

Bolivian Chain Sword (*Helanthium bolivianum*)

Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, March 2021

Revised, April 2021, June 2021

Web Version, 8/24/2021

Organism Type: Plant

Overall Risk Assessment Category: Uncertain



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https://commons.wikimedia.org/wiki/File:Helanthium_bolivianum_kz01.jpg. (June 2021).

1 Native Range and Status in the United States

Native Range

From POWO (2021):

“Argentina Northeast, Bolivia, Brazil North, Brazil Northeast, Brazil South, Brazil Southeast, Brazil West-Central, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador,

Guatemala, Guyana, Honduras, Jamaica, Mexico Southeast, Netherlands Antilles, Nicaragua, Panamá, Paraguay, Peru, Puerto Rico, Venezuela”

Status in the United States

There are no records of *H. bolivianum* being established in the contiguous United States, but it is native to Puerto Rico (USDA 2021).

This species is available in the United States in the aquarium trade (Florida Aquatic Nurseries, 2021).

Means of Introductions in the United States

No records of *H. bolivianum* in the wild in the contiguous United States were found.

Remarks

Information for this assessment was searched for using the valid name *Helanthium bolivianum* and the synonym *Echinodorus bolivianus*.

Helanthium bolivianum taxonomic hierarchy is still being studied with Lehtonen and Myllys (2008) stating “*H. bolivianum* is paraphyletic and thus should be split further”.

According to World Flora Online (2021), GBIF Secretariat (2021) and POWO (2021) *Helanthium bolivianum* (Rusby, Lehtonen & Myllysis) is the current valid name for this species. However, the USDA (2021) and ITIS (2021) have the current valid name for this species as *Echinodorus bolivianus*. It was originally described as *Alisma bolivianum* (Rusby, 1927). This screening follows the taxonomic structure outlined by World Flora Online (2021), treating *H. bolivianum* as the valid name for this species. World Flora Online (2021) also lists the following names as synonyms of *H. bolivianum*: *Alisma bolivianum* Rusby, *Alisma tenellum* f. *latifolium* Seub., *Echinodorus angustifolius* Rataj, *Echinodorus australis* Rataj, *Echinodorus austroamericanus* Rataj, *Echinodorus bolivianus* (Rusby) Holm-Niels., *Echinodorus isthmicus* Fassett, *Echinodorus latifolius* (Seub.) Rataj, *Echinodorus magdalenensis* Fassett, *Echinodorus quadricostatus* Fassett, *Echinodorus quadricostatus* var. *magdalenensis* (Fassett) Rataj, *Echinodorus quadricostatus* var. *xinguensis* Rataj, *Echinodorus tenellus* f. *apanecae* Fassett, *Echinodorus tenellus* var. *latifolius* (Seub.) Fassett, and *Echinodorus xinguensis* (Rataj) Rataj.

From Aquatic Plant Central (2021):

“Once established, it can be very invasive, so care has to be taken to keep it in check.”

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

According to World Flora Online (2021), *Helanthium bolivianum* (Rusby) Lehtonen & Myllys the current valid name for this species.

From GBIF Secretariat (2021):

Kingdom Plantae

Phylum Tracheophyta

Class Liliopsida

Order Alismatales

Family Alismataceae

Genus *Helanthium*

Species *Helanthium bolivianum* (Rusby) Lehtonen & Myllys

Size, Weight, and Age Range

From Tropica Aquarium Plants A/S (2021):

“[...] leaves 10-15 cm long [...], each roset becoming 15-20 cm wide.”

Environment

From Lehtonen and Myllys (2008):

“[...] aquatic or semiaquatic [...].”

From Posada-García (2021):

“Elevation: 0 - 280 m”

From Tropic Fish Keeping (2021):

“Soft to moderately hard (4 to 15 dGH), acidic to basic (pH up to 7.5), temperature 22-30C/72-86F.” [assumed to be recommended aquarium environment]

Climate

From POWO (2021):

“its native range is Tropical America”

From Tropical Fish Keeping (2021):

“Neotropical; [...].”

