

Overview of Aquatic Invasive Plants in South Carolina

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Resources



Overview of Aquatic Invasive Plants in South Carolina

- I'm not necessarily an expert on invasive aquatics – just where they are and what habitats they're in
- The *SCDNR Botany & Plant Conservation Program* – my staff and I, are active in documenting ALL plants in the state, native and exotic, and classifying invasiveness
- Our goal is to not just track, but detect threats and work with an EDRR program on eradication of new threats

Overview of Aquatic Invasive Plants in South Carolina

- This talk:
 - Definitions of native, established, and invasive species
 - How aquatic invasives are bucking the lingo
 - About South Carolina's flora overall
 - How invasives are coming into SC – the rate and from where
 - A new(ish) South Carolina Invasive plant list
 - An overview of Aquatic Invasive Plants in South Carolina
 - Some unregulated newcomers to the Aquatic Invasive guild
 - EDRR

Aquatic Invasive Plants Definitions – A Tower of Babel

THE BOTANY TOWER OF BABEL: OVERLAPPING & CONFLICTING DEFINITIONS



South Carolina (Saint Andrews area)

COMMON CONFUSION:
Definitions vary by region,
agency, and intended use.
Leading to conceptual drift
& public misunderstanding.



Definitions (for this talk)

- **Non-Native Plant (“exotic”):** A plant introduced with human help (intentionally or accidentally) after 1492 to a new place or new type of habitat where it was not previously found. Includes cultivated plants. We have no catalogue of them all.
- **Established Plant (“naturalized exotic”):** A non-native plant that does not need human help to reproduce and maintain itself over time in an area where it is not native. We have about 1,199.
- **Invasive Plant (“invasive exotic”):** A plant that is both non-native and able to establish on many sites, grow quickly, and spread to the point of disrupting plant communities or ecosystems.

Common foxglove (*Digitalis purpurea*)

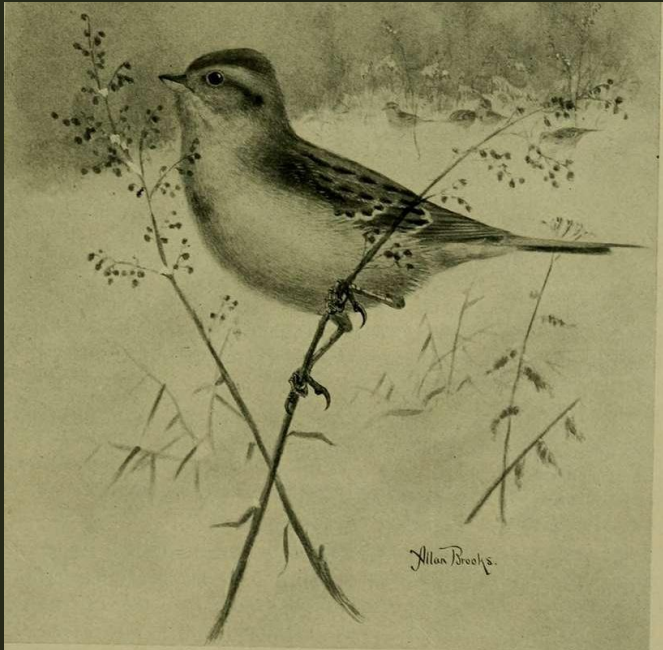


Definitions (for this talk)

- **Established Plant (“naturalized exotic”)**: A non-native plant that does not need human help to reproduce and maintain itself over time in an area where it is not native. We have about 1,199.
- Christopher Columbus didn't record all our native plants 😞



Definitions (for this talk)

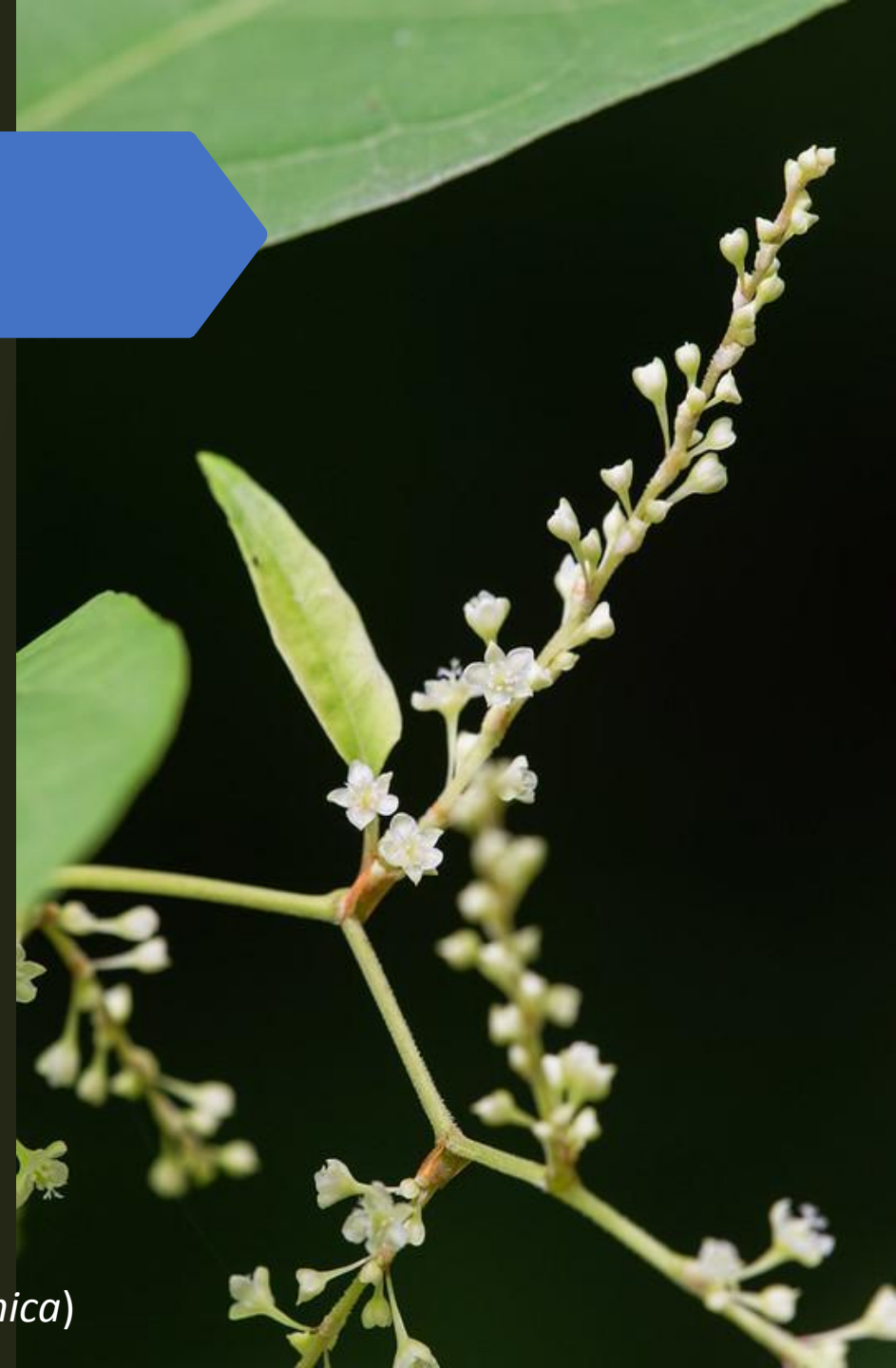


Florida false beardgrass (*Chrysopogon pauciflorus*)

Definitions

- **Invasive Plant (“invasive exotic”)**: A plant that is both established, and in natural areas, and can spread to the point of disrupting plant communities or ecosystems.

Japanese knotweed (*Reynoutria japonica*)



Definitions

- **Plant Communities or Ecosystems:** Habitats that are not significantly altered by human activity

i.e. nicer places without a lot of human disturbance and most ecological processes still intact like fire regime and hydrology



