

American Featherfoil (*Hottonia inflata*)

Ecological Risk Screening Summary

U.S. Fish and Wildlife Service, January 2025

Revised, February 2025

Web Version, 6/23/2025

Organism Type: Flowering Plant

Overall Risk Assessment Category: Uncertain



Photo: Connor Ross. Licensed under CC BY-NC 4.0. Available:
<https://www.inaturalist.org/observations/207410562> (January 2025).

1 Native Range and Status in the United States

Native Range

From POWO (2025):

“Alabama, Arkansas, Connecticut, Delaware, Georgia, Illinois, Indiana, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Mississippi, Missouri, New Hampshire, New Jersey, New

York, North Carolina, Ohio, Oklahoma, Rhode [Island], South Carolina, Tennessee, Texas, Virginia, West Virginia”

Hill (2007) and NatureServe (2025) also include Pennsylvania within the native range of *Hottonia inflata*.

Status in the United States

From Hill (2007):

“*Hottonia inflata*, the American Featherfoil, is found only in the United States, and it is widespread in portions of the temperate eastern region. The species is known to occur historically in twenty-eight states, namely, Alabama, Arkansas, Connecticut, Delaware, Florida, Georgia, Illinois, Indiana, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Mississippi, Missouri, New Hampshire, New Jersey, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, Rhode Island, South Carolina, Tennessee, Texas, Virginia, and West Virginia [...] It appears that the species may no longer exist in Ohio and Pennsylvania, and that its range is decreasing.”

“One specimen of *Hottonia inflata* from Kansas was brought to my attention [...] There are no other known records from Kansas, and this record appears unlikely to be a wild collection, but nothing else is known about this collection. The species has not otherwise been reported from Kansas.”

“Despite the inclusion of this plant for Florida by Kartesz and Meacham (1999) and others [...], there is no evidence that this plant occurs in that state.”

“*Hottonia inflata* is generally accepted to occur in Georgia by most authorities.”

From Hill (2007):

“The American Featherfoil (sometimes called the ‘Tropical Water Violet’) is available commercially from several sources that supply the aquarium industry, normally as young plants, because of its ornamental and oxygenating qualities.”

Regulations

No species-specific regulations on possession or trade were found within the United States.

Means of Introductions within the United States

No records of *Hottonia inflata* outside its native range in the United States were found.

Remarks

From Hill (2007):

“Based on its current status, American Featherfoil [...] has been designated as Critically Imperiled in Georgia, Maine, New Hampshire, Rhode Island, and West Virginia and as Critically

Imperiled/Imperiled in Mississippi. It is considered Imperiled in Alabama, Delaware, Missouri, North Carolina and Tennessee, Imperiled/Vulnerable in Illinois, and Vulnerable in Connecticut, Texas and Virginia. In Connecticut and Tennessee, American Featherfoil has been designated to be of Special Concern.”

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From ITIS (2025):

Kingdom Plantae
Subkingdom Viridiplantae
Infrakingdom Streptophyta
Superdivision Embryophyta
Division Tracheophyta
Subdivision Spermatophytina
Class Magnoliopsida
Superorder Asteranae
Order Ericales
Family Primulaceae
Genus *Hottonia*
Species *Hottonia inflata* Elliott

According to WFO (2025), *Hottonia inflata* is the current valid name for this species.

Size, Weight, and Age Range

From NatureServe (2025):

“The species is believed to be a winter annual, based initially on observations made in Massachusetts by Knowlton (1911). Recent work by Frost (pers. comm., 1990) has suggested that the species may, in fact, require two years to complete its life cycle, with the seeds lying dormant in mud for a full year before germinating.”

From Cholewa (2025):

“Stems 3-5 dm.”

Environment

From Dodds (2022):

“Throughout its range, *Hottonia inflata* has been recorded in a variety of aquatic habitats including swamps, bayous, sloughs, millponds, beaver ponds, sag ponds, interdunal pools, oxbows, ditches, lakes, and slow-moving rivers (Weakley 2015, Hill 2007, Brockett 1983, Maine Natural Areas Program 2021). The waters are generally acidic but extend to neutral, with pH values ranging from 5.0–6.5 (–7) (Hill 2007).”

Climate

From POWO (2025):

“[...] grows primarily in the temperate biome.”

From Hill (2007):

“It appears to prefer temperate to warm temperate, humid climates without major temperature extremes, and so it is relatively rare in the far northern portions of its range, the far southern parts of its range, as well as in portions of the midwest that have a continental climate with temperature extremes.”

From Dodds (2022):

“Baskin et al. (1996) found [...] negligible germination at daily maximum/minimum [air] temperature ranges of 15/6°C (59/43°F) but substantial germination at temperatures of 20/10°C (68/50°F) and above.”

Distribution Outside the United States

Native

The native range for this species is wholly within the United States; see section 1 for a complete description of the native range.

Introduced

From Cholewa (2025):

“*Hottonia inflata* has been reported from Prince Edward Island [Canada] (J. F. MacSwain and F. Bain 1891). It was most likely a casual waif; no specimens are known and it has not been seen there since.”

Means of Introduction Outside the United States

No information available on means of introduction outside the United States.