Distribution Outside the United States

Native

From POWO (2021):

“Argentina Northeast, Bolivia, Brazil North, Brazil Northeast, Brazil South, Brazil Southeast, Brazil West-Central, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador,

Guatemala, Guyana, Honduras, Jamaica, Mexico Southeast, Netherlands Antilles, Nicaragua, Panamá, Paraguay, Peru, Puerto Rico, Venezuela”

Introduced

GBIF Secretariat (2021) has *Helanthium bolivianum* recorded as being introduced in Mauritius by the Global Register of Introduced and Invasive Species. No other information on this introduction could be found to determine if there is an established population of *H. bolivianum* in Mauritius.

Means of Introduction Outside the United States

No information could be found on the means of introduction into Mauritius.

Short Description

From Aquatic Plant Central (2021):

“The light green leaves of *H. bolivianum* 'Angustifolius' are about as wide as a shoe lace and as tall as eighteen inches [...].”

From Florida Aquatic Nurseries (2021):

“The leaves are much broader than that of its cousin *Helanthium tenellum* and the overall plant will also be taller.”

From Tropical Fish Keeping (2021):

“[...] *H. bolivianum* has three rows of chlorophyll-free pullucid "windows" adjacent to the leaf spine, [...].”

The following is in reference to the genus *Helanthium*.

From Lehtonen and Myllys (2008):

“A detailed description of the genus *Helanthium* is given below.

Annuals or short-lived perennials, glabrous, scapose, pseudostoloniferous aquatic or semiaquatic plants. Leaves as basal rosette, erect, ascending or floating; emerged leaves petiolate, blades narrow to elliptic, one to three ribbed, with pellucid markings absent or present as lines, the margins entire, the apex acute to acuminate, the base attenuate; submersed leaves sessile phyllodes, the blades linear. Inflorescence erect to creeping, umbelliform or racemose of two to three whorls, vegetatively proliferating or transformed to pseudostolon in submerged conditions, bracts deltoid. Flowers perfect, pedicellate; pedicels spreading in fruit; sepals 3, erect; petals 3, clawed, white, larger than sepals; stamens (6–)9, the anthers short, basifixed, the filaments glabrous; carpels 10–20, separate, each with one ovule. Fruits achenes in a loose head, turgid, obovate, 3–4-ribbed, without keel, without glands, beaked, the beak erect.”

Biology

From Tropical Fish Keeping (2021):

“In both the emersed and submersed forms, it reproduces vegetatively by sending out numerous pseudo-stolons on top of the substrate from which plantlets will emerge every couple of inches and root in the substrate. These pseudo-stolons are usually referred to simply as "runners" but technically they are not true runners (stolons) but a modification of the flower stalk.”

Human Uses

H. bolivianum is available in the aquarium trade under the valid name and some synonyms, for example, *Helanthium bolivianum* 'Vesuvius' (Florida Aquatic Nurseries, 2021), *Helanthium bolivianum* 'Quadricostatus' (Florida Aquatic Nurseries, 2021), *Helanthium bolivianum* 'Angustifolius' (Aquatic Plant Central 2021), *Echinodorus latifolius* Dwarf Sword (Serene Aquarium 2021), and Vesuvius *Echinodorus angustifolia* (AquariumPlants.com 2021).

H. bolivianum is popular in the aquarium trade.

Diseases

No records of diseases were found for *H. bolivianum*.

Threat to Humans

No records of threats to humans were found for *H. bolivianum*.

3 Impacts of Introductions

No documented impacts of introductions of *H. bolivianum* to Mauritius were found.

4 History of Invasiveness

The History of Invasiveness for *Helanthium bolivianum* is classified as No Known Nonnative Population. There is one record of *H. bolivianum* being introduced outside its native range. However, no information on how it was introduced, if a population is established, and if there were any impacts from this introduction were found. *H. bolivianum* is available in the aquarium trade.

5 Global Distribution



Figure 1. Known global distribution of *Helanthurium bolivianum*. Observations are reported from Central and South America. Map from GBIF Secretariat (2021). There were minimal observations available to represent the species' distribution in the Caribbean.