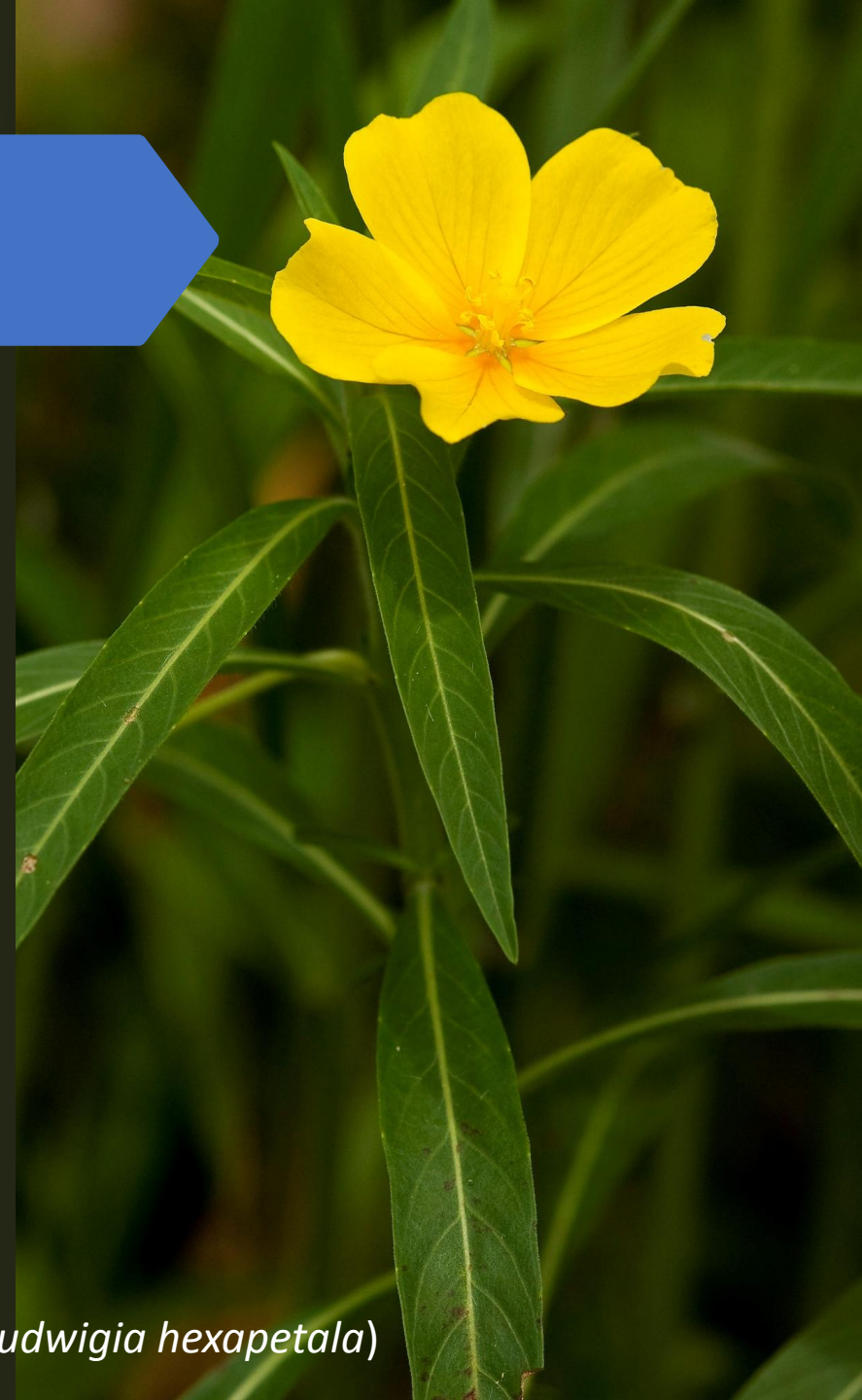
Purple savanna milkweed (*Asclepias rubra*)

Aquatic Confoundment

- **Aquatic Invasives**

Don't fit in the typical IPC/EPPC concept of "invasive in natural areas"

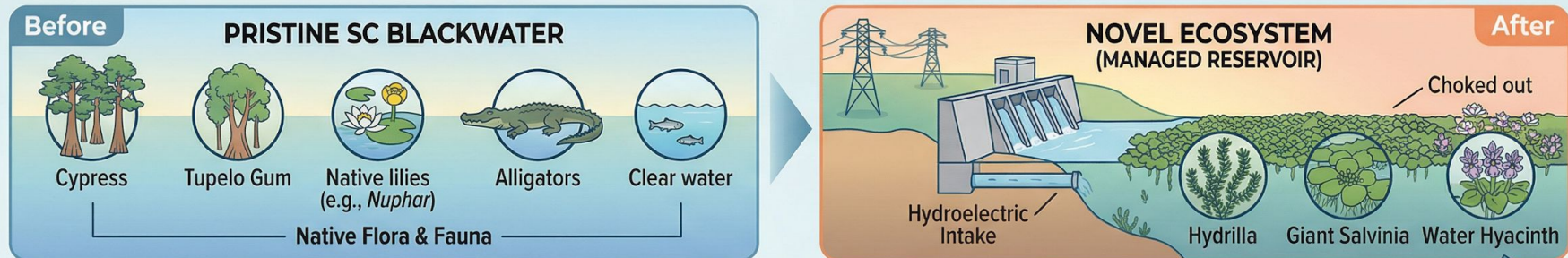
Common water-primrose (*Ludwigia hexapetala*)



Aquatic Confoundment – Novel Ecosystems

SOUTH CAROLINA'S NOVEL AQUATIC ECOSYSTEMS: DEFINED BY INVASIVES & INFRASTRUCTURE

TRANSFORMATION: FROM NATIVE TO NOVEL



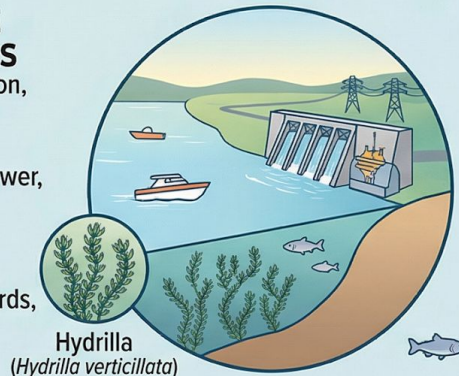
KEY NOVEL SC HABITATS & THEIR INVASIVES

1. MAN-MADE RESERVOIRS

(e.g., Lake Marion, Santee Cooper)

- **Infrastructure:** Hydroelectric Power, Cooling Water

- **Impacts:** Clogs Turbines, Navigation Hazards, Clogs Cooling Water Intakes

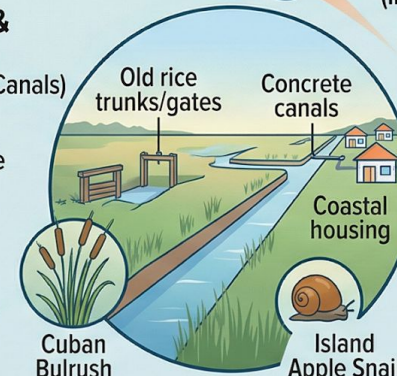


2. NOVEL COASTAL & TIDAL SYSTEMS

(e.g., Rice Fields, Ponds, Canals)

- **Infrastructure:** Abandoned Rice Culture & Culturer (e.g., Trunks), Drainage Canals, Flood Control

- **Impacts:** Creates Floating Islands, Displaces Native Coastal Vegetation



HUMAN IMPACT/MODIFICATION
(Infrastructure & Climate)

STATE-FUNDED MANAGEMENT
(e.g., SCDNR)



South Carolina's Flora

- 4,280 plants documented as wild in the state
- 1,199 (28%) are Established
- 130 are Invasive in natural areas (IPC)



South Carolina's Flora

About five new plants become detected each year in South Carolina
- The origins are variable -