Short Description

From Hill (2007):

“*Hottonia inflata*, American Featherfoil, is a moderately delicate, annual aquatic floating herb that initially roots in mud, and later often becomes free-floating as the roots weaken and break; the stems are submersed, glabrous, and (0.3-) 50 cm (-1.5 m) long; the generally numerous leaves are submerged and often appear clustered at the base of the flowering peduncles, but they are actually closely alternate and scattered below this point, and the blades are pinnately dissected (feather-like) into linear or threadlike divisions 0.3-1.5 mm wide with the central lamina 1-6 mm wide; the general leaf shape is oblong, and they are (2-) 6-7 (-18) cm long and

0.8-5 cm wide. [...] The inflorescence is a cluster of 1-15 partly emerged, terminal, interrupted racemes 3-20 cm long and 0.3-2 cm in diameter, contracted at the nodes into segments, with the short-stalked flowers in separate whorls of 2-10 at the nodes (joints); the segments become successively shorter towards the apex; these essentially leafless flowering stems or peduncles are spongy, hollow, thick, and inflated and allow the plants to float on the water surface. [...] the flower is white or whitish and 5-8 mm long; [...] The fruit is a nearly globose or subpyriform capsule 2.5-3 mm long with 5 valves that cohere at the base and summit. The seeds are reddish-brown, numerous, tiny (1.4-1.6 mm long), amber brown, ellipsoid or oblong-oval in outline, with a somewhat roughened-wrinkled surface. [...] (Adapted from Godfrey and Wooten 1981, Fernald 1950, Gleason and Cronquist 1991, and Radford et al. 1964).”

Biology

From Hill (2007):

“*Hottonia inflata* is a delicate winter annual aquatic herb or, perhaps, a biennial herb, with a rather unusual life history. The seeds germinate in the fall (or winter?) in mud or very shallow water and grow into small leafy plants during the winter while protected from cold temperatures by the water (Guthrie 1987). The timing of seed germination is dependent on the water level (Baskin et al. 1996). During growth the stem continues to elongate until it reaches the surface as the weather warms, at which time the plants initiate the inflated flower stalks that are so characteristic of the plant and which act to keep the plant floating at the surface of the water.”

From NatureServe (2025):

“*Hottonia inflata* is apparently the beneficiary of a commensal relationship with beaver (*Castor canadensis*) (Frost, pers. comm., 1984). Beaver ponds produce the essential, stable, shallow pond habitat needed for the survival of the plants.”

“[...] mallards and wood ducks [...] are believed to be the primary dispersers for *Hottonia*.”

“Beavers are also likely distributors of seeds. An observation of a stream system over a number of years in North Carolina revealed that *Hottonia* appeared in the pools of successively new, upstream beaver ponds within a year after their formation (Frost, pers. obs., 1990). It is believed that beavers spread the seeds during the transportation of pond mud for building and repairing dams and lodges.”

Human Uses

From Hill (2007):

“The American Featherfoil (sometimes called the ‘Tropical Water Violet’) is available commercially from several sources that supply the aquarium industry, normally as young plants, because of its ornamental and oxygenating qualities.”

Diseases

No information was found on diseases associated with *Hottonia inflata*.

Threat to Humans

No information was found on threats to humans from *Hottonia inflata*.

3 Impacts of Introductions

No records of introductions were found for *Hottonia inflata*; therefore, there is no information on impacts of introduction.

4 History of Invasiveness

The History of Invasiveness for *Hottonia inflata* is classified as No Known Nonnative Population. There is no evidence of this species being introduced or established outside its native range. Although this species is used in the aquarium trade, there is very limited information on the volume or duration of trade.

