in the contiguous United States under future climate scenarios are available for *Zizania latifolia* (see Appendix). These projected climate matches are provided as additional context for the reader; future climate scenarios are not factored into the Overall Risk Assessment Category.

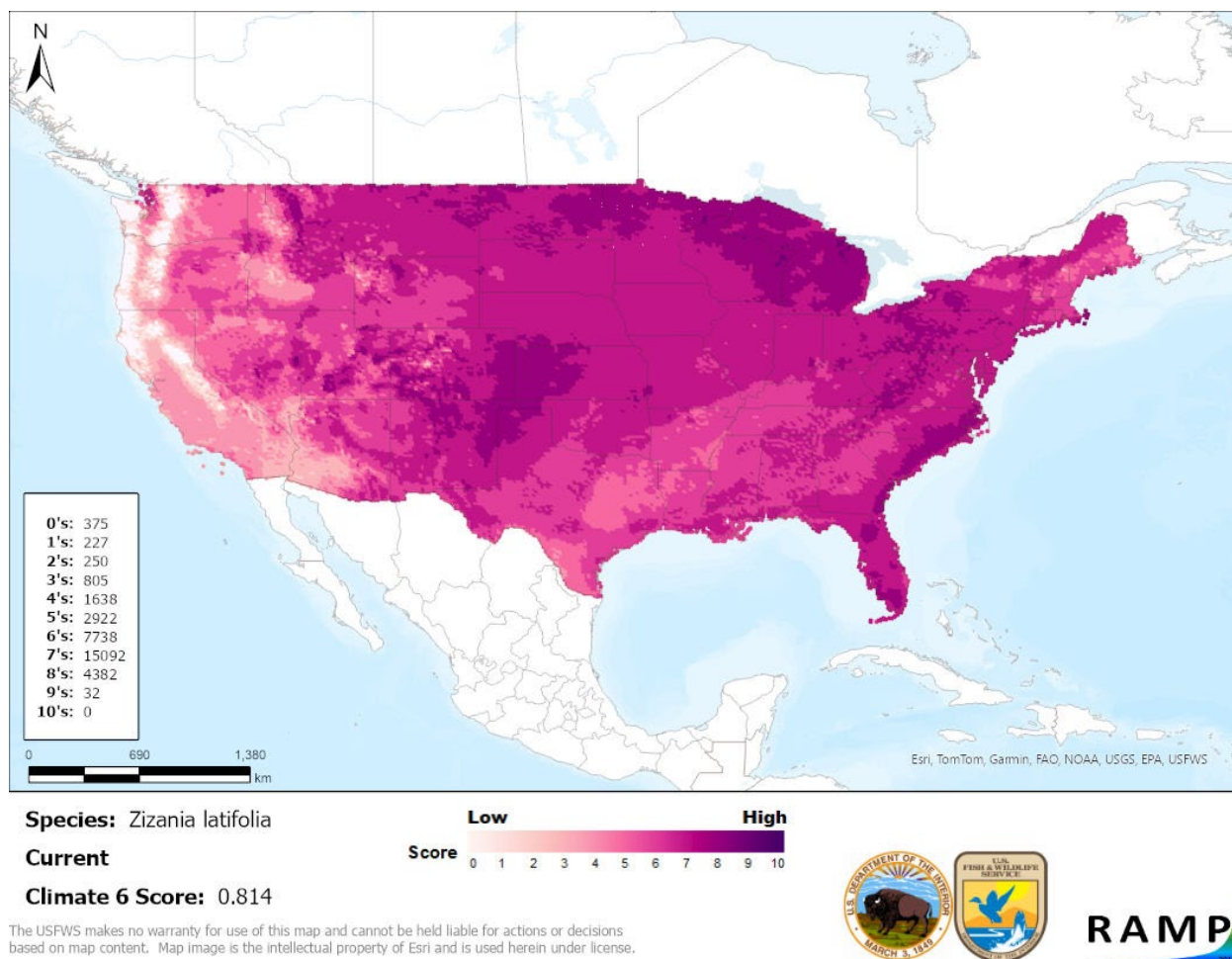


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**RAMP**

**Figure 4.** RAMP (Sanders et al. 2023) source map showing weather stations in North America, Europe, Asia, and New Zealand selected as source locations (red; Hawaii (United States), Belarus, Belgium, Switzerland, Germany, Ukraine, Russia, China, North Korea, South Korea, Japan, Taiwan, New Zealand) and non-source locations (gray) for *Zizania latifolia* climate matching. Source locations from GBIF-US (2023) and GBIF Secretariat (2025). Selected source locations are within 100 km of one or more species occurrences, and do not necessarily represent the locations of occurrences themselves.



**Figure 5.** Map of RAMP (Sanders et al. 2023) climate matches for *Zizania latifolia* in the contiguous United States based on source locations reported by GBIF-US (2023) and GBIF Secretariat (2025). Counts of climate match scores are tabulated on the left. 0/Pale Pink = Lowest match, 10/Dark Purple = Highest match.

## 8 Certainty of Assessment

The certainty of this assessment is High. There was adequate biological and ecological information available for *Zizania latifolia*. Records of introductions were found that resulted in established populations. The information pertaining to history of invasiveness was from grey literature and conference proceedings presenting summary impact information. No peer-reviewed papers were available that studied introduction impacts directly. However, the impact information available was of sufficient quality and quantity.

## 9 Risk Assessment

### Summary of Risk to the Contiguous United States

*Zizania latifolia*, Manchurian Wildrice, is a flowering plant native to East Asia. *Z. latifolia* is used in various ways as a food source and has a long history of use in traditional medicine. *Z. latifolia* is in the horticultural trade in the United States. The plant has been introduced to and

become established in Europe, western Asia, Hawaii, and New Zealand. *Z. latifolia* monocultures are reported to encourage land erosion, promote flooding, and suppress native species. The History of Invasiveness is classified as High. The climate matching analysis for the contiguous United States indicates establishment concern for this species. Most of the contiguous United States had a medium to high climate match. Areas of low match were found along the Pacific Coast. The Certainty of Assessment for this ERSS is High due to ample records of introduction and impacts. The Overall Risk Assessment Category for *Z. latifolia* in the United States is High.

## Assessment Elements

- **History of Invasiveness (see section 4): High**
- **Establishment Concern (see section 7): Yes**
- **Certainty of Assessment (see section 8): High**
- **Remarks, Important additional information: None**
- **Overall Risk Assessment Category: High**

## 10 Literature Cited

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**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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## 11 Literature Cited in Quoted Material

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**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.**