6 Distribution Within the United States

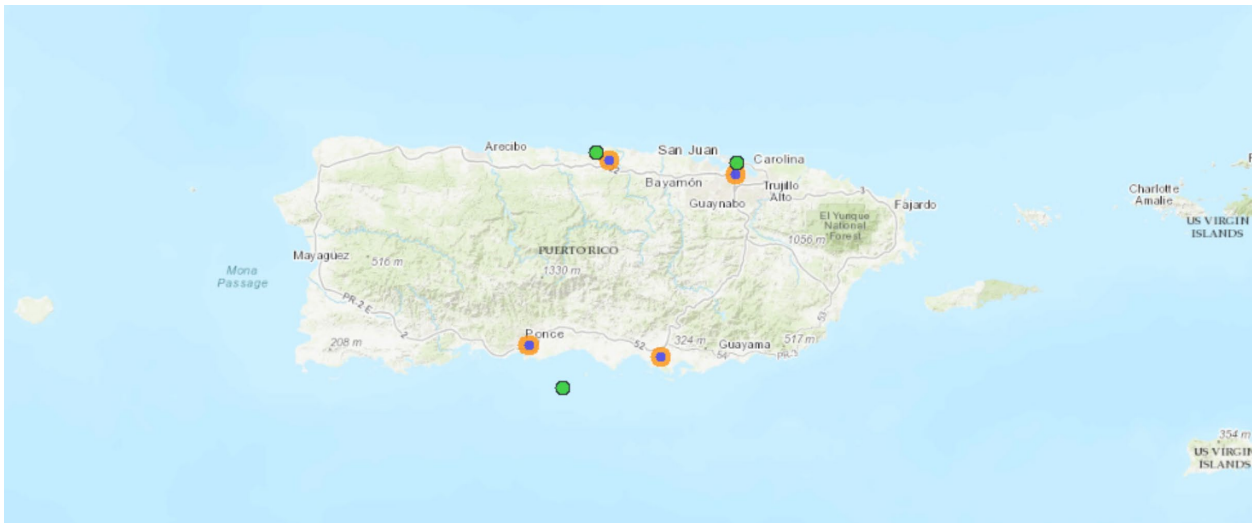


Figure 2. Known distribution of *Helanthurium bolivianum* in the United States territory of Puerto Rico. Map from BISON (2021). The point in the ocean is not representative of a population of *Helanthurium bolivianum*, therefore it will not be used in the climate matching analysis.

7 Climate Matching

Summary of Climate Matching Analysis

The climate match was highest in southern Florida, although high matches extended along the coast from North Carolina to Texas. Other regions of the Southeast from New Jersey south and east to Texas, the Pacific coastline of southern California, and a small area around the Puget Sound had a medium climate match. The remainder of the contiguous United States had a low climate match. The overall Climate 6 score (Sanders et al. 2018; 16 climate variables; Euclidean distance) for the contiguous United States was 0.064, medium. (Scores between 0.005 and 0.103, exclusive, are classified as medium.) The following States had high individual Climate 6 scores: Alabama, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, and Texas. All other states had low individual Climate 6 scores.

