

# Cuban Bulrush (*Oxycaryum cubense*)

## Ecological Risk Screening Summary

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## 1 Native Range and Status in the United States

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### Native Range

From McLaurin and Wersal (2018):

“Cuban bulrush is native to South America and the West Indies.”

GISD (2017) lists *Oxycaryum cubense* as native in Argentina, Bolivia, Brazil, Colombia, Costa Rica, Cuba, Ecuador, El Salvador, French Guiana, Guatemala, Guyana, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Suriname, Trinidad and Tobago, United States, and Venezuela.

## Status in the United States

According to McLaurin and Wersal (2018), *Oxycaryum cubense* (listed under the name *Cyperus blepharoleptos*) has been present in Florida since 1982 and Louisiana since 2011.

From Bryson et al. (2008):

“Each of the *O. cubense* collections reported herewith possess monocephalous inflorescences and is *O. cubense* forma *paraguayense* (Figure 2 [in source material]). The Alabama record cited below is only the third collection from Alabama and circa (ca.) 310 km (190mi) north of previously reported sites in Mobile County, Alabama (Bryson et al. 1996; LeLong 1988; Mohr 1901). The Mississippi records cited below are the first from the state, represent the most northern collections of *O. cubense* in the United States, and expand the range north from the initial Alabama collections by ca. 380 km.”

GISD (2017) lists *Oxycaryum cubense* as alien, established, and invasive in the United States.

From GISD (2017):

“*Oxycaryum cubense* was first reported from southern Alabama in 1901 (Mohr 1901). *O. cubense* forma *cubense* (possibly native) is known from peninsular Florida, Louisiana and coastal Texas.”

“*O. Cubense* forma *paraguayense* is known from northern Florida, southern Georgia, Alabama and Mississippi and appears to be invasive (apparently introduced from South America).”

## Means of Introductions in the United States

From Bryson et al. (2008):

“*O. cubense* has been in the southeastern United States for more than a century (Chapman 1889; Mohr 1901), and was possibly dispersed into North America from the West Indies or South America by migratory birds or with ship ballast (Bryson et al. 1996).”

## Remarks

Synonyms of *Oxycaryum cubense* are *Cyperus blepharoleptos* (GBIF Secretariat 2018; McLaurin and Wersal 2018) and *Scirpus cubensis* (ITIS 2018). According to ITIS (2018) the accepted name is *O. cubense*. *O. cubense* and *C. blepharoleptos* are the most commonly used names and information searches were conducted using both to gather all pertinent information for this species.

Different sources present *Oxycaryum cubense* as native (GISD 2017) or invasive (GISD 2017; McLaurin and Wersal 2018) to the United States. This assessment presents the contradictory information as accurately as possible.

From McLaurin and Wersal (2018):

“To date, little is known regarding basic biological and ecological characteristics of this plant. Additionally, there have not been any management recommendations developed for this species. Cuban bulrush is expanding in the MidSouth region of the United States and additional research is needed to develop techniques to slow its spread.”

From Bryson et al. (2008):

“The taxonomic placement of *O. cubense* has been disputed. It possesses spirally arranged scales and thus has been treated as *Scirpus cubensis* Poepp. & Kunth (e.g., Correll and Johnston 1970; Godfrey and Wooten 1979; Wunderlin 1998). Molecular analysis by Muasya et al. (2002) supports classification of *Oxycaryum* in tribe Cyperae. Two forms of *O. cubense* are recognized and they differ from one another by inflorescence features (Figure 1 [in source material]). Plants with umbellate inflorescences are *O. cubense* forma *cubense*, while those with monocephalous inflorescences are *O. cubense* forma *paraguayense* (Maury Pedersen (Barros 1960; Pedersen 1995).”