Autumn fern - gardens



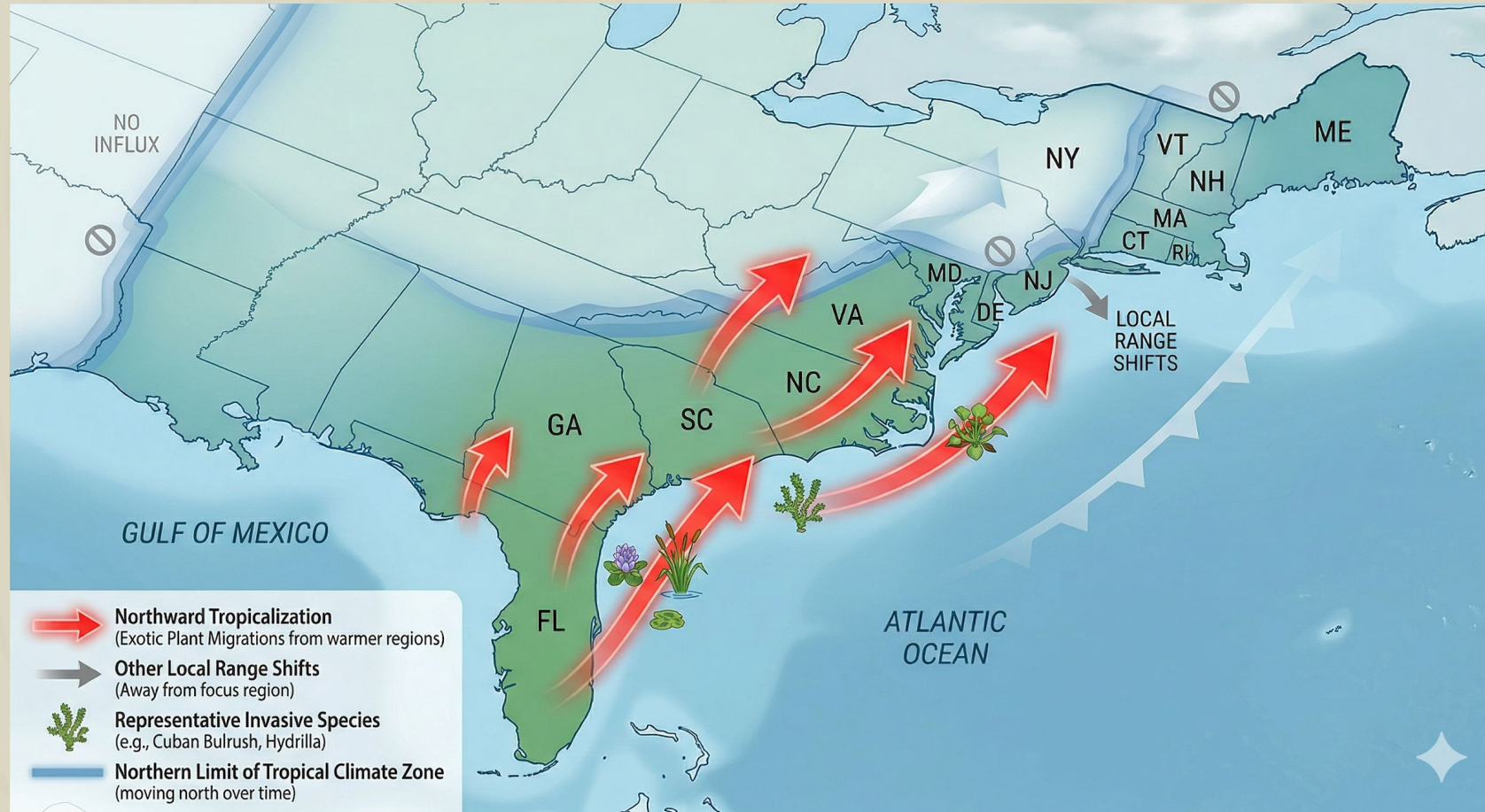
Brazilian-pepper – migrating north



Yellow wort – Europe?

South Carolina's Flora

About five new plants become detected each year in South Carolina
- The origins are variable – but expansions almost all from south



SC Exotic Pest Plant Council 2014: The last list

South Carolina Exotic Pest Plant Council Terrestrial Exotic Invasive Species List 2014				
<i>(list by Growth Form and by Severity of Threat) / Range based on SC Plant Atlas/EDDMapS Database</i>				
Form	Threat Category	Common Name	Scientific Name	Range
Tree	Severe Threat	Tree of heaven*	<i>Ailanthus altissima</i> *	ALL
Tree	Severe Threat	Chinaberry	<i>Melia azedarach</i>	ALL
Tree	Severe Threat	Princess Tree/Royal Paulownia*	<i>Paulownia tomentosa</i> *	ALL
Tree	Severe Threat	Chinese Tallow Tree*	<i>Triadica sebifera</i> *	PCP
Tree	Significant Threat	Mimosa, Silk tree	<i>Albizia julibrissin</i>	ALL
Tree	Significant Threat	Paper Mulberry	<i>Broussonetia papyrifera</i>	ALL
Tree	Significant Threat	Chinese Parasol Tree	<i>Firmiana simplex</i>	ALL
Tree	Significant Threat	White Mulberry	<i>Morus alba</i>	ALL
Tree	Significant Threat	White Poplar*	<i>Populus alba</i> *	ALL
Tree	Significant Threat	Callery Pear (Bradford Pear)	<i>Pyrus calleryana</i>	ALL
Tree	Emerging Threat	Camphortree	<i>Cinnamomum camphora</i>	CP
Tree	Alert	Russian-olive*	<i>Elaeagnus angustifolia</i> *	MP
Tree	Alert	Sawtooth Oak	<i>Quercus acutissima</i>	ALL
Tree	Alert	Chinese Elm	<i>Ulmus parvifolia</i>	ALL

South Carolina Invasive Pest Council

The 2024 list: Ignoring the Law

Forum

An Analysis of US State Regulated Weed Lists: A Discordance between Biology and Policy

VASILIIY T. LAKOBA, RACHEL K. BROOKS, DAVID C. HAAK, AND JACOB N. BARNEY

Weedy and invasive plants threaten our food supply, native biodiversity, and the structure and function of ecosystems. The number and impact of these damaging plants are expected to continue to grow with ongoing global change. Some of the most common policy tools to help mitigate this threat are regulatory weed lists, which limit the importation and movement of listed plant species, but there has never been a comprehensive analysis of plants regulated in the United States. We analyzed US state regulatory lists (e.g., noxious, invasive, prohibited) to evaluate their composition, patterns of listing, congruities with weed distributions, and limitations. In total, 46 states maintain regulatory weed lists that include 3210 total listings of 1249 unique species; 48% of them are introduced, 40% are native, and 12% are not yet found in the United States. Overall, the listed species are not a good reflection of the weeds in each state, and listing appears largely reactive, regulating species after they become widespread. We highlight patterns and incongruities among lists and discuss their implications, especially the large number of regulated species native to the United States.

Keywords: agricultural weeds; invasive plants; noxious weeds; policy; risk assessment; weed prevention

The 2024 list: Ignoring the Law

Lakoba et al. (2020): Overall, the **listed species are not a good reflection of the weeds in each state, and listing appears largely reactive**, regulating species after they become widespread.

Johnson (2021): Previous scholarship has shown that **regulatory lists do not capture the actual extent of plant invasions and are largely reactive, so non-regulatory listing groups such as “invasive plant councils” work to fill this leadership gap**. However, differences in the intent, listing methods, and transparency of the listing process could lead to inconsistencies in list accuracy/efficacy and hinder effective list implementation.


Making the 2024 list

Myself, Sudie, Dena started working on a new version

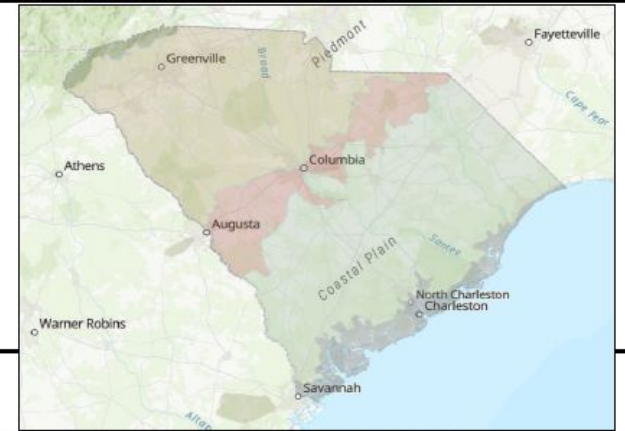


The 2024 SC Invasive Species Council List

130 Species

SCIPC Invasive Exotic Plant List Updated July/2024	This list of invasive-exotic plants in South Carolina was developed by the SC-Invasive Pest Council (SC-IPC), formerly known as the SC EPPC (SC Exotic Pest Plant Council), in collaboration with natural resource professionals working in the fields of biology, forestry, botany, wildlife/habitats, and land management in South Carolina. Definitions, distribution map, and resources follow the list.	C a t e g o r y	Please report observations of invasive exotic plant species to EDDMapS at https://www.eddmaps.org/ so that more complete occurrence information is documented and available.	
Growth Form	Common Name		Scientific Name 2024	
Tree	Siberian Elm, Dwarf Elm	II	<i>Ulmus pumila</i>	CZ, CP, S, P
Vine	Green kiwi-fruit, Chinese gooseberry	II	<i>Actinidia chinensis var. deliciosa</i>	M
Vine	Fiveleaf akebia, Chocolate Vine	II	<i>Akebia quinata</i>	P, M
Vine	Porcelain berry	II	<i>Ampelopsis glandulosa</i>	P, M
Vine	Climbing Euonymus, Winter Creeper	II	<i>Euonymus fortunei</i>	ALL
Vine	Bigleaf Periwinkle	II	<i>Vinca major</i>	ALL
Vine	Common Periwinkle	II	<i>Vinca minor</i>	ALL

SC-IPC Definitions of Terms	
Exotic	a species introduced into South Carolina, either by intentional or unintentional means, that belongs to a natural range outside of South Carolina.
Native	a species whose natural range includes South Carolina
Naturalized	an exotic plant species that is able to establish and sustain itself outside of cultivation
Invasive Exotic	an exotic plant species that has naturalized in an area and is expanding on its own in South Carolina native plant communities
Region	refers to the general area in South Carolina each species is distributed or has been recorded as established. Does not indicate range within the state of SC
Regions (SC Ecoregions/SC Wildlife Action Plan)	
CZ=	Coastal Zone
CP=	Coastal Plain
S=	Sandhills
P=	Piedmont
M=	Mountains/Blue Ridge
ALL=	occurs in all SC regions
Resources	
SC Native Plant Society: Issues and alternatives - https://scnps.org/invasive-plant-species/	
SCDNR: management - https://www.dnr.sc.gov/invasiveweeds/program.html	
SCDNR: SC illegal aquatic plants - https://www.dnr.sc.gov/invasiveweeds/illegal1.html	
SC Department of Plant Industry: illegal plants - https://www.clemson.edu/public/regulatory/plant-industry/plant-pest-regulations/state-plant-pest-information/pests_list.html	
USDA Federal Noxious Weed list: https://www.ams.usda.gov/sites/default/files/media/StateNoxiousWeedsSeedList.pdf	