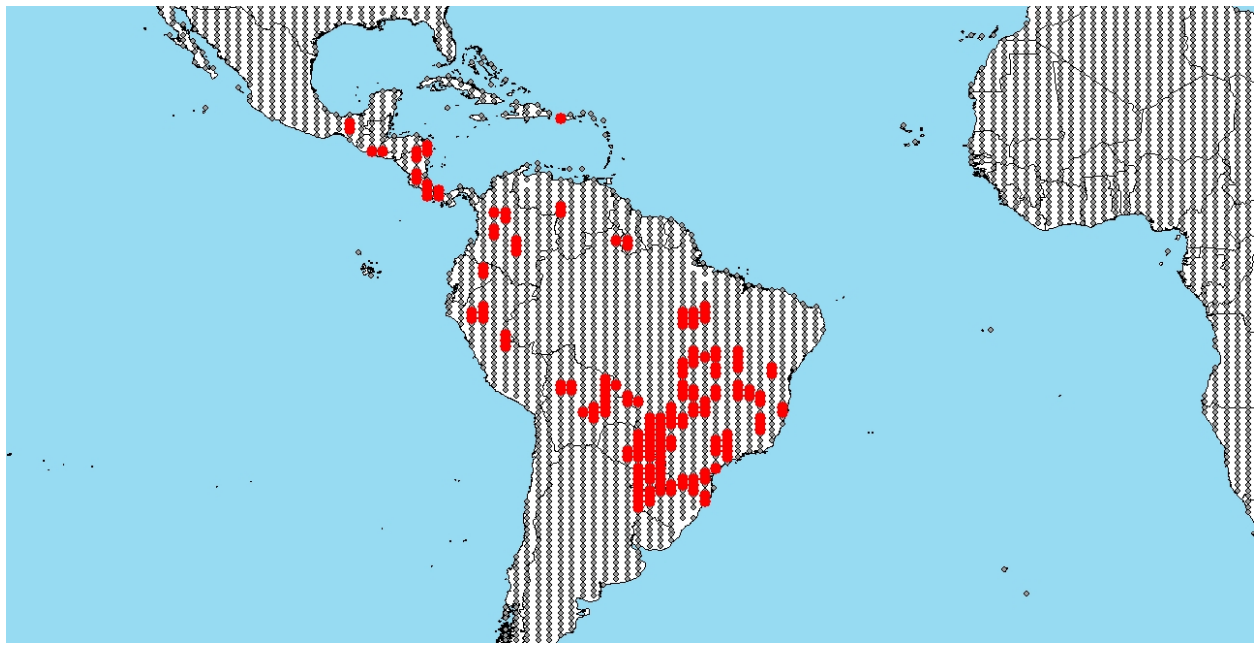


Figure 3. RAMP (Sanders et al. 2018) source map showing weather stations in Central and South America and the Caribbean selected as source locations (red; Brazil, Bolivia, Paraguay, Argentina, Peru, Ecuador, Colombia, Venezuela, Guyana, Panama, Costa Rica, San Salvador, Nicaragua, Guatemala, Mexico, and Puerto Rico) and non-source locations (gray) for *Helanthium bolivianum* climate matching. Source locations from GBIF Secretariat (2021). Selected source locations are within 100 km of one or more species occurrences, and do not necessarily represent the locations of occurrences themselves.