## 2 Biology and Ecology

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### Taxonomic Hierarchy and Taxonomic Standing

From ITIS (2018):

“Taxonomic Status:

Current Standing: accepted”

“Kingdom Animalia

Subkingdom Viridiplantae

Infrakingdom Streptophyta

Superdivision Embryophyta

Division Tracheophyta

Subdivision Spermatophytina

Class Magnoliopsida

Superorder Lilianae

Order Poales

Family Cyperaceae

Genus *Oxycaryum*

Species *Oxycaryum cubense* (Poepp. & Kunth) Lye”

### Size, Weight, and Age Range

From McLaurin and Wersal (2018):

“Cuban bulrush is a floating, epiphytic perennial herb, with a slender triangular stem that is 1 to 3 feet in height.”

## Environment

No information on specific environmental requirements of *Oxycaryum cubense* was found.

## Climate/Range

No information on the specific climate or range of *Oxycaryum cubense* was found.

## Distribution Outside the United States

GISD (2017) lists *Oxycaryum cubense* as cryptogenic and established in Botswana, Burkina Faso, Cameroon, the Democratic Republic of the Congo, Ghana, Madagascar, Mexico, Nigeria, South Africa, and Zambia.

### Native

From McLaurin and Wersal (2018):

“Cuban bulrush is native to South America and the West Indies.”

GISD (2017) lists *Oxycaryum cubense* as native in Argentina, Bolivia, Brazil, Colombia, Costa Rica, Cuba, Ecuador, El Salvador, French Guiana, Guatemala, Guyana, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Suriname, Trinidad and Tobago, United States, and Venezuela.

### Introduced

GISD (2017) lists the status of *Oxycaryum cubense* as cryptogenic (listed above) in many countries. No other records explicitly stating introductions of *O. cubense* outside of the United States were found.

## Means of Introduction Outside the United States

No information on specific means of introduction outside the United States was found.

## Short Description

From McLaurin and Wersal (2018):

“Cuban bulrush is a floating, epiphytic perennial herb, with a slender triangular stem that is 1 to 3 feet in height. Slender leaves form at the base of the stem and extend 3 to 4 feet above the water surface. Multiple inflorescences, either umbellate or monocephalous depending on form, are produced at the apical portion of each stem. Inflorescences are comprised of one to many spherical heads that are 1-2 cm in diameter. The inflorescence is surrounded by 2 to 6 long leaf-like bracts (Godfrey 1979). Seeds are in the form of spiked, buoyant achenes, which form spring through fall. Reddish runners form the base of floating mats and are the means of vegetative spread (Bryson [et al.] 2008).”

## Biology

From Bryson et al. (2008):

“*O. cubense* is a vigorous invasive aquatic plant similar in vegetative reproductive capability to *Salvinia molesta*, *Pistia stratiotes* L., and other invasive aquatic weeds (Tur 1971). It forms transient floating mats and rafts in lakes in Africa (Holm et al. 1977; Okali and Hall 1974), Argentina (Tur 1971), and the United States (Mallison et al. 2001). Although not stated directly (Tur 1971), there are some implications of aquatic succession in mat or raft formation since *O. cubense* depends upon the preexistence of other aquatic species, such as *E. crassipes*, for establishment.”

“This characteristic identified *O. cubense* as an aquatic epiphyte by Tur (1971). The corky, buoyant achenes of *O. cubense* are adapted to dispersal by moving water. Its mat-forming, floating habit facilitates asexual reproduction and transport of vegetative fragments by moving water (Haines and Lye 1983).”

From GISD (2017):

“*Oxycaryum cubense* (Cuban bulrush) is a perennial that may grow from a seed or a rhizome.”

“*Oxycaryum cubense* (Cuban bulrush) is an obligate wetland species (USDA, 2007) and is found in rivers, streams, swamps, marshes, ponds and other forms of standing water. It may be on the water's edge (up to 50m from the coast) or may detach from the land and float freely (eFloras, 2007).”

## Human Uses

No information on human uses of *Oxycaryum cubense* was found.