2014 → 2024

- **Now a status list – Is it invasive in South Carolina, or isn't it?**
 - Non-invasives aren't on the list
 - Only species in South Carolina are on the list
 - Invasives, by definition, occur in natural communities
- List includes any kind of vascular plant, **including aquatics**, if criteria are met
- Scientific and Common Names follow the Flora of the Southeastern United States
- Mapping follows physiographic regions that will be in 2025 State Wildlife Action Plan

2014 → 2024

- Binary Choice:
 - **Category I:** Invasive-exotic plants that are known to cause significant threat to native plant communities by displacing native species and impacting plant communities negatively through changes to composition, structure or ecological function, or hybridizing with natives. **76 Species.**
 - **Category II:** Invasive exotics that have increased in abundance or frequency but have not yet altered South Carolina plant communities to the extent shown by Category I species. These species may become Category I. **54 Species.**

2014 → 2024 (Types of Changes)



Aquatics Now Listed:

State and Federal lists contain species not in the state, and don't list all species that are invasive aquatics in South Carolina



Giant salvinia (*Salvinia molesta*) – Cat I

Parrot-feather (*Myriophyllum aquaticum*)

2014 → 2024 (Types of Changes)



Garlic mustard (*Alliaria petiolata*)

DELETIONS

Species not in South Carolina:
State and Federal lists contain species not in the state, and don't list all species that are invasive aquatics in South Carolina



Old World climbing fern (*Lygodium microphyllum*)

2014 → 2024 (Types of Changes)



Leo Klemm 2007

Asiatic witchweed (*Striga asiatica*)

DELETIONS

Ignoring Federal and State Lists: The lists tend to focus on economic threats

South Carolina Code of Regulations Chapter 27 Article 10: 27-135. Designation of Plant Pests.

88 Stat. 2148 - Federal Noxious Weed Act

2014 → 2024 (Types of Changes)



Basketgrass (*Arthraxon hispidus*)
Cat II



Chinese holly (*Ilex cornuta*), Cat I

ADDITIONS

Species overlooked as invasive in South Carolina: Species that are mainly just becoming invasive, even though they have been present in the state for some time

2014 → 2024 (Types of Changes)



Cuban bulrush (*Cyperus blepharoleptos*)
Cat I

ADDITIONS

Species recently detected as invasive in South Carolina:
Newly discovered as invading in the state (some are also newly discovered in the state, and happen to be invasive)



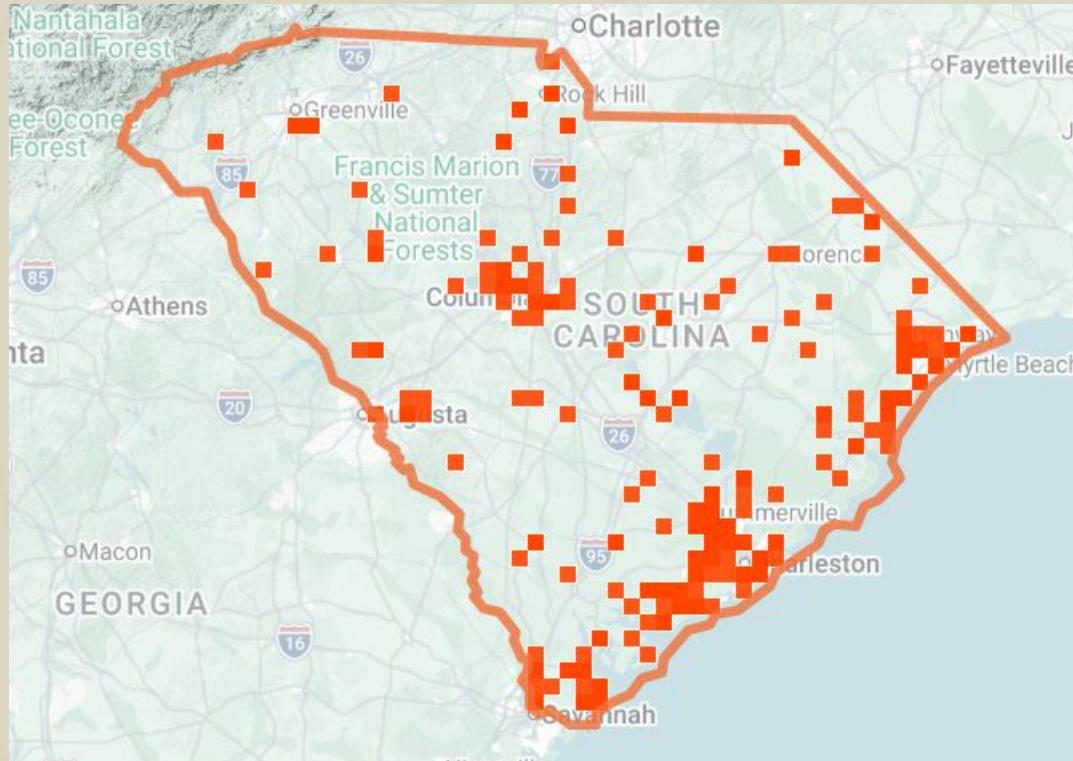
Japanese lady fern (*Deparia petersenii*)
Cat I

Overview of Aquatic Invasive Plants in South Carolina

Should I get to that now?

State-listed Aquatic Invasive Species

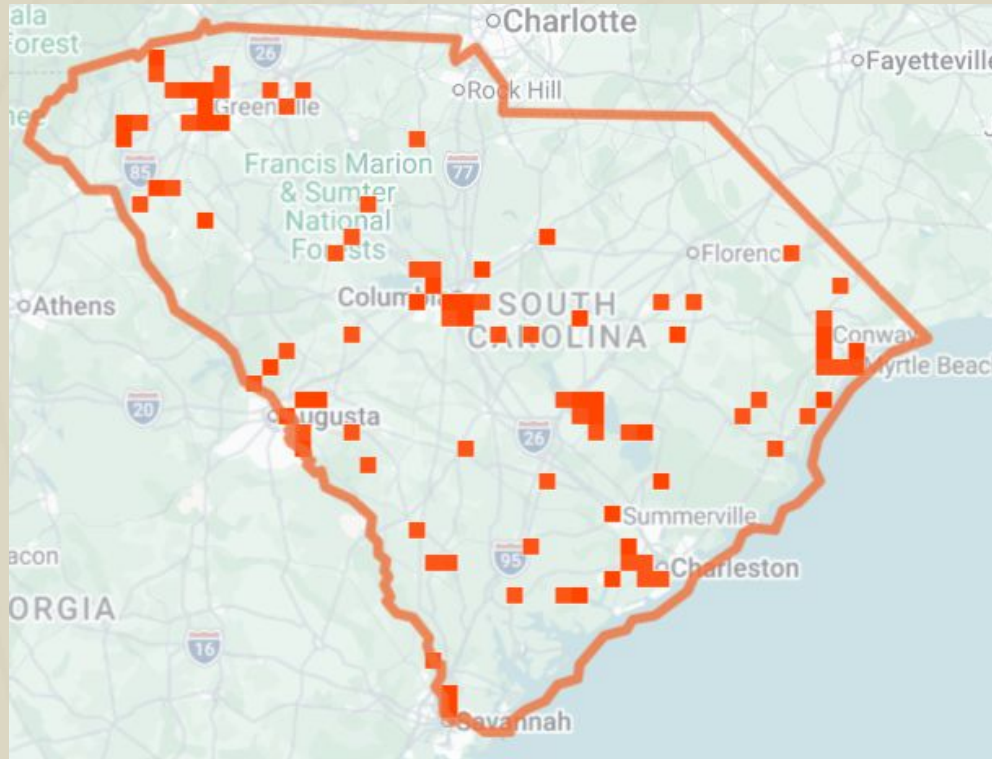
355 iNaturalist Records



Alligatorweed (*Alternanthera philoxeroides*)