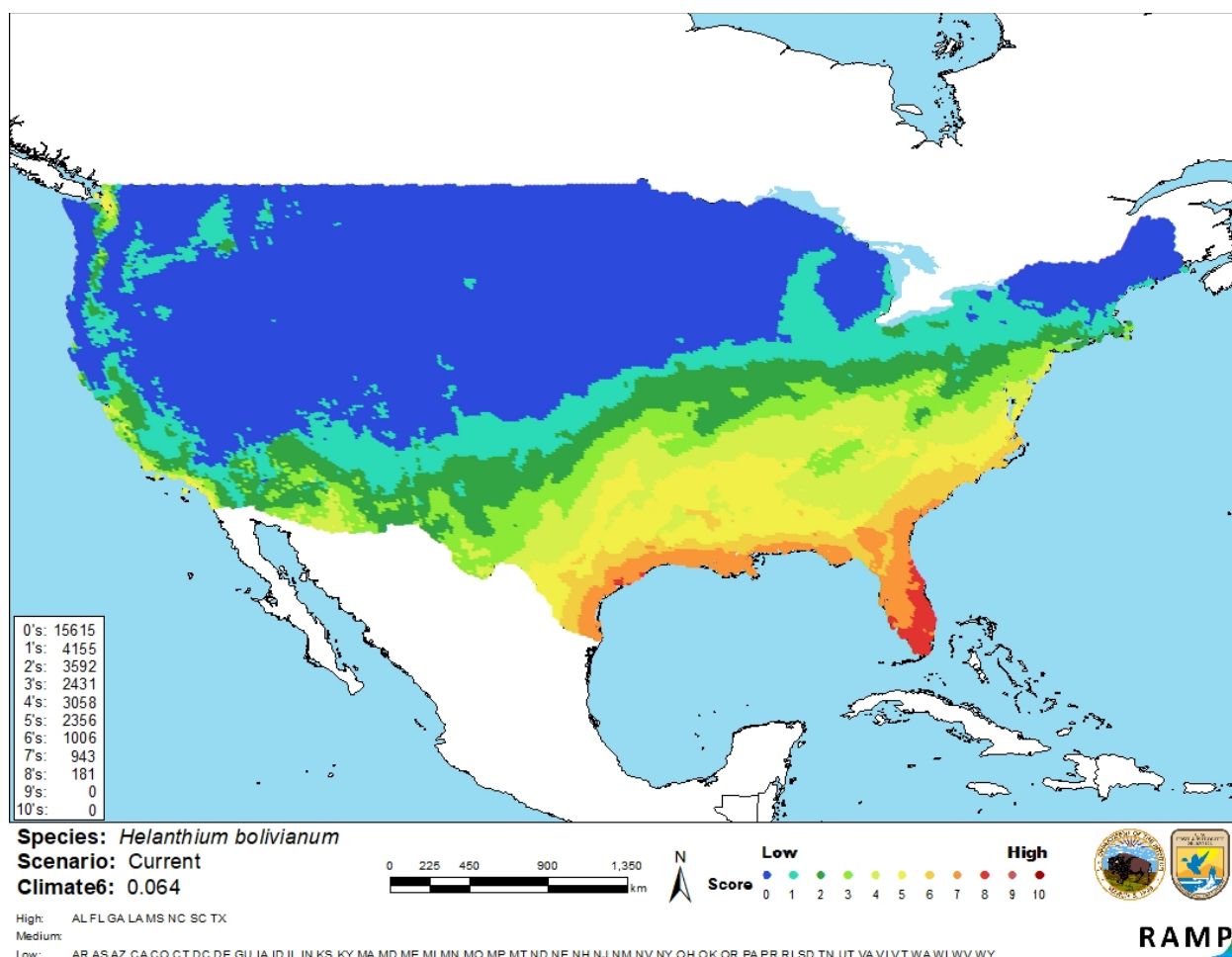


Figure 4. Map of RAMP (Sanders et al. 2018) climate matches for *Helanthium bolivianum* in the contiguous United States based on source locations reported by GBIF Secretariat (2021). Counts of climate match scores are tabulated on the left. 0/Blue = Lowest match, 10/Red = Highest match.

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
$0.000 \leq X \leq 0.005$	Low
$0.005 < X < 0.103$	Medium
≥ 0.103	High

8 Certainty of Assessment

The Certainty of Assessment for *Helanthium bolivianum* is low. A record of introduction was found, but there was no detailed or supporting information on status of the species or impacts. The taxonomic understanding of *H. bolivianum* is still being studied with an existing advisement

that it may be split into multiple distinct species in the future, which would impact the distribution information and climate match.

9 Risk Assessment

Summary of Risk to the Contiguous United States

Helanthium bolivianum, Bolivian Chain Sword, is an herbaceous aquatic plant that is native to South and Central America and the Caribbean Islands, including Puerto Rico. *H. bolivianum* is commonly available in the aquarium trade. The History of Invasiveness for *Helanthium bolivianum* is classified as No Known Nonnative Population. There is one record of *H. bolivianum* being introduced outside its native range to Mauritius. However, no information on how it was introduced, if a population is established, and if there were any impacts from this introduction was found. The overall climate match with contiguous United States was medium. Most of the Southeast had a medium match, except coastal areas where there was a high match. The certainty of assessment was low because of the limited information on introductions and the taxonomic uncertainty. The overall risk assessment category is Uncertain.

Assessment Elements

- **History of Invasiveness (Sec. 4): No Known Nonnative Population**
- **Overall Climate Match Category (Sec. 7): Medium**
- **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.

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- Tropica Aquarium Plants A/S. 2021. *Helanthium bolivianum* 'Quadricostatus'. Denmark: Tropica Aquarium Plants A/S. Available: [https://tropica.com/en/plants/plantdetails/Helanthiumbolivianum'Quadricostatus'\(068TC\)/18896](https://tropica.com/en/plants/plantdetails/Helanthiumbolivianum'Quadricostatus'(068TC)/18896) (March 2021).
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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.

There are no references for this section.