## Diseases

No information on parasites or pathogens of *Oxycaryum cubense* was found.

## Threat to Humans

No information on threats to human from *Oxycaryum cubense* was found.

## 3 Impacts of Introductions

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From Bryson et al. (2008):

“It forms transient floating mats and rafts in lakes in Africa (Holm et al. 1977; Okali and Hall 1974), Argentina (Tur 1971), and the United States (Mallison et al. 2001). [...] These floating mats and rafts impede navigation and displace native organisms. In the southeastern United States and elsewhere, *O. cubense* appears to be extremely invasive, with extensive floating mats and rafts covering large areas in ditches, lakes, ponds, rivers, and impounded swamps to the exclusion of other aquatic vegetation (Bryson et al. 1996; Haines and Lye 1983; Mallison et al.

2001). It is reportedly highly competitive with other floating aquatic species including *Azolla* spp., *E. crassipes*, and *P. stratiotes* (Tur 1971).”

From McLaurin and Wersal (2018):

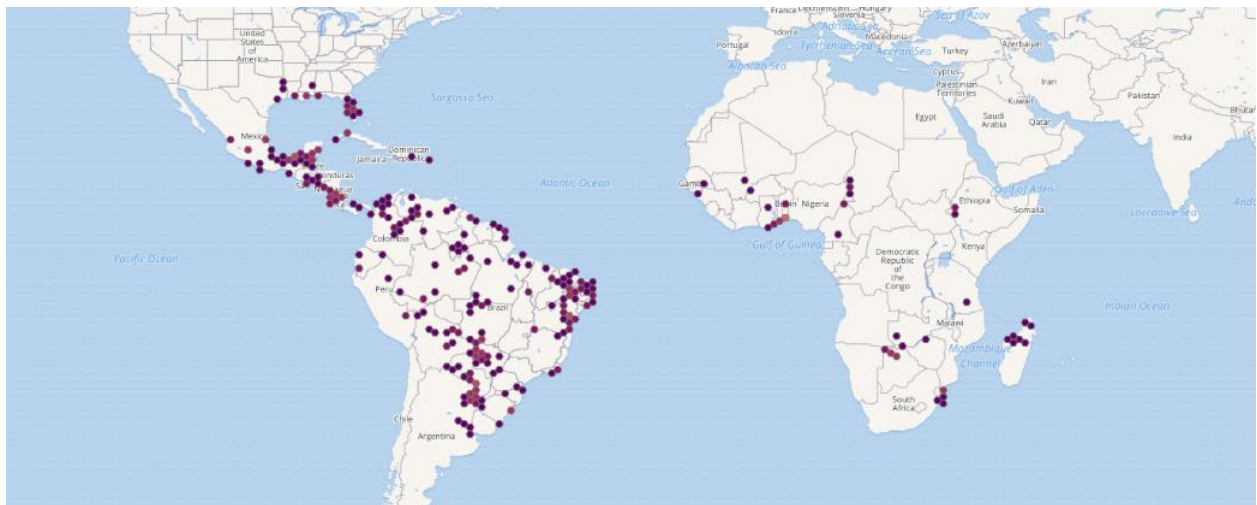
“Due to its mat-forming growth, Cuban bulrush shades out desirable submersed vegetation and alters water quality for aquatic organisms. Underneath floating mats, fish habitat can rapidly degrade due to increased organic matter and low dissolved oxygen. Cuban bulrush is thought to be able to compete with other emergent plants, including water hyacinth, due to its tall epiphytic growth habit (Robles 2007). Cuban bulrush mats also impede navigation and recreation within otherwise economically productive water bodies by limiting access and accumulating along shorelines (Mallison [et al.] 2001).”

From GISD (2017):

“*Oxycaryum cubense* (Cuban bulrush) forms large monotypic floating mats on the surface of standing water. These mats may send out runners over other emergent plant species and crowd them or exclude them (Schardt, 2006). Cuban bulrush does not appear to be a dangerous invasive throughout much of the world, but is described by Weakley (2007) as "aggressively weedy" and is known to be invasive in Georgia and Alabama, US (Carter in Bryson et al. 1996).”

