



Assessing the state of Cuban bulrush management across Florida & the Southeastern United States

**Patrick Belk*, Stephen Enloe,
Gray Turnage, & Chris Mudge**



**CENTER FOR AQUATIC
AND INVASIVE PLANTS**

CUBAN BULRUSH, BURHEAD SEDGE

CYPERUS BLEPHAROLEPTOS
FORMERLY OXYCARIUM CUBENSE
INVASIVE, NONNATIVE

PLANT FACT SERIES

NATIVE TO
SOUTH & CENTRAL
AMERICA TO MEXICO



INTRODUCED TO FLORIDA
IN THE LATE 1880S BY MIGRATORY
BIRDS & SHIP BALLAST

EXPANDED FROM A FEW FLORIDA
PUBLIC WATERS
IN THE 1980S TO MORE
THAN HALF IN 2017



GROWS INTO DENSE
MATS THAT OVERGROW AND
OUTCOMPETE NATIVE PLANTS



Overview

- Biological & ecological problems with Cuban bulrush
- Current state of management practices
- Addressing questions with new research
- SURVEY IS LIVE (11/05/24)

qualtrics[®] XM



Starting from seed

- Corky seeds float
- Rest in leaf axils or other notches on floating plants & debris
- Germinates **epiphytically**

Hyacinth rosette
with CB shoots →



Picture: Gray Turnage PhD

Observed host plants

Non-native

- Giant salvinia (*Salvinia molesta*)
- Water hyacinth (*Pontederia crassipes*)
- Alligator weed (*Alternanthera philoxeroides*)
- Water primroses (*Ludwigia* sp.)

Native

- Water pennyworts (*Hydrocotyle* sp.)
- Frog-bit (*Limnobium spongia*)
- Water lettuce (*Pistia stratiotes*)
- Spatterdock (*Nuphar advena*)



Water hyacinth

Frog-bit

Water lettuce

Cuban bulrush in giant salvinia (Louisiana)



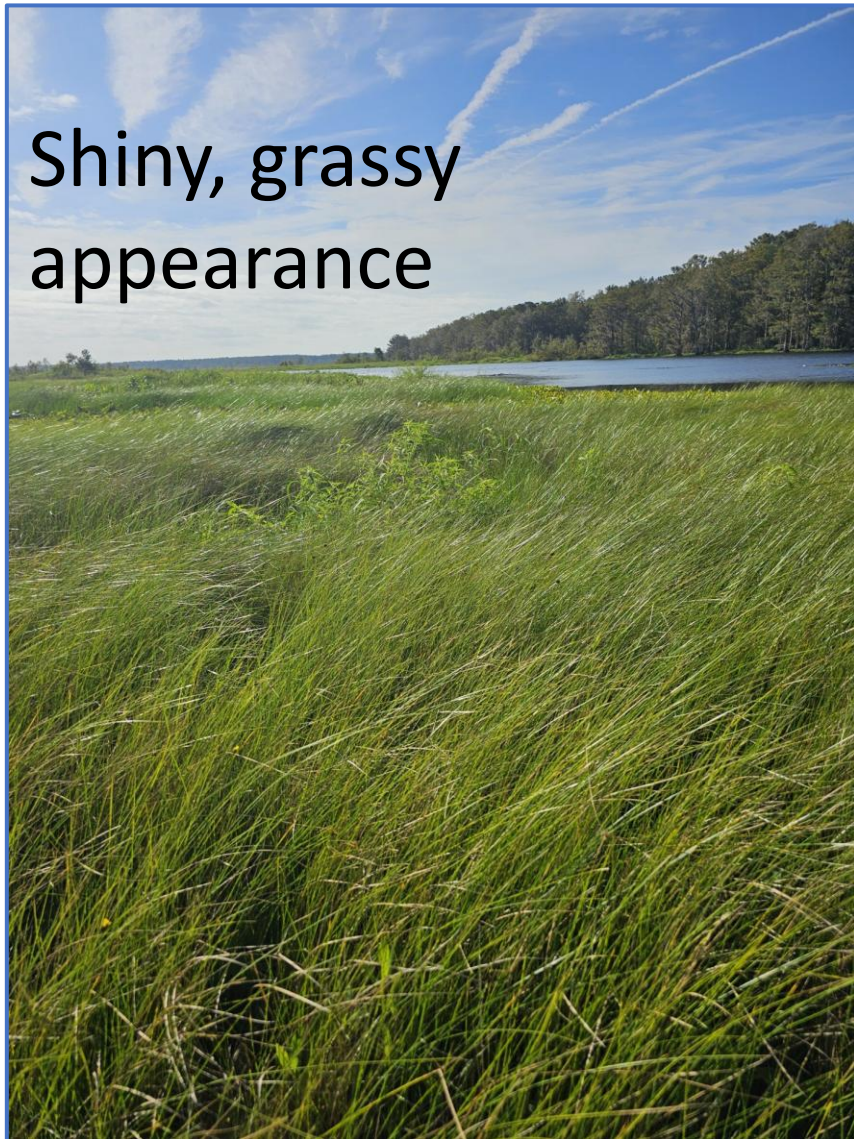
Picture: © Margaret Vincent via iNaturalist