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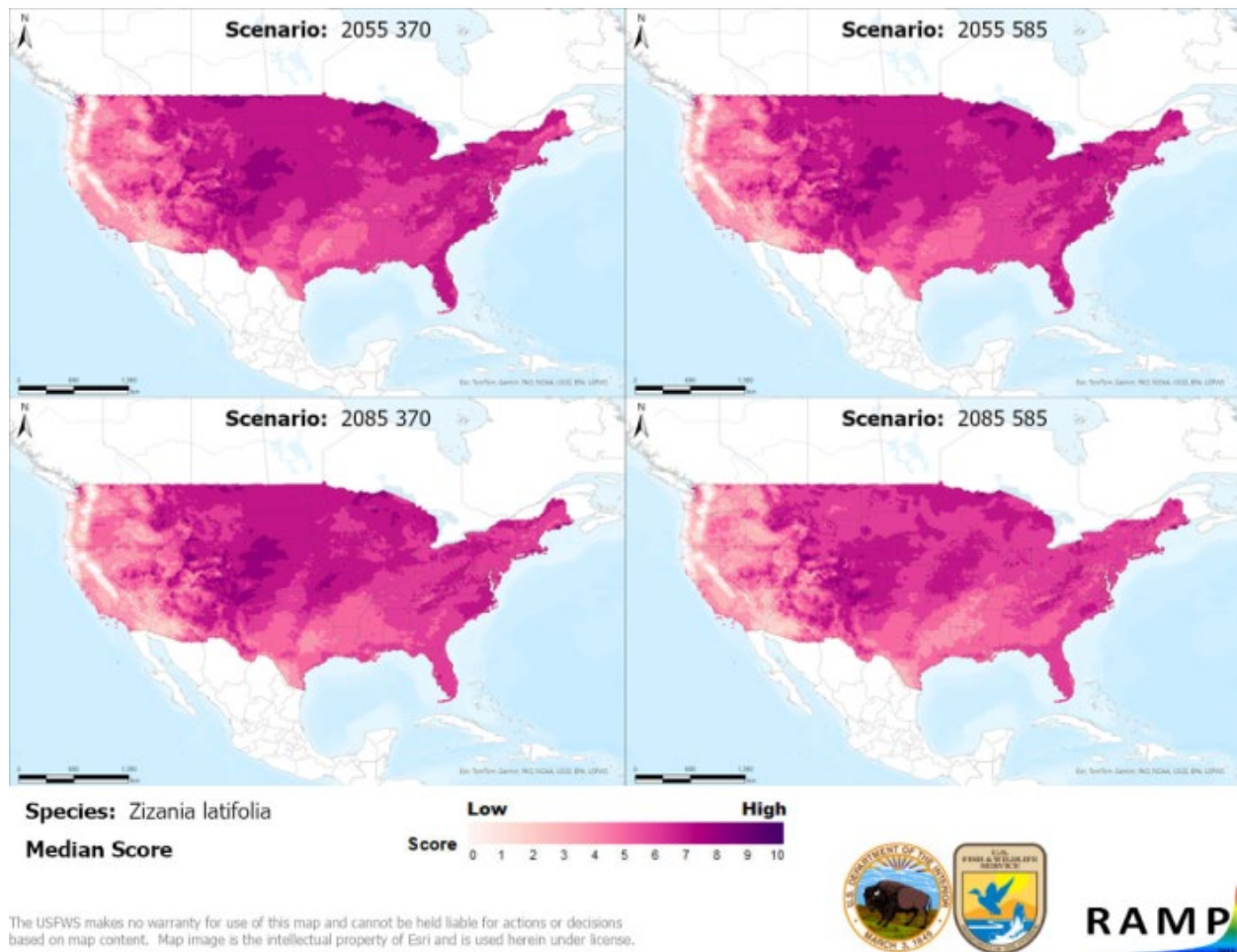
# Appendix

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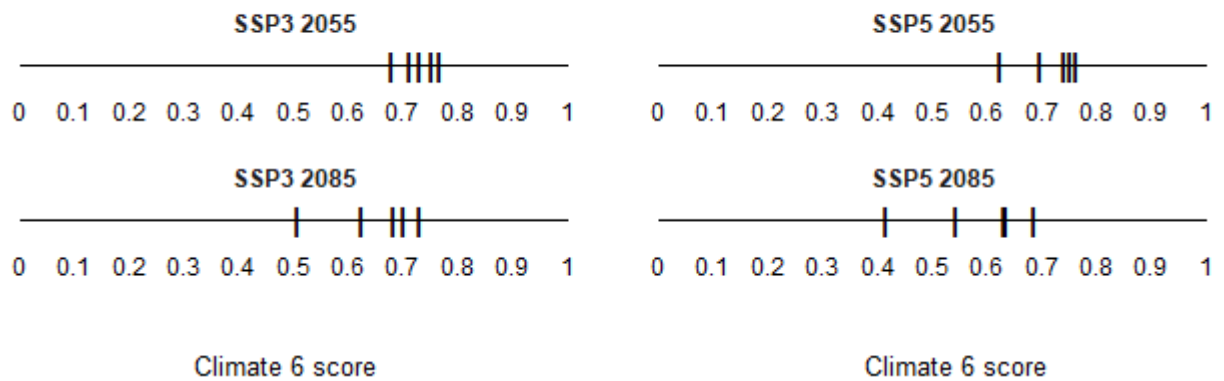
## Summary of Future Climate Matching Analysis

Future climate projections represent two Shared Socioeconomic Pathways (SSP) developed by the Intergovernmental Panel on Climate Change (IPCC 2021): SSP5, in which emissions triple by the end of the century; and SSP3, in which emissions double by the end of the century. Future climate matches were based on source locations reported by GBIF-US (2023) and GBIF Secretariat (2025).