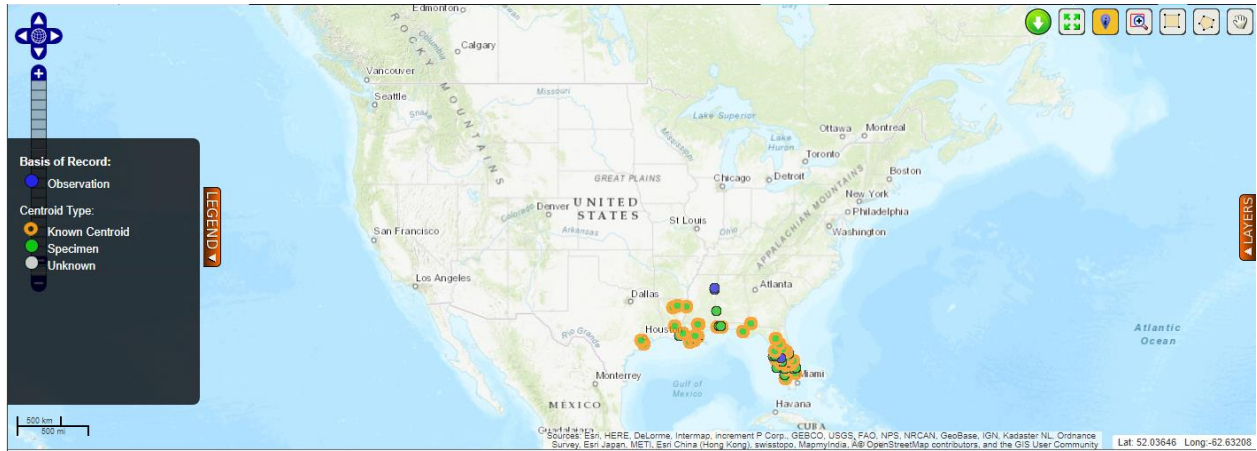
## 4 Global Distribution

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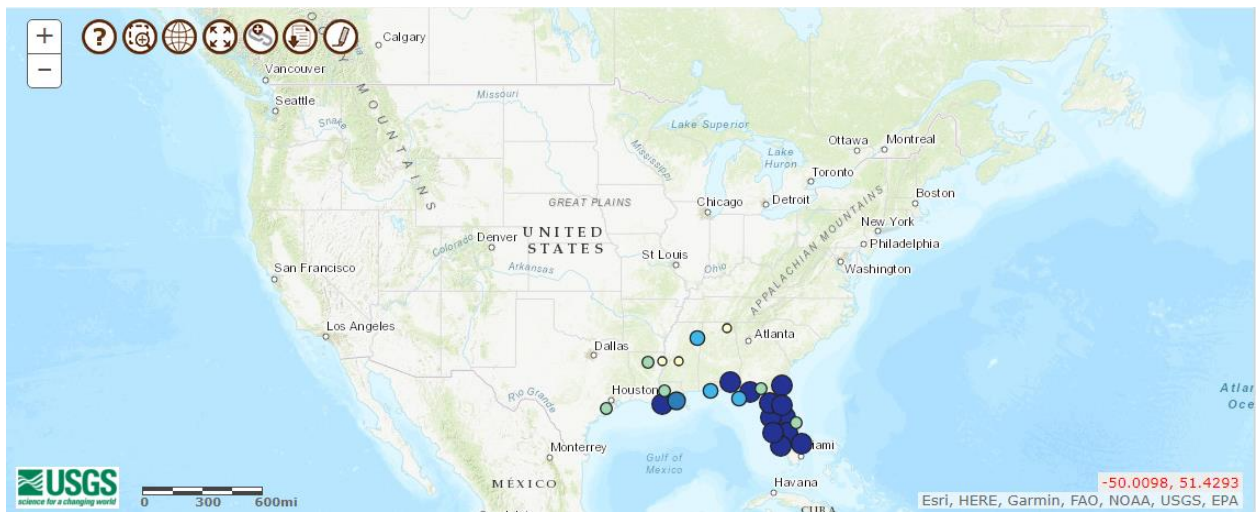