5 Global Distribution

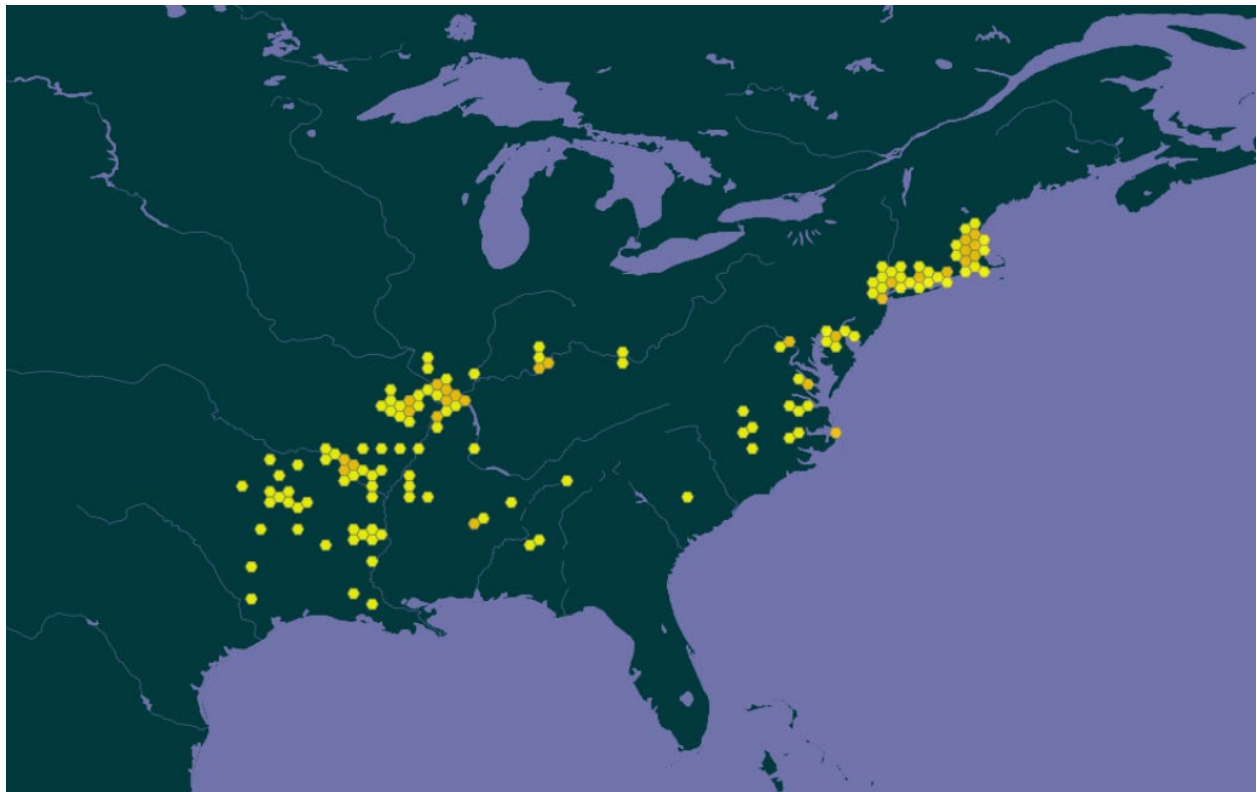


Figure 1. Reported global distribution of *Hottonia inflata*. Map from GBIF Secretariat (2025). Observations are reported from the eastern United States. An observation in Montana was excluded from the extent of this map and from the climate matching analysis because it does not represent an established population.