State-listed Aquatic Invasive Species

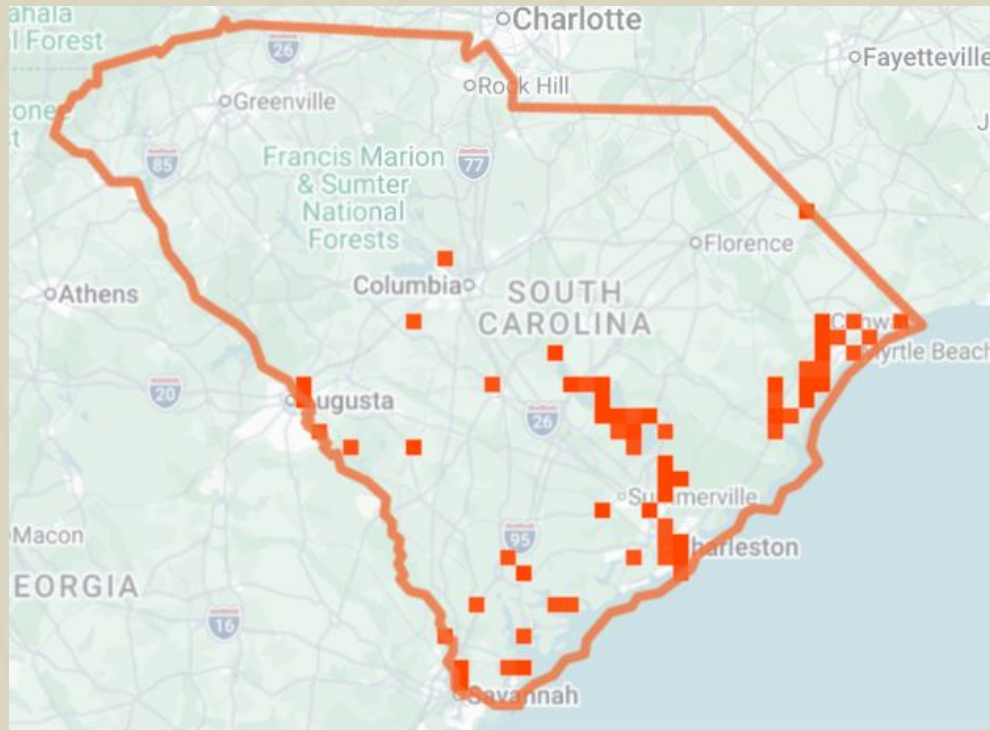
291 iNaturalist Records



Parrot-feather (*Myriophyllum aquaticum*)

State-listed Aquatic Invasive Species

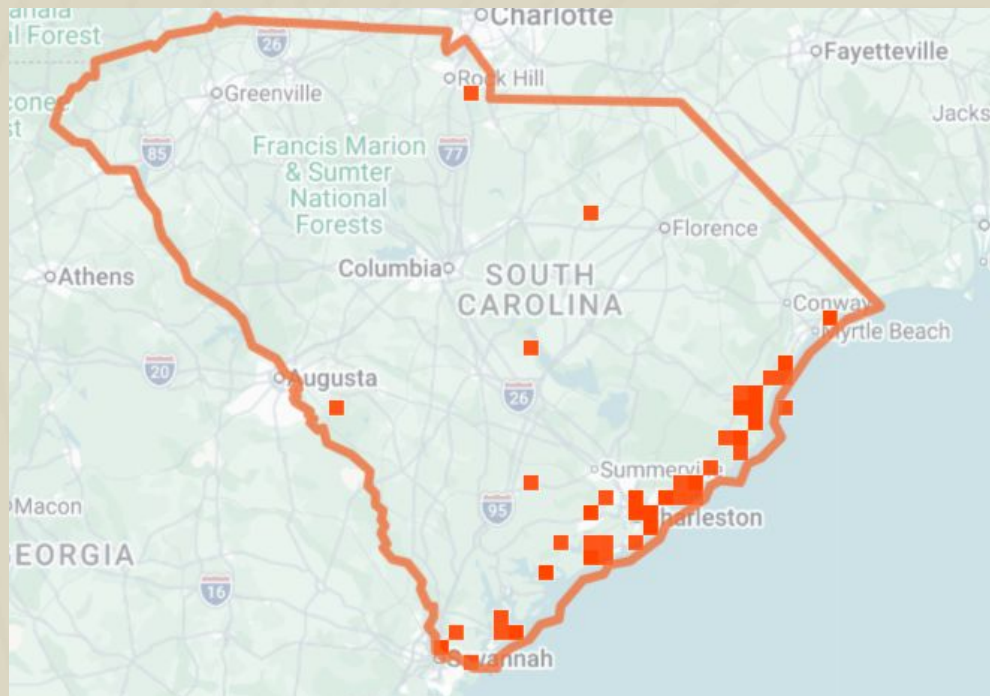
219 iNaturalist Records



Water hyacinth (*Eichhornia crassipes*)

State-listed Aquatic Invasive Species

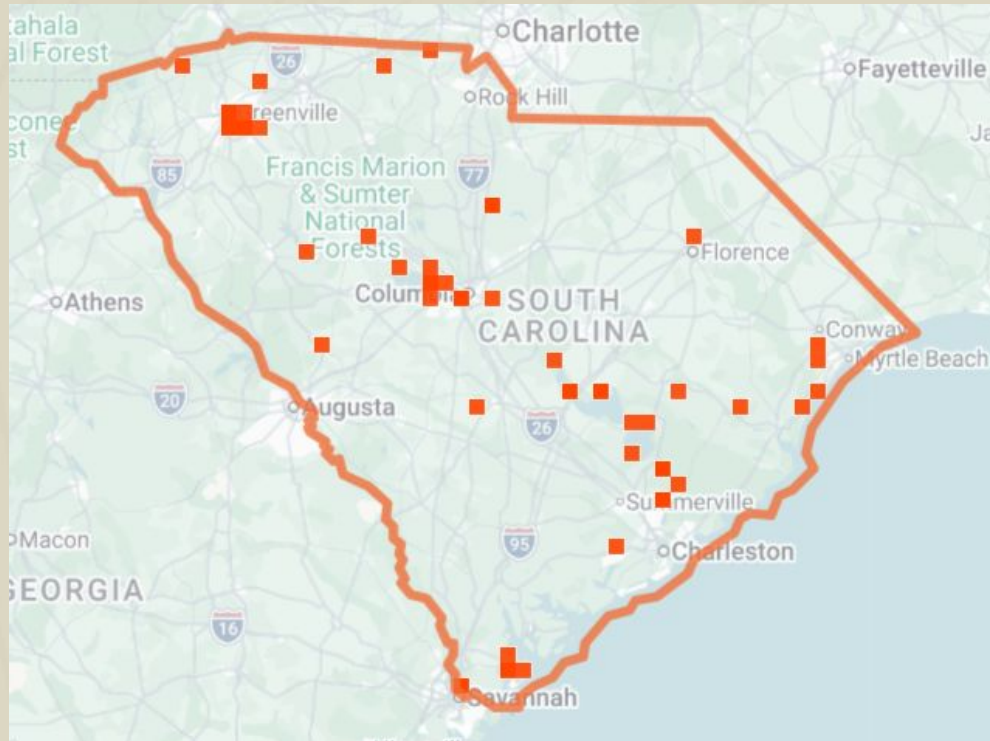
115 iNaturalist Records



Common reed (*Phragmites australis*)

State-listed Aquatic Invasive Species

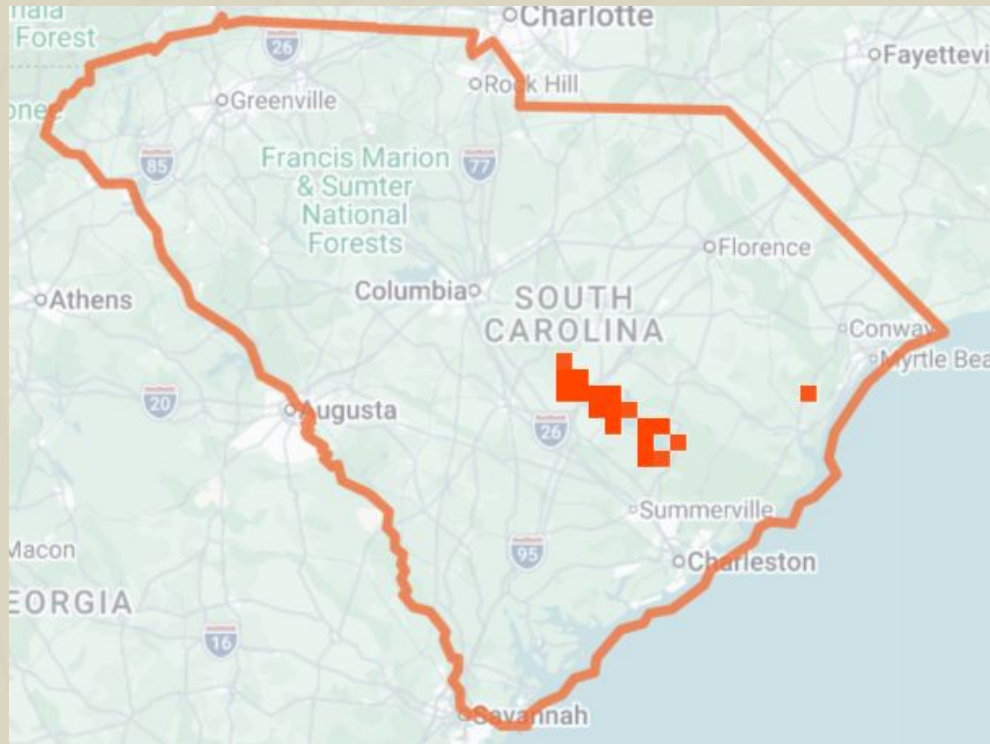
101 iNaturalist Records



Common Water-Primrose (*Ludwigia hexapetala*)