**Figure 1.** Known global distribution of *Oxycaryum cubense* (*Cyperus blepharoleptos*). Locations are in North and South America, sub-Saharan Africa, and Madagascar. Map from GBIF Secretariat (2018).

## 5 Distribution Within the United States



**Figure 2.** Known distribution of *Oxycaryum cubense* in the United States. Map from BISON (2018).

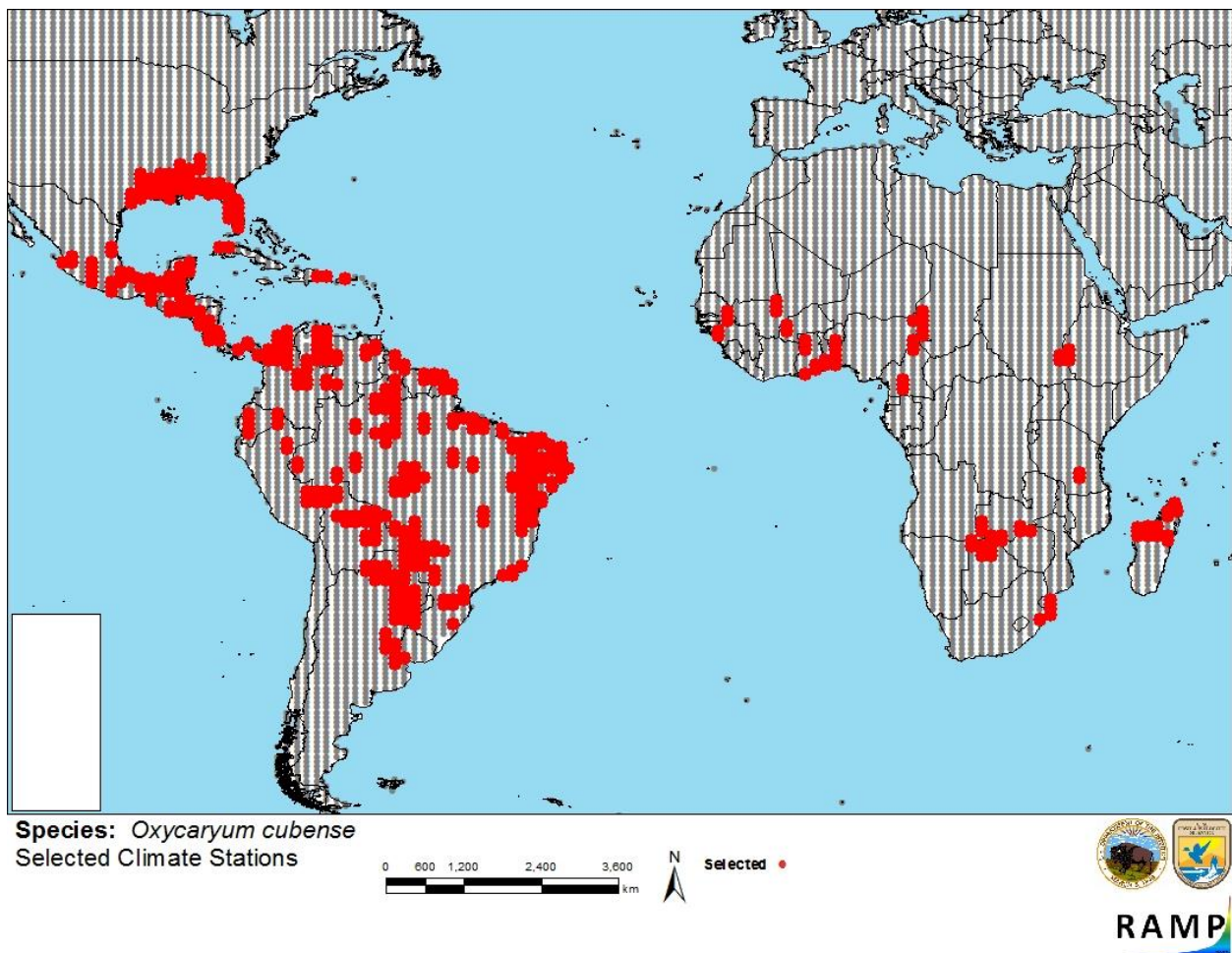


**Figure 3.** Additional known distribution of *Oxycaryum cubense* in the United States. Map from McLaurin and Wersal (2018).

## 6 Climate Matching

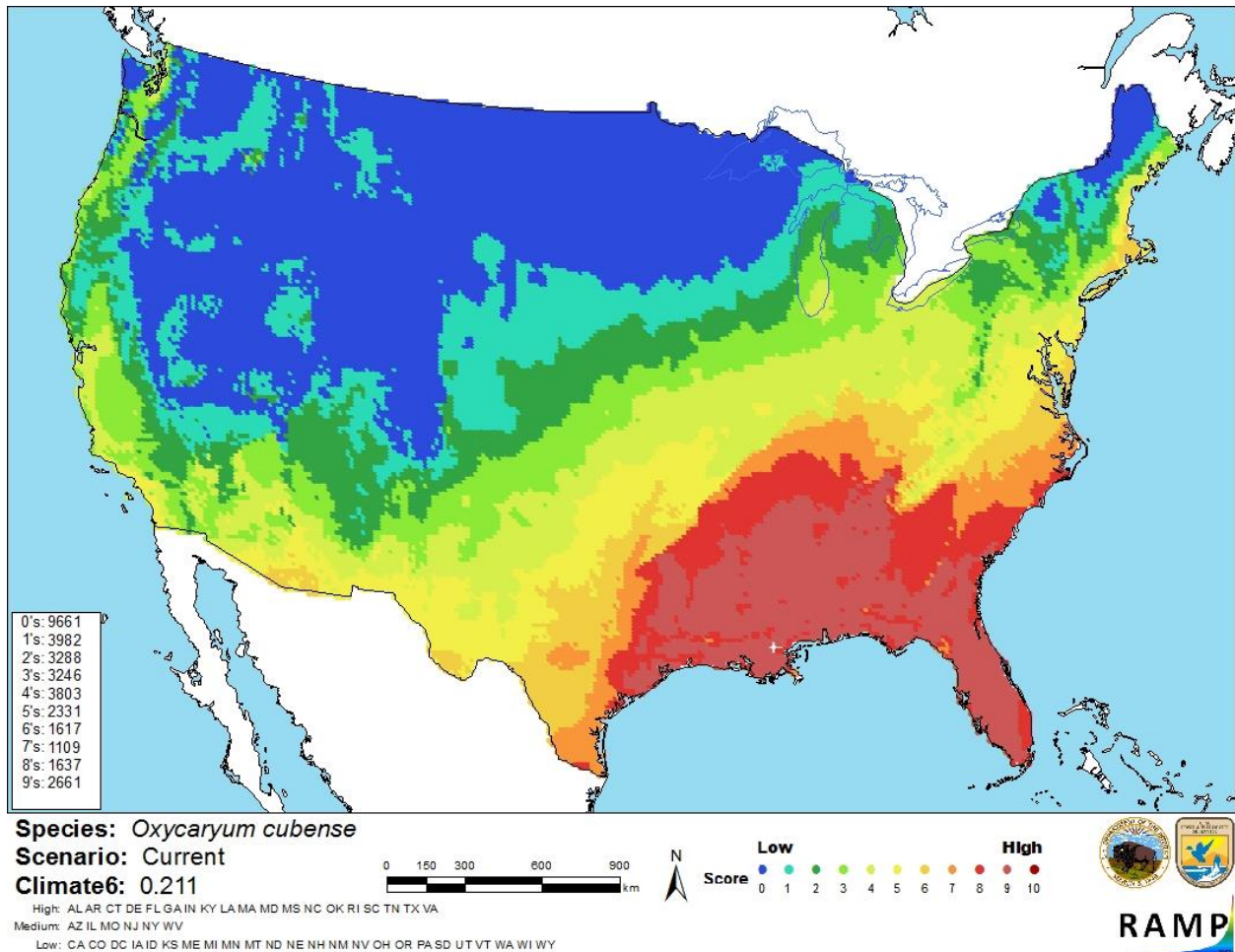
### Summary of Climate Matching Analysis