6 Distribution Within the United States

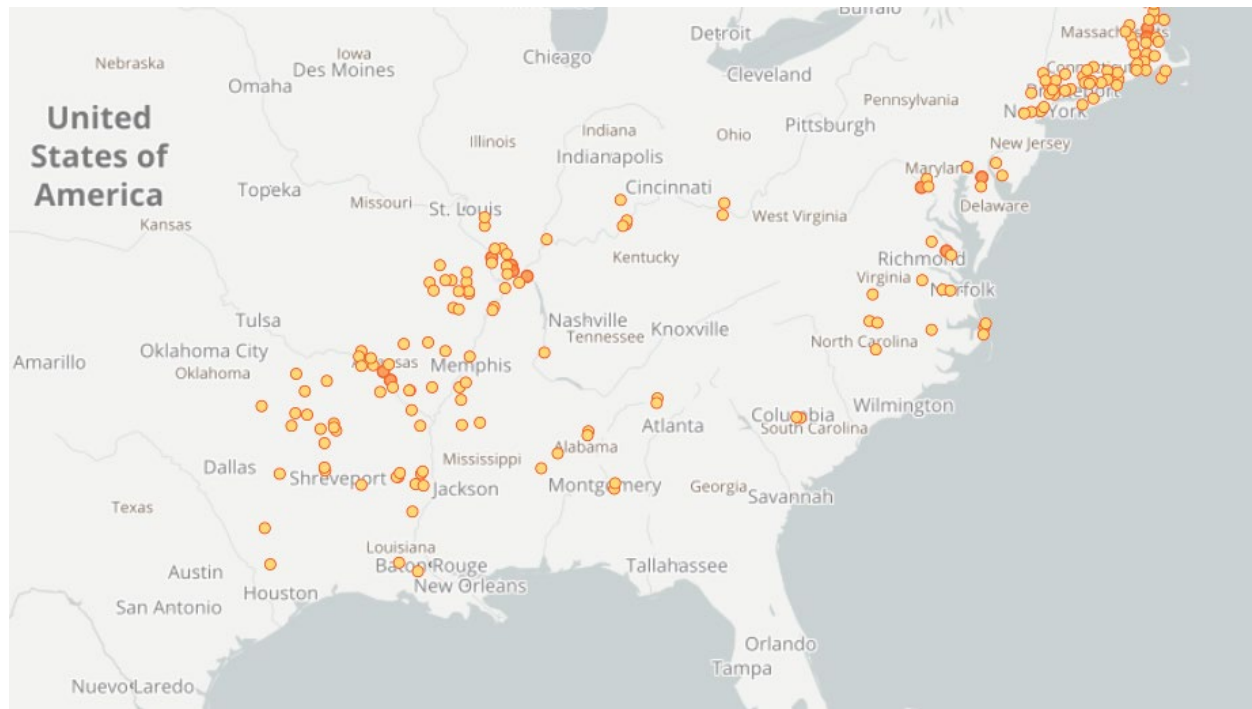


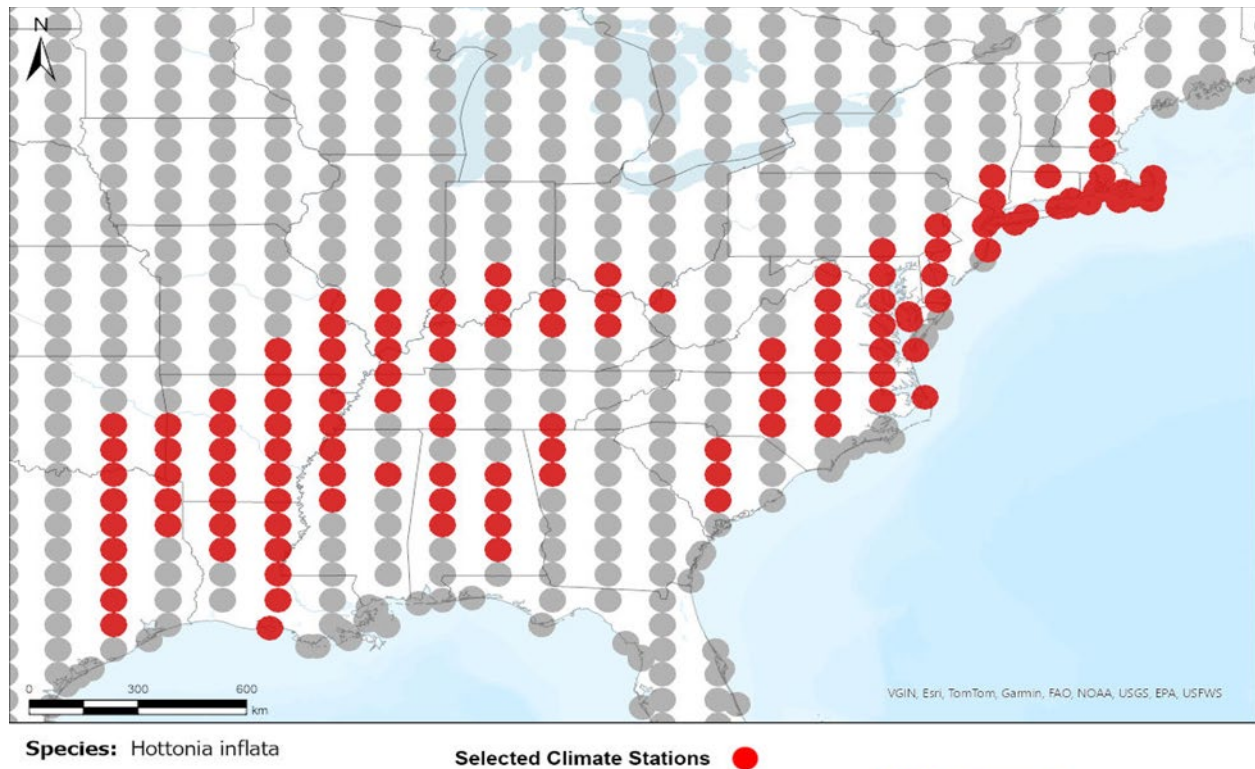
Figure 2. Reported distribution of *Hottonia inflata* in the United States. Map from GBIF-US (2025). Observations are reported from Alabama, Arkansas, Connecticut, Delaware, Georgia, Illinois, Indiana, Kentucky, Louisiana, Maryland, Massachusetts, Mississippi, Missouri, New Hampshire, New Jersey, New York, North Carolina, Ohio, Oklahoma, Rhode Island, South Carolina, Tennessee, Texas, and Virginia. An observation in Montana was excluded from the extent of this map and from the climate matching analysis because it does not represent an established population.

7 Climate Matching

Summary of Climate Matching Analysis

The climate matching analysis for *Hottonia inflata* to the contiguous United States found a high climate match across the Appalachian Range, Mid-Atlantic, Northeast, Southeast, and Southern Atlantic Coast regions, and into the Great Lakes region. The native range for the species is included in these areas of high match. Aside from scattered, small areas of medium to high match in the Rocky Mountains, central Arizona, and near Seattle, there was generally low climate match west of a line reaching from western Texas in the south to Minnesota in the north. The climate match was also low in southern Florida. The overall Climate 6 score (Sanders et al. 2023; 16 climate variables; Euclidean distance) for the contiguous United States was 0.427, indicating that Yes, there is establishment concern for this species outside its native range. The Climate 6 score is calculated as: $(\text{count of target points with scores} \geq 6) / (\text{count of all target points})$. 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 *Hottonia inflata* (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.



The USFWS makes no warranty for use of this map and cannot be held liable for actions or decisions based on map content. Map image is the intellectual property of Esri and is used herein under license.



RAMP

Figure 3. RAMP (Sanders et al. 2023) source map showing weather stations in the United States selected as source locations (red) and non-source locations (gray) for *Hottonia inflata* climate matching. Source locations from GBIF Secretariat (2023). Selected source locations are within 100 km of one or more species occurrences, and do not necessarily represent the locations of occurrences themselves.