State-listed Aquatic Invasive Species

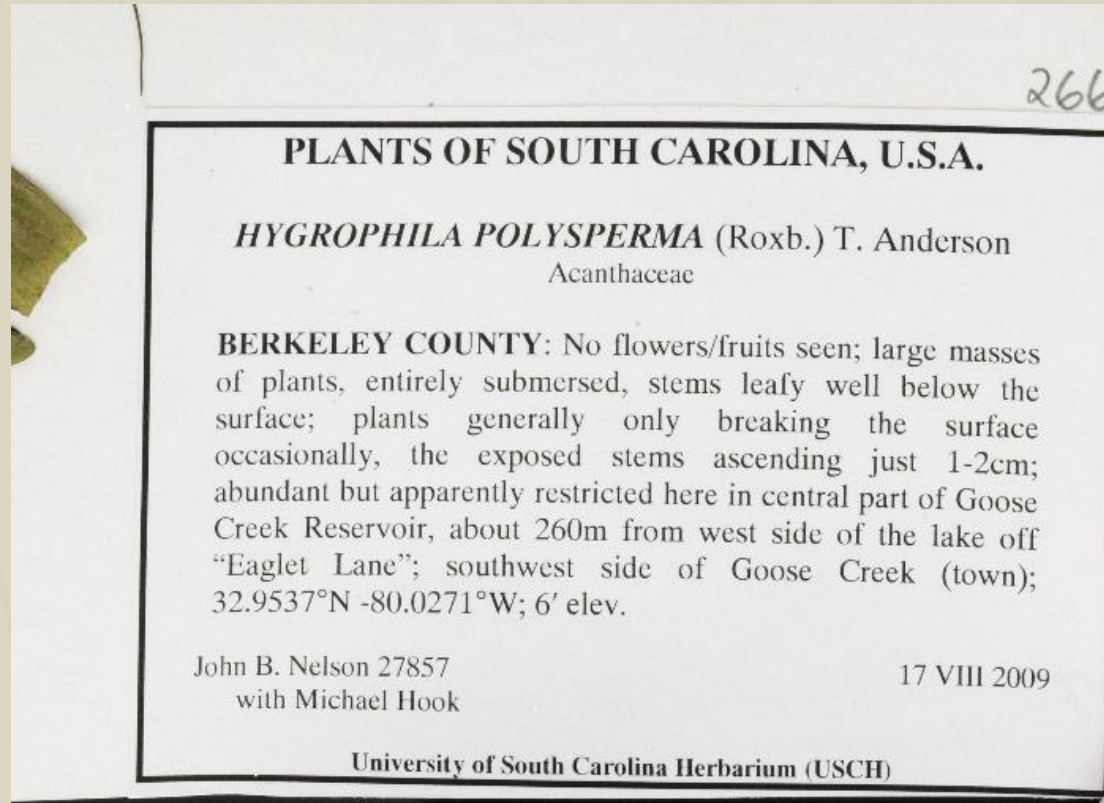
64 iNaturalist Records



Giant salvinia (*Salvinia molesta*) – Cat I

Overlooked Species?

0 iNaturalist Records, one specimen,
needs confirmation

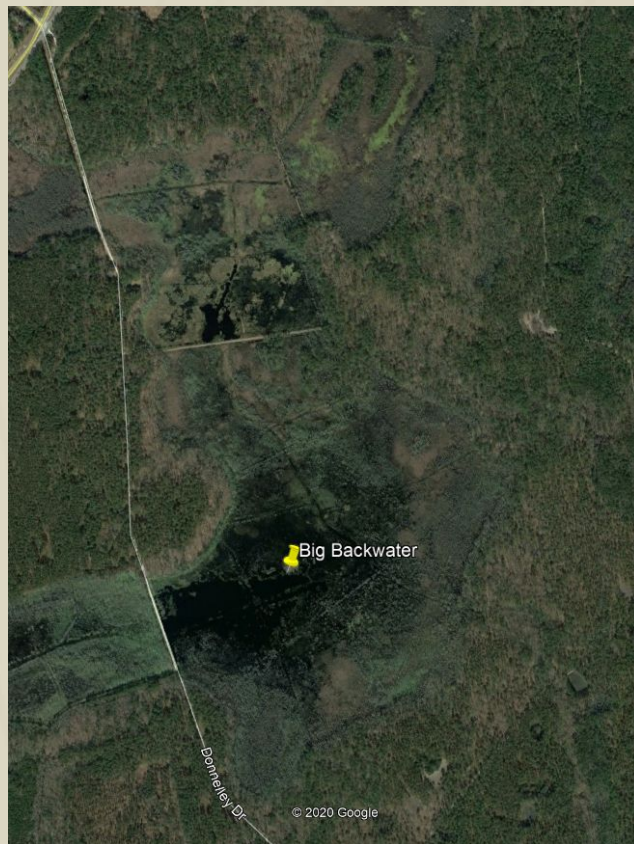


East Indian Swampweed (*Hygrophila polysperma*)

Unregulated Species

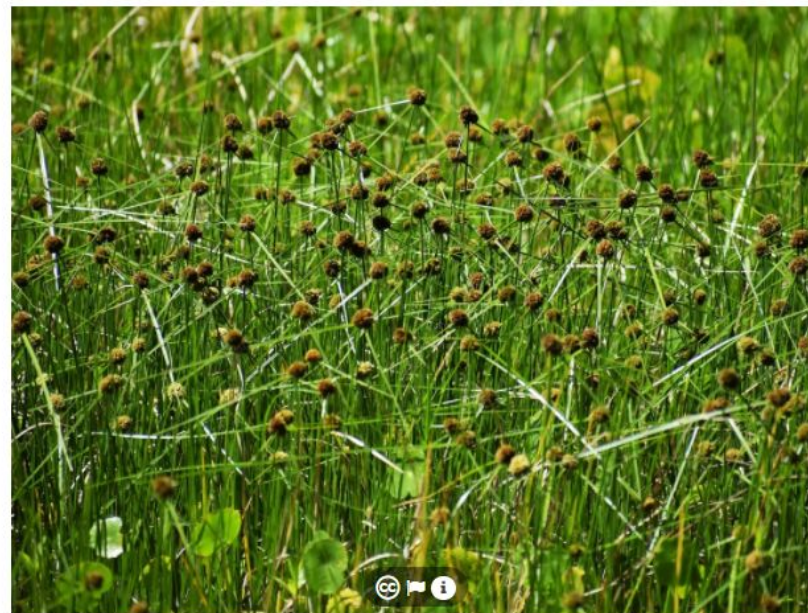
Cyperus blepharoleptos (Cuban bulrush)

- Known from Donnelley WMA for at least 10 years, now covering >100 acres



Cuban Bulrush (*Cyperus blepharoleptos*) Research Grade

Follow



sharleen_j

4,358 observations



Observed:

May 9, 2020 · 3:32 PM EDT

Submitted:

May 10, 2020 · 3:12 PM EDT



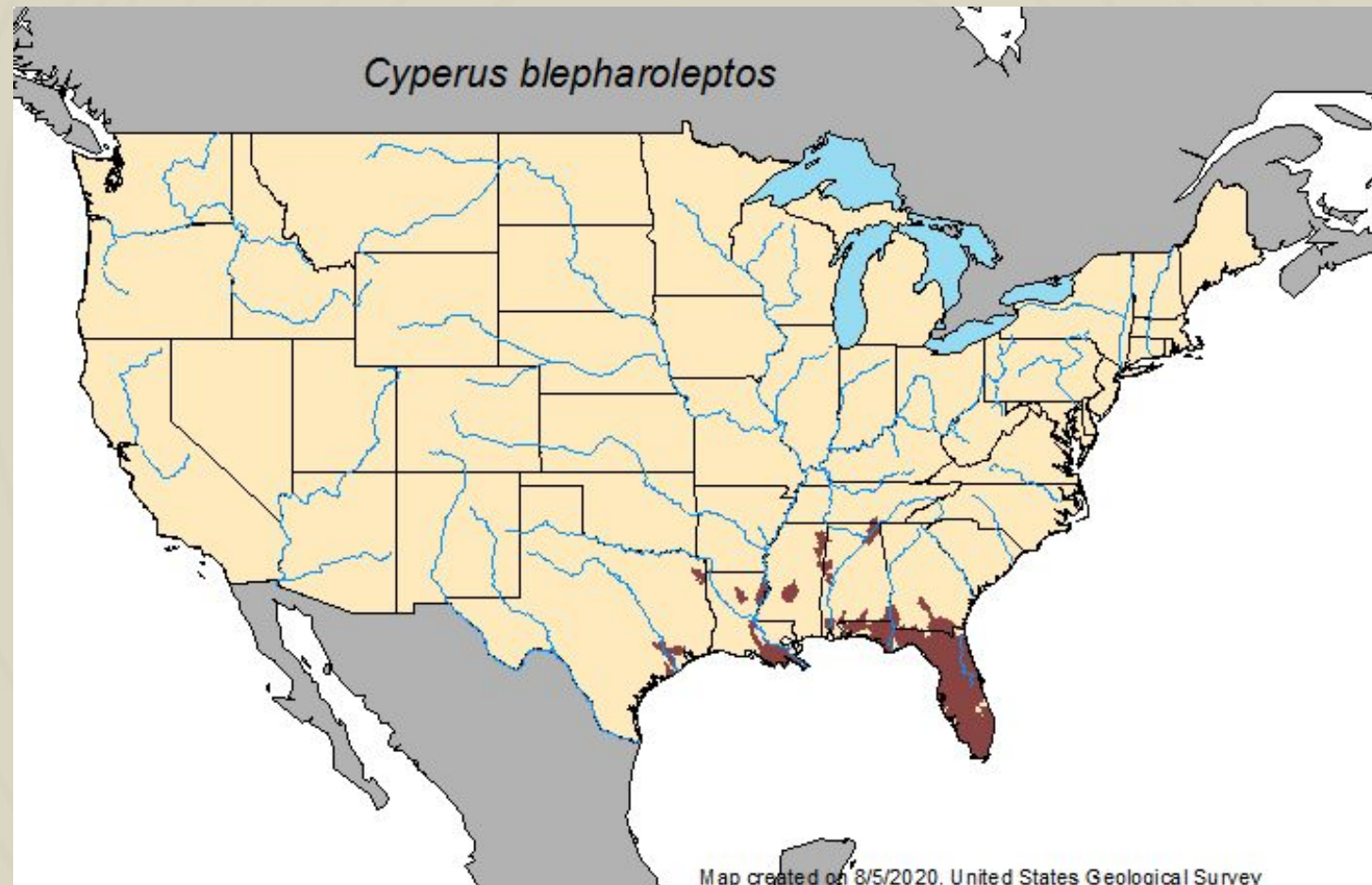
585 Donnelley Dr, Green Pond, SC... [Show](#)