Morphology

- Weak reddish stolons
- Thin stringy roots: very long to 75cm+ (30in)



Picture: Left: UF/IFAS Right: Patrick Belk

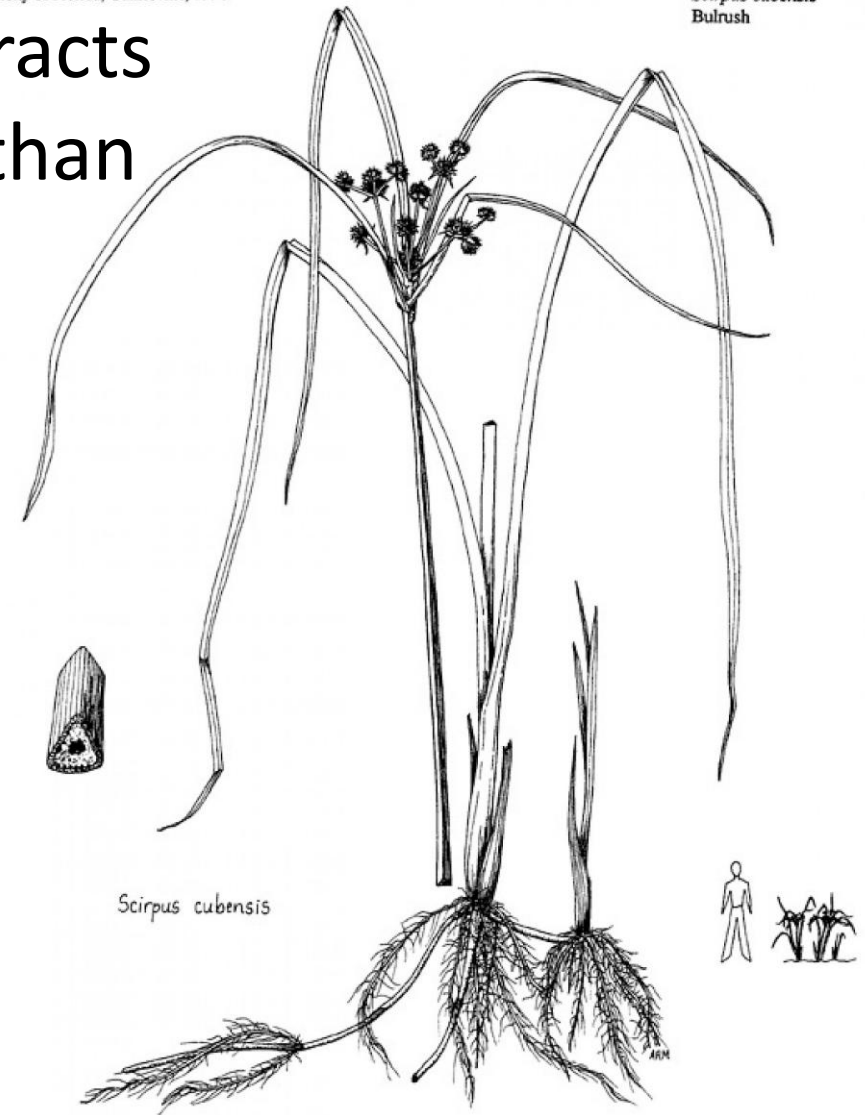


Shiny, grassy
appearance

Leafy bracts
longer than
culm

illustration provided by:
IFAS, Center for Aquatic Plants
University of Florida, Gainesville, 1996