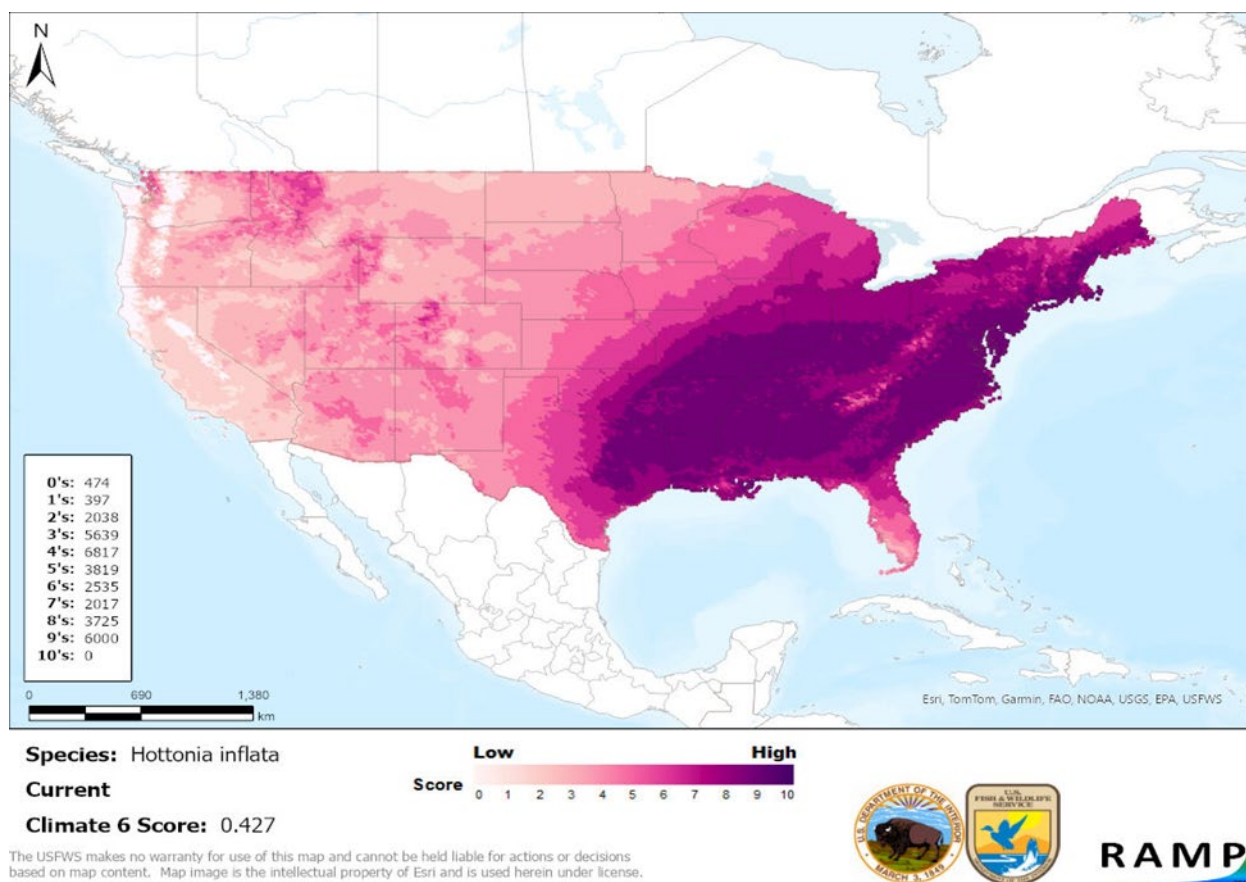


Figure 4. Map of RAMP (Sanders et al. 2023) climate matches for *Hottonia inflata* in the contiguous United States based on source locations reported by GBIF Secretariat (2023). Counts of climate match scores are tabulated on the left. 0/Pale Pink=Lowest match, 10/Dark Purple = Highest match.

8 Certainty of Assessment

The Certainty of Assessment for *Hottonia inflata* is classified as Low. There is no evidence of this species' introduction or establishment outside of its native range. Additionally, information on this species was primarily available in gray literature, not peer-reviewed sources.

9 Risk Assessment

Summary of Risk to the Contiguous United States

Hottonia inflata, American Featherfoil, is an emergent aquatic plant that is native to the eastern and southeastern United States. This plant is primarily found in lentic bodies of water such as lakes, swamps, backwaters, and beaver ponds and is believed to be dispersed by beavers and waterfowl. There are no known introductions of *H. inflata* outside its native range; therefore, the History of Invasiveness is categorized as No Known Nonnative Population. This species is present in the aquarium trade, but little information is available on the length of time it has been in trade or how many individuals are being traded. The climate matching analysis for the contiguous United States indicates establishment concern for this species outside its native range.

High climate match occurred in the eastern contiguous United States, primarily in the species' native range, but also in areas north and west of the species' range. The climate match was generally low elsewhere, particularly in the western United States. The Certainty of Assessment for this ERSS is classified as Low because there is no information available on impacts of *H. inflata* introduction. The Overall Risk Assessment Category for *Hottonia inflata* in the contiguous United States is Uncertain.

Assessment Elements

- **History of Invasiveness (see Section 4): No Known Nonnative Population**
- **Establishment Concern (see Section 7): Yes**
- **Certainty of Assessment (see Section 8): Low**
- **Remarks, Important additional information: None**
- **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.

Cholewa AF. 2025. *Hottonia inflata*. In Flora of North America Editorial Committee, editors. Flora of North America north of Mexico. Volume 8. New York and Oxford: Flora of North America Association. Available: http://floranorthamerica.org/Hottonia_inflata (February 2025).

Dodds JS. 2022. *Hottonia inflata* rare plant profile. Trenton: New Jersey Department of Environmental Protection, State Parks, Forests & Historic Sites, State Forest Fire Service & Forestry, Office of Natural Lands Management, New Jersey Natural Heritage Program. Available: <https://www.nj.gov/dep/parksandforests/natural/heritage/docs/hottonia-inflata-featherfoil.pdf> (February 2025).

GBIF Secretariat. 2023. GBIF backbone taxonomy: *Hottonia inflata* Elliott. Copenhagen: Global Biodiversity Information Facility. Available: <https://www.gbif.org/species/3169299> (January 2025).