[Details](#)

☆ Be the first to fave this observation!

Cyperus blepharoleptos (Cuban bulrush)

- Tropical American, found in Mobile Bay in late 1800s, spreading northward



Cyperus blepharoleptos (Cuban bulrush)

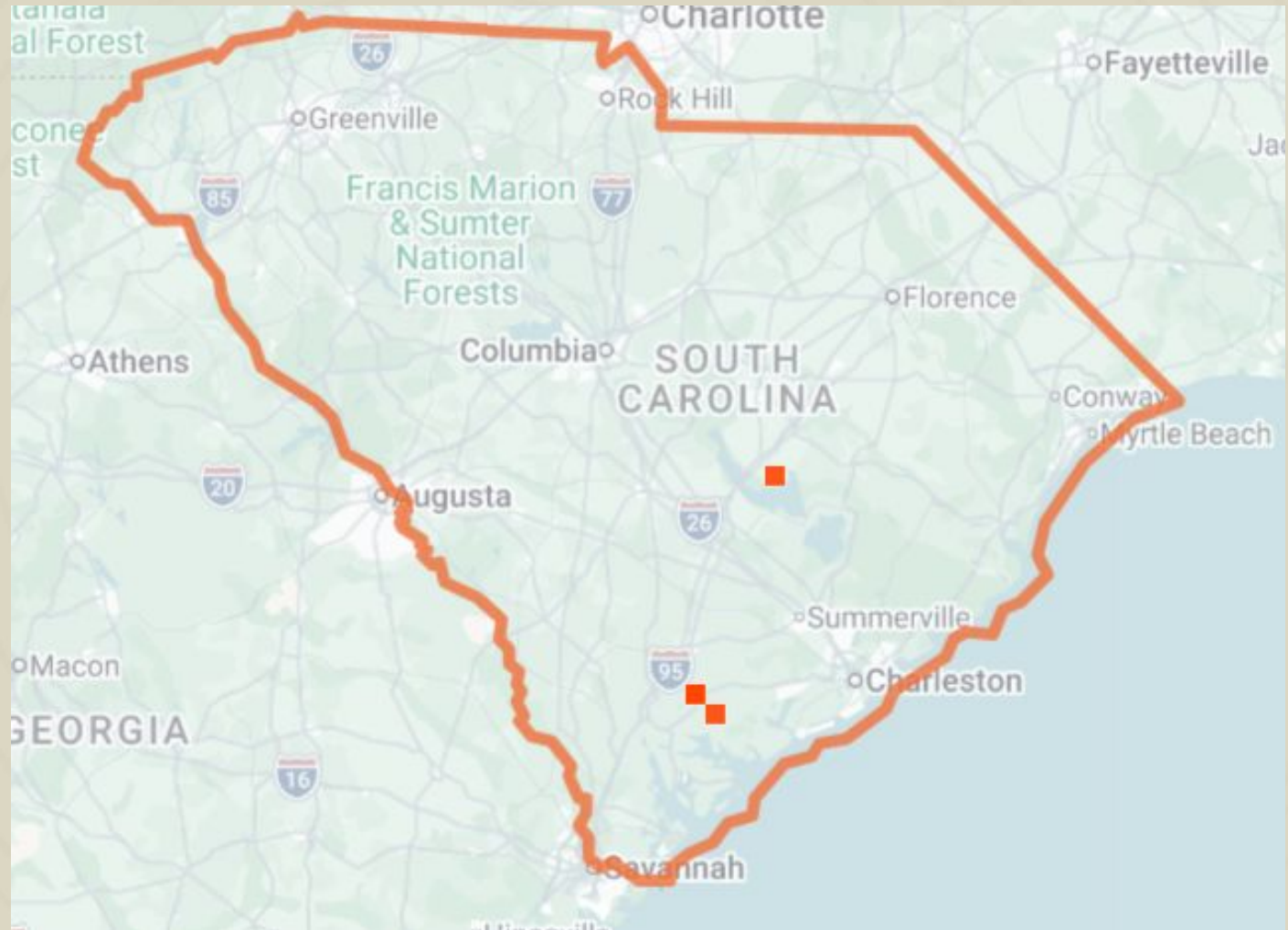


Cyperus blepharoleptos (Cuban bulrush)



Cyperus blepharoleptos (Cuban bulrush)

5 iNaturalist Records
Now known from 3 locations
Threat to Wood Stork nesting



Unregulated Species

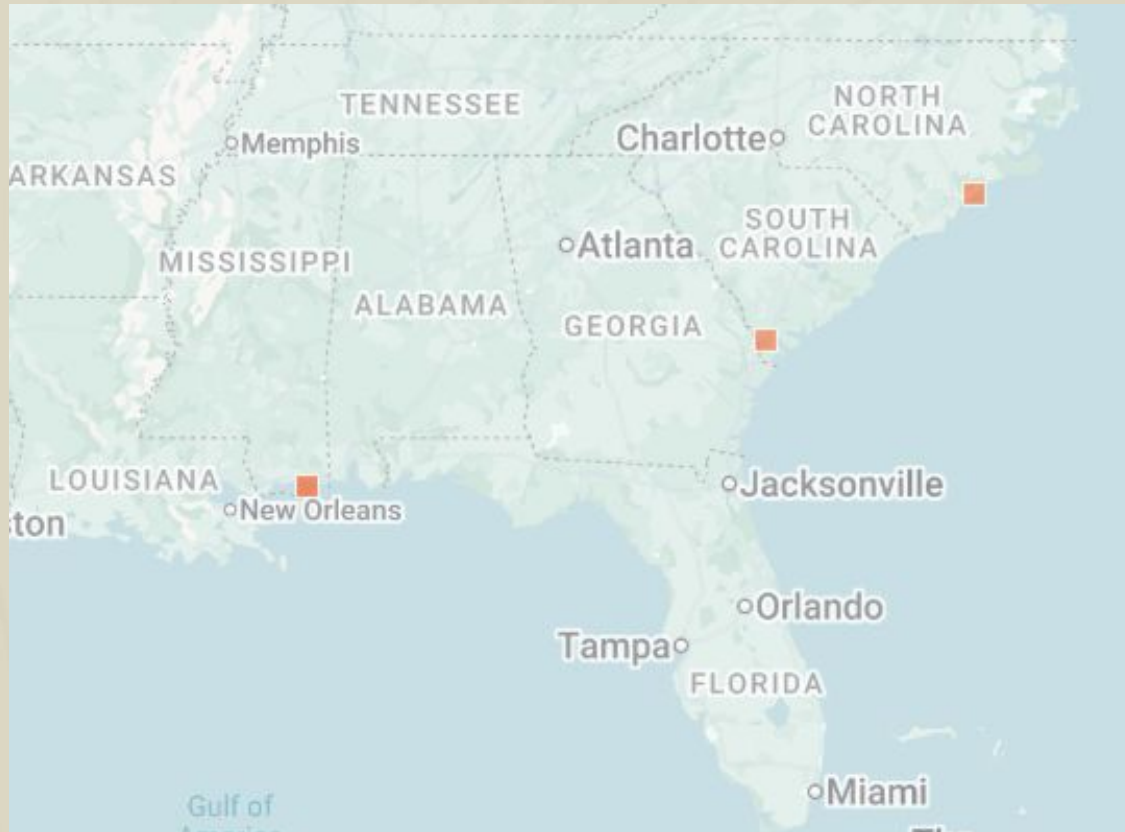
1 iNaturalist Record



Frog's Mouth (*Philydrum lanuginosum*)

Unregulated Species

NC – SC – MS, where next?