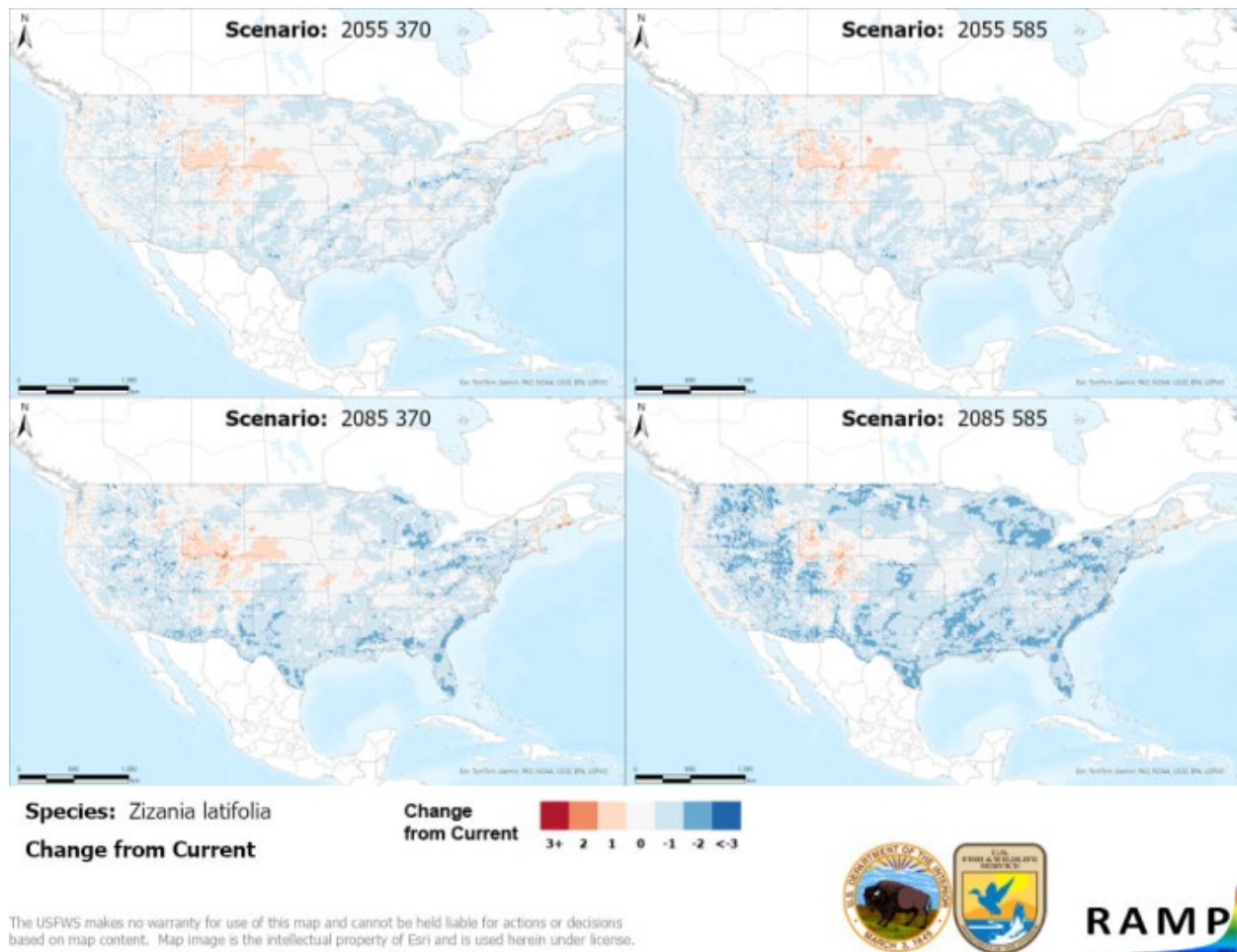
Under the future climate scenarios (figure A1), no regions of the contiguous United States were projected to have a high climate match for *Zizania latifolia*. Areas of low climate match were projected to occur in the Northern Pacific Coast region. The areas of low match extended east into the Western Mountains, Great Basin, and Southwest. All other regions were projected to have a medium match across most scenarios. The Climate 6 scores for the individual future scenario models (figure A2) ranged from a low of 0.411 (model: UKESM1-0-LL, SSP5, 2085) to a high of 0.766 (model: IPSL-CM6A-LR, SSP3, 2055). All future scenario Climate 6 scores were above the Establishment Concern threshold, indicating that Yes, there is establishment concern for this species under future scenarios. The Climate 6 score for the current climate match (0.814, figure 5) falls above the range of scores for future projections. The time step and climate scenario with the most change relative to current conditions was SSP5, 2085, the most extreme climate change scenario. Under all time step and climate scenarios only minor or no increases in the climate match relative to the current match were observed. Under one or more time step and climate scenarios, areas within the Appalachian Range, Colorado Plateau, Great Basin, Great Lakes, Gulf Coast, Mid-Atlantic, Northeast, Northern Pacific Coast, Northern Plains, Southeast, Southern Atlantic Coast, Southern Florida, Southern Plains, Southwest, and Western Mountains saw a moderate decrease in the climate match relative to current conditions. No large decreases were observed regardless of time step and climate scenarios. Additional, very small areas of large or moderate change may be visible on the maps (figure A3).