GBIF-US. 2025. Species occurrences: *Hottonia inflata*. Available: <https://doi.org/10.15468/dl.jex55w> (February 2025).

Hill SR. 2007. Conservation assessment for the American featherfoil (*Hottonia inflata* Ell.). Champaign: Illinois Natural History Survey. Available: <https://www.ideals.illinois.edu/items/18206/bitstreams/65694/object?dl=1> (February 2025).

[ITIS] Integrated Taxonomic Information System. 2025. *Hottonia inflata* Elliott. Reston, Virginia: Integrated Taxonomic Information System. Available: https://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=24048#null (January 2025).

NatureServe. 2025. NatureServe Explorer: an online encyclopedia of life. Arlington, Virginia: NatureServe. Available: <http://explorer.natureserve.org> (January 2025).

[POWO] Plants of the World Online. 2025. *Hottonia inflata* Elliott. Plants of the World Online. London: Royal Botanic Gardens, Kew. Available: <https://powo.science.kew.org/taxon/urn:lsid:ipni.org:names:701003-1> (January 2025).

Sanders S, Castiglione C, Hoff M. 2023. Risk Assessment Mapping Program: RAMP. Version 5.0. U.S. Fish and Wildlife Service.

[USFWS] U.S. Fish and Wildlife Service. 2024. Standard operating procedure: how to prepare an “Ecological Risk Screening Summary.” Version 3. Available: <https://www.fws.gov/media/standard-operating-procedures-how-prepare-ecological-risk-screening-summary-2024> (June 2025).

[WFO] World Flora Online. 2025. World Flora Online – a project of the World Flora Online Consortium. Available: <http://www.worldfloraonline.org> (January 2025).

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.

Baskin CC, Baskin JM, Chester EW. 1996. Seed germination ecology of the aquatic winter annual *Hottonia inflata*. *Aquatic Botany* 54:51–57.

Brockett BL, Cooperrider TS. 1983. The Primulaceae of Ohio. *Castanea* 48:37–40.

Fernald ML. 1950. Gray's manual of botany. Eighth edition. Portland, Oregon: Dioscorides Press.

Gleason HA, Cronquist A. 1991. Manual of vascular plants of northeastern United States and adjacent Canada. Second edition. Bronx: New York Botanical Garden.

Godfrey RK, Wooten JW. 1981. Aquatic and wetland plants of southeastern United States. Monocotyledons. Athens, Georgia: University of Georgia Press.

Knowlton CK. 1911. *Hottonia inflata*, a winter annual. *Rhodora* 13(150):108.

MacSwain JF, Bain F. 1891. List of Prince Edward Island plants. Charlottetown, Canada: Natural History Society of Prince Edward Island.

Maine Natural Areas Program. 2021. *Hottonia inflata* Ell. Augusta: Maine Department of Agriculture, Conservancy and Forestry. Available: <https://www.maine.gov/dacf/mnap/features/hotinf.htm>.

Radford AE, Ahles HA, Bell CR. 1964. Manual of the vascular flora of the Carolinas. Chapel Hill: University of North Carolina Press.

Weakley AS. 2015. Flora of the southern and mid-Atlantic states, working draft of May 2015. Chapel Hill: University of North Carolina Herbarium, North Carolina Botanical Garden.

Appendix

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 Secretariat (2023).

Under the future climate scenarios (figure A1), on average, high climate match for *Hottonia inflata* was projected to occur in the Appalachian Range, Great Lakes, Mid-Atlantic, Northeast, and Southeast regions of the contiguous United States. Areas of low climate match were projected to occur in the Northern Pacific Coast region and California, and in parts of the Northern Plains, western Southern Plains, Southwest, and Great Basin. All four climate scenarios showed a similar pattern of higher climate match in the eastern contiguous United States than the western contiguous United States. The Climate 6 scores for the individual future scenario models (figure A2) ranged from a low of 0.418 (model: MPI-ESM1-2-HR, SSP5, 2085) to a high of 0.474 (model: GFDL-ESM4, SSP5, 2085). 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 (0.427, figure 4) falls within 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. At the 2085 time step, areas within the Northeast saw a large increase in the climate match relative to current conditions. Additionally, under one or more time step and climate scenarios, areas within the Colorado Plateau, Great Lakes, Northern Plains, and Western Mountains saw a moderate increase in the climate match relative to current conditions. At the 2085 time step, areas within the Gulf Coast saw a large decrease in the climate match relative to current conditions. Additionally, under one or more time step and climate scenarios, areas within the Appalachian Range, Mid-Atlantic, Northeast, Southeast, Southern Atlantic Coast, and Southern Plains saw a moderate decrease in the climate match relative to current conditions. Additional, very small areas of large or moderate change may be visible on the maps (figure A3). Areas of high change in climate match were relatively small in both 2055 scenarios and larger in both 2085 scenarios.