Scirpus cubensis
Bulrush



Scirpus cubensis

Picture: Patrick Belk

Biotypes: two seedheads

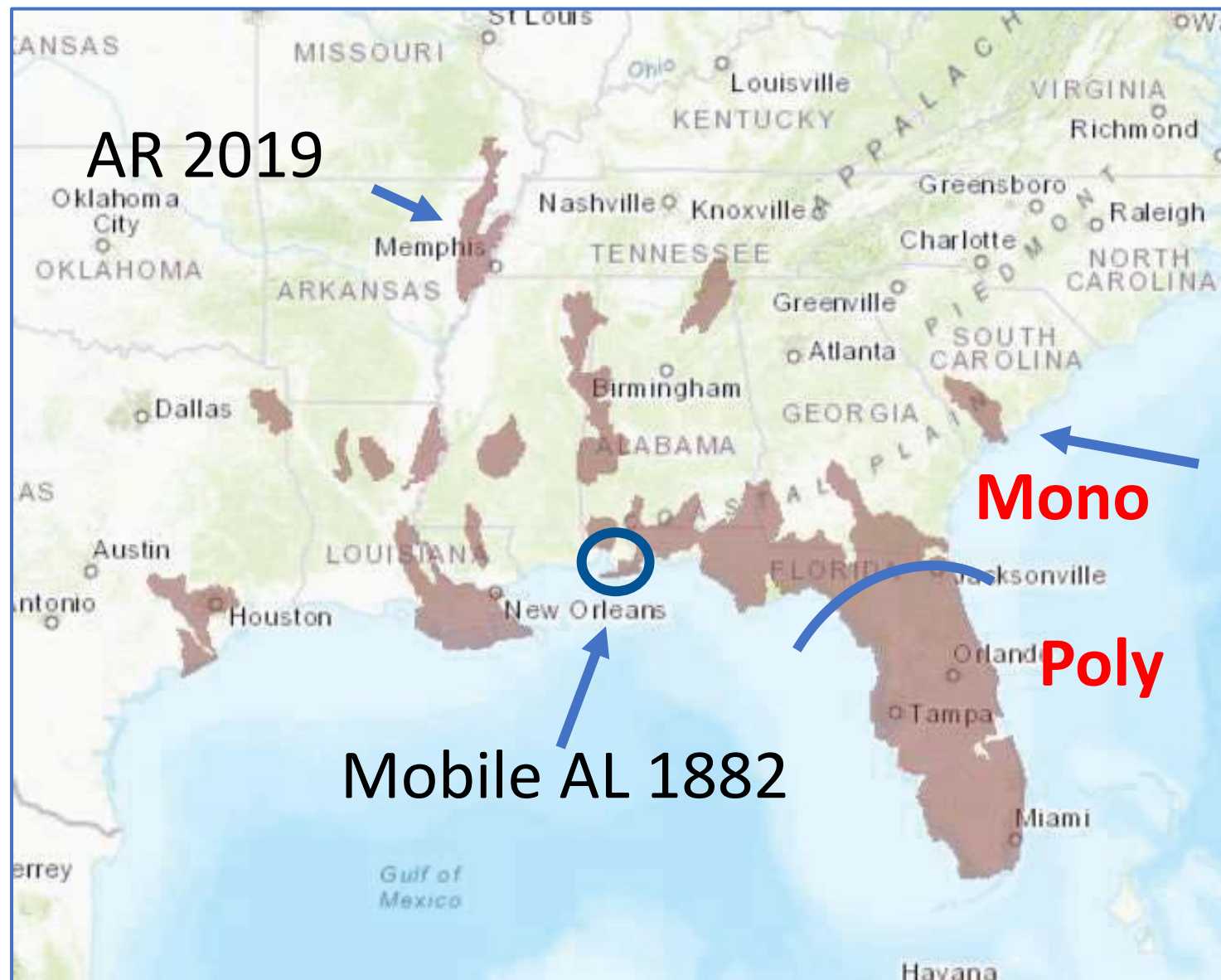


**Polycephalous (forma
cubense) “POLY”**



**Monocephalous (forma
paraguayense) “MONO”**