**Figure A1.** Maps of median RAMP (Sanders et al. 2023) climate matches projected under potential future climate conditions using five global climate models for *Zizania latifolia* in the contiguous United States. Climate matching is based on source locations reported by GBIF-US (2023) and GBIF Secretariat (2025). Shared Socioeconomic Pathways (SSPs) used (from left to right): SSP3, SSP5 (IPCC 2021). Time steps: 2055 (top row) and 2085 (bottom row). Climate source data from CHELSA (Karger et al. 2017, 2018); global climate models used: GFDL-ESM4, UKESM1-0-LL, MPI-ESM1-2-HR, IPSL-CM6A-LR, and MRI-ESM2-0. 0/Pale Pink = Lowest match, 10/Dark Purple = Highest match.



**Figure A2.** Comparison of projected future Climate 6 scores for *Zizania latifolia* in the contiguous United States for each of five global climate models under four combinations of Shared Socioeconomic Pathway (SSP) and time step. SSPs used (from left to right): SSP3, SSP5 (Karger et al. 2017, 2018; IPCC 2021). Time steps: 2055 (top row) and 2085 (bottom row). Climate source data from CHELSA (Karger et al. 2017, 2018); global climate models used: GFDL-ESM4, UKESM1-0-LL, MPI-ESM1-2-HR, IPSL-CM6A-LR, and MRI-ESM2-0.



**Figure A3.** RAMP (Sanders et al. 2023) maps of the contiguous United States showing the difference between the current climate match target point score (figure 5) and the median target point score for future climate scenarios (figure A1) for *Zizania latifolia* based on source locations reported by GBIF-US (2023) and GBIF Secretariat (2025). Shared Socioeconomic Pathways (SSPs) used (from left to right): SSP3, SSP5 (IPCC 2021). Time steps: 2055 (top row) and 2085 (bottom row). Climate source data from CHELSA (Karger et al. 2017, 2018); global models used: GFDL-ESM4, UKESM1-0-LL, MPI-ESM1-2-HR, IPSL-CM6A-LR, and MRI-ESM2-0. Shades of blue indicate a lower target point score under future scenarios than under current conditions. Shades of red indicate a higher target point score under future scenarios than under current conditions. Darker shades indicate greater change.

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