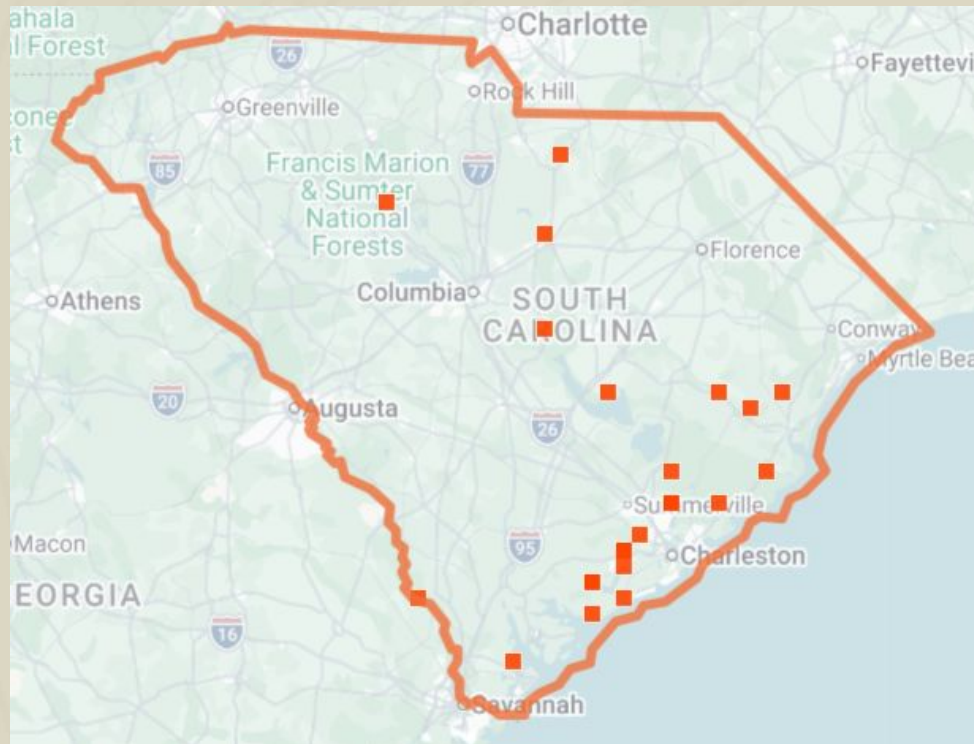


Frog's Mouth (*Philydrum lanuginosum*)



Unregulated Species

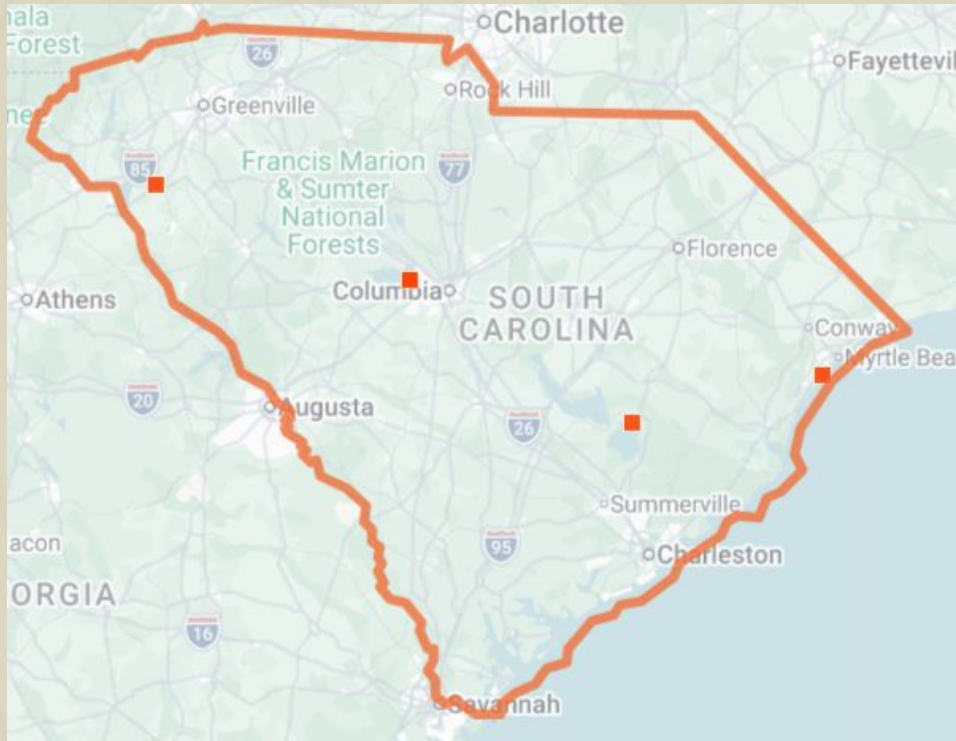
23 iNaturalist Records,
but far more common than data show



Dotted Duckmeat (*Landoltia punctata*)

Unregulated Species

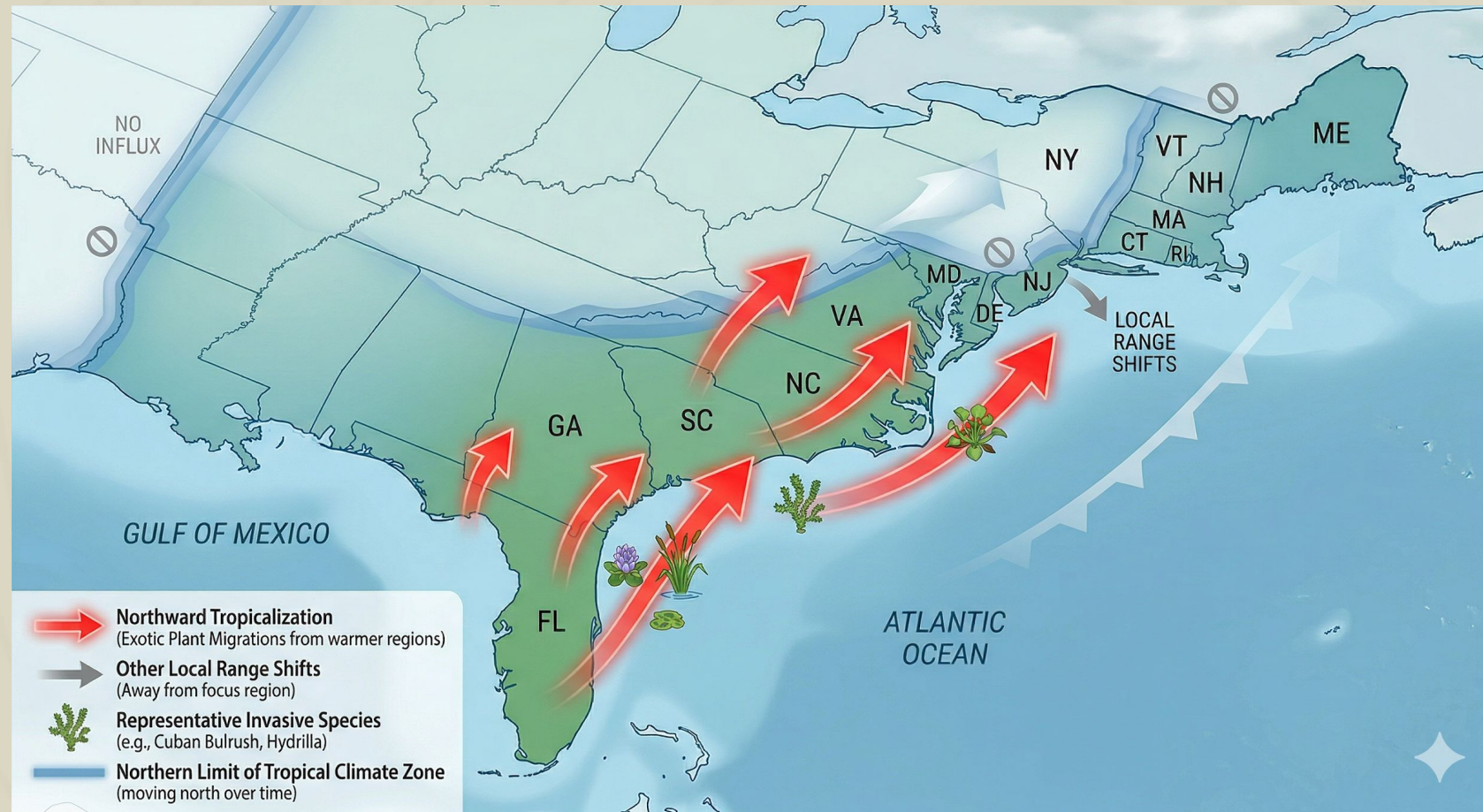
5 iNaturalist Records



Curled pondweed (*Potamogeton crispus*)

South Carolina's Flora – Need for EDRR

About five new plants become detected each year in South Carolina
- The origins are variable – but expansions almost all from south



South Carolina's Flora – Need for EDRR

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