Picture: Left: floridagrasses.org Right: Southeastern flora



Picture: USGS

Impacts



“Locks in” coves

Blocks access points

Impedes navigation

Shades out native plants

Ecosystem transformation

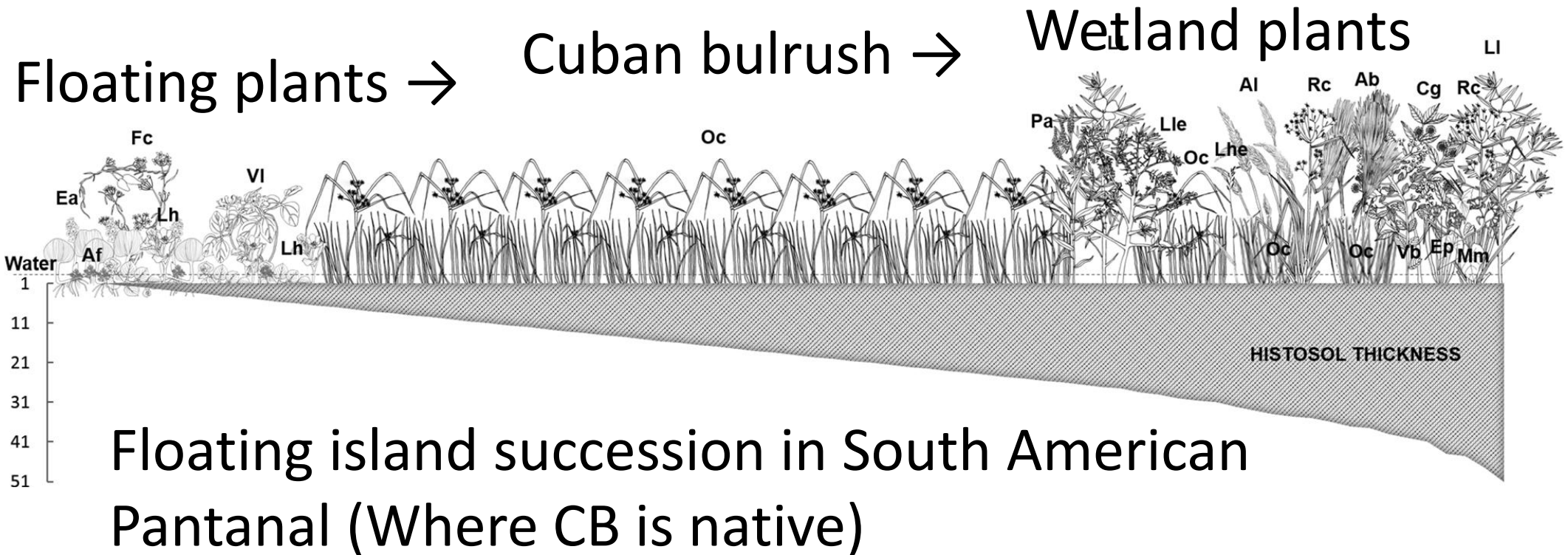
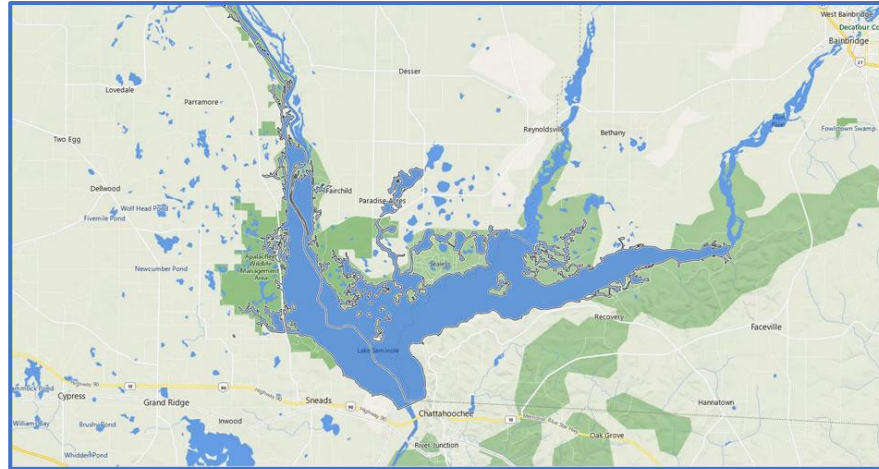