The climate match for *Oxycaryum cubense* was high in the southeast. High match areas were centered on the areas with already known populations. The northeast and most of the west had low matches, everywhere else had a medium match. The Climate 6 score (Sanders et al. 2014; 16 climate variables; Euclidean distance) for the contiguous United States was 0.211, high (scores 0.103 and greater are classified as high). About half the States had low individual Climate 6 scores. Alabama, Arkansas, Connecticut, Delaware, Florida, Georgia, Indiana, Kentucky, Louisiana, Maryland, Massachusetts, Mississippi, North Carolina, Oklahoma, Rhode Island, South Carolina, Tennessee, Texas, and Virginia had high individual Climate 6 scores and Arizona, Illinois, Missouri, New Jersey, New York, and West Virginia had medium scores.



**Figure 4.** RAMP (Sanders et al. 2014) source map showing weather stations in North and South America, sub-Saharan Africa, and Madagascar selected as source locations (red) and non-source locations (gray) for *Oxycaryum cubense* climate matching. Source locations from BISON (2018), GBIF Secretariat (2018), and McLaurin and Wersal (2018). 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. 2014) climate matches for *Oxycaryum cubense* in the contiguous United States based on source locations reported by BISON (2018), GBIF Secretariat (2018), and McLaurin and Wersal (2018). Counts of climate match scores are tabulated on the left. 0 = Lowest match, 10 = Highest match.

The High, Medium, and Low Climate match Categories are based on the following table:

Climate 6: Proportion of (Sum of Climate Scores 6-10) / (Sum of total Climate Scores)	Climate Match Category
$0.000 \leq X \leq 0.005$	Low
$0.005 < X < 0.103$	Medium
$\geq 0.103$	High

## 7 Certainty of Assessment

Certainty of this assessment is medium. There are some gaps in information for this species but they do not hinder the assessment. Some information about the distribution is unclear on native or introduced status but at least one introduction is clearly outlined in the literature. Peer-reviewed literature exists discussing the introduction history and impacts from those introductions.

## 8 Risk Assessment

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### Summary of Risk to the Contiguous United States

Cuban bulrush (*Oxycaryum cubense*) is an aquatic macrophyte native to South America and is cryptogenic in Central America and Africa. The history of invasiveness for *O. cubense* is high. It has been documented as introduced in the southern United States and has impacted biodiversity and navigation and recreational use of waterways. The climate match is high. The areas of highest match are concentrated around already established populations in the southeastern United States. The certainty of assessment is medium. The overall risk assessment category is high.

### Assessment Elements

- **History of Invasiveness (Sec. 3): High**
- **Climate Match (Sec. 6): High**
- **Certainty of Assessment (Sec. 7): Medium**
- **Remarks/Important additional information:** No additional remarks.
- **Overall Risk Assessment Category: High**

## 9 References

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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 10.**

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## 10 References Quoted But Not Accessed

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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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