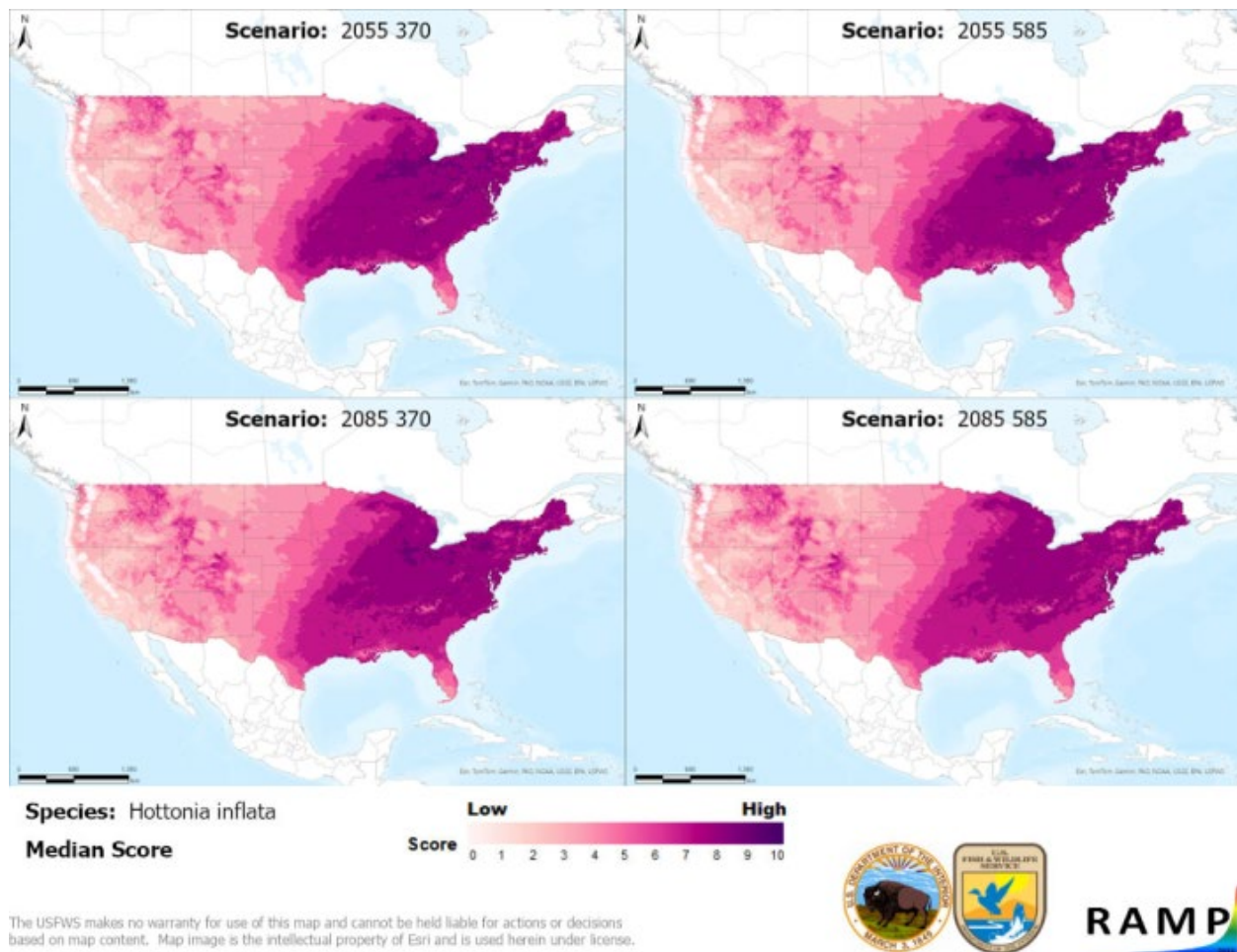


Figure A1. Maps of median RAMP (Sanders et al. 2023) climate matches projected under potential future climate conditions using five global climate models for *Hottonia inflata* in the contiguous United States. Climate matching is based on source locations reported by GBIF Secretariat (2023). Shared Socioeconomic 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.

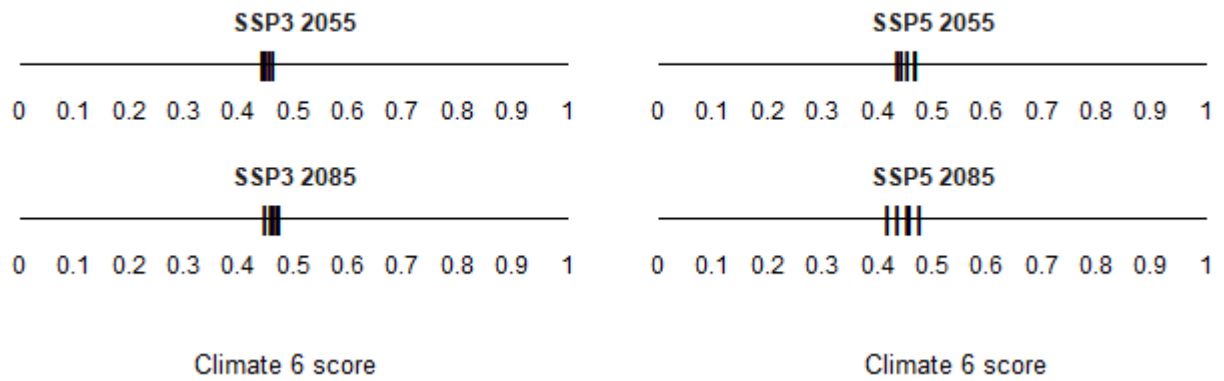


Figure A2. Comparison of projected future Climate 6 scores for *Hottonia inflata* in the contiguous United States for each of five global climate models under four combinations of Shared Socioeconomic Pathway (SSP) and time step. SSPs used (from left to right): SSP3, SSP5 (Karger et al. 2017, 2018; IPCC 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.

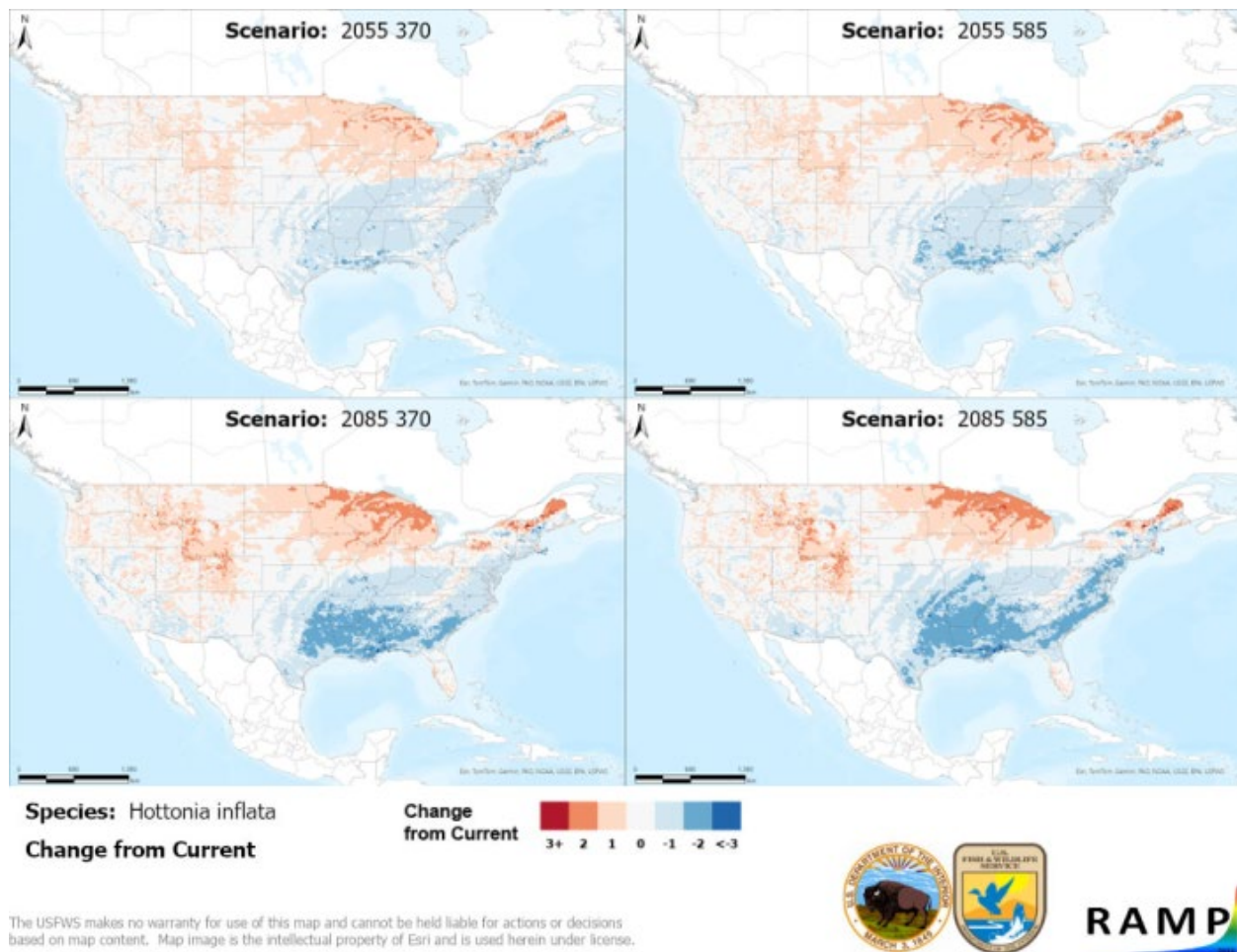


Figure A3. RAMP (Sanders et al. 2023) maps of the contiguous United States showing the difference between the current climate match target point score (figure 4) and the median target point score for future climate scenarios (figure A1) for *Hottonia inflata* based on source locations reported by GBIF Secretariat (2023). 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.

Literature Cited

- GBIF Secretariat. 2023. GBIF backbone taxonomy: *Hottonia inflata* Elliott. Copenhagen: Global Biodiversity Information Facility. Available: <https://www.gbif.org/species/3169299> (January 2025).
- [IPCC] Intergovernmental Panel on Climate Change. 2021. Climate change 2021: the physical science basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press.
- Karger DN, Conrad O, Böhner J, Kawohl T, Kreft H, Soria-Auza RW, Zimmermann NE, Linder HP, Kessler M. 2018. Data from: Climatologies at high resolution for the earth's land surface areas. EnviDat. Available: <https://doi.org/10.16904/envodat.228.v2.1>.
- Karger DN, Conrad O, Böhner J, Kawohl T, Kreft H, Soria-Auza RW, Zimmermann NE, Linder P, Kessler M. 2017. Climatologies at high resolution for the Earth land surface areas. Scientific Data 4:170122.
- Sanders S, Castiglione C, Hoff M. 2023. Risk Assessment Mapping Program: RAMP. Version 5.0. U.S. Fish and Wildlife Service.