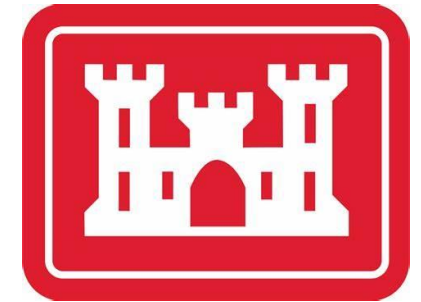
Figure: Coutinho et. al. 2017

Management practices

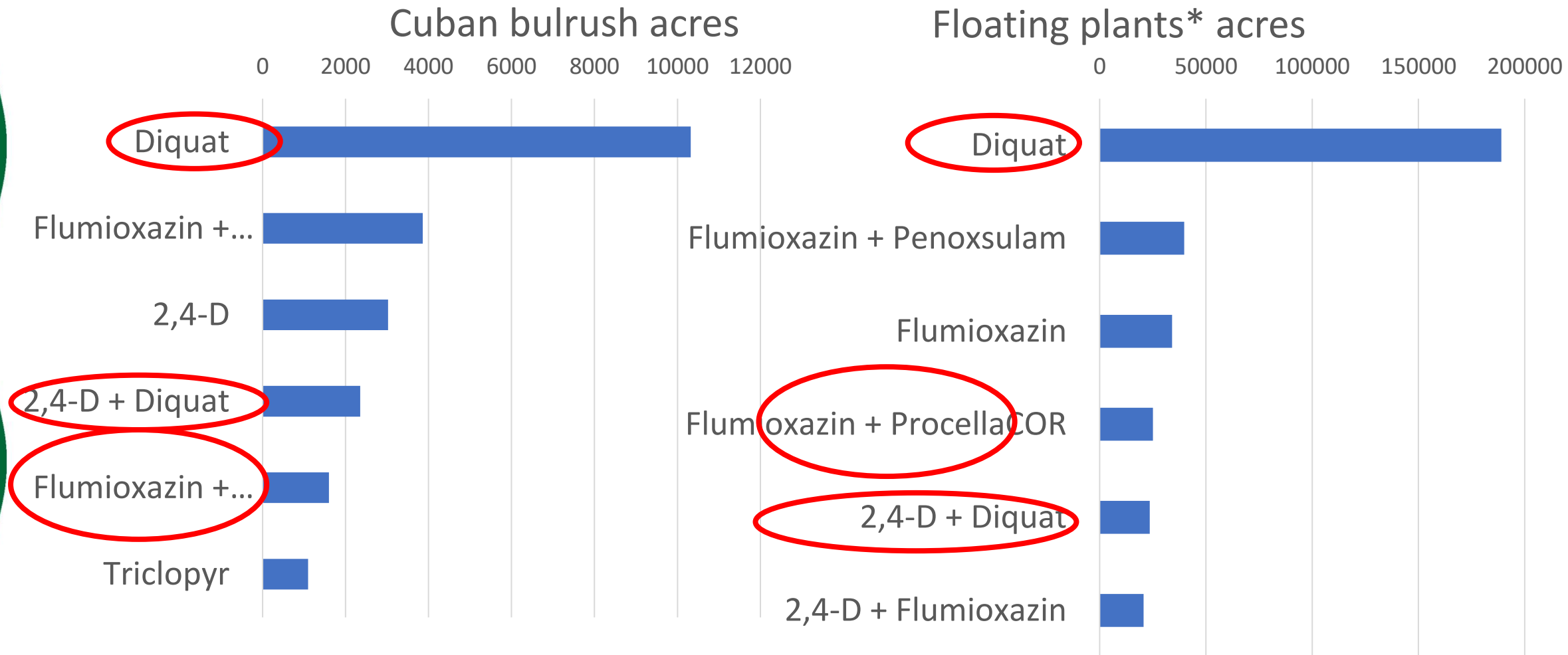
I use 0.5gal
diquat + 0.5gal
2,4-D



I use 0.5gal
glyphosate +
0.5gal 2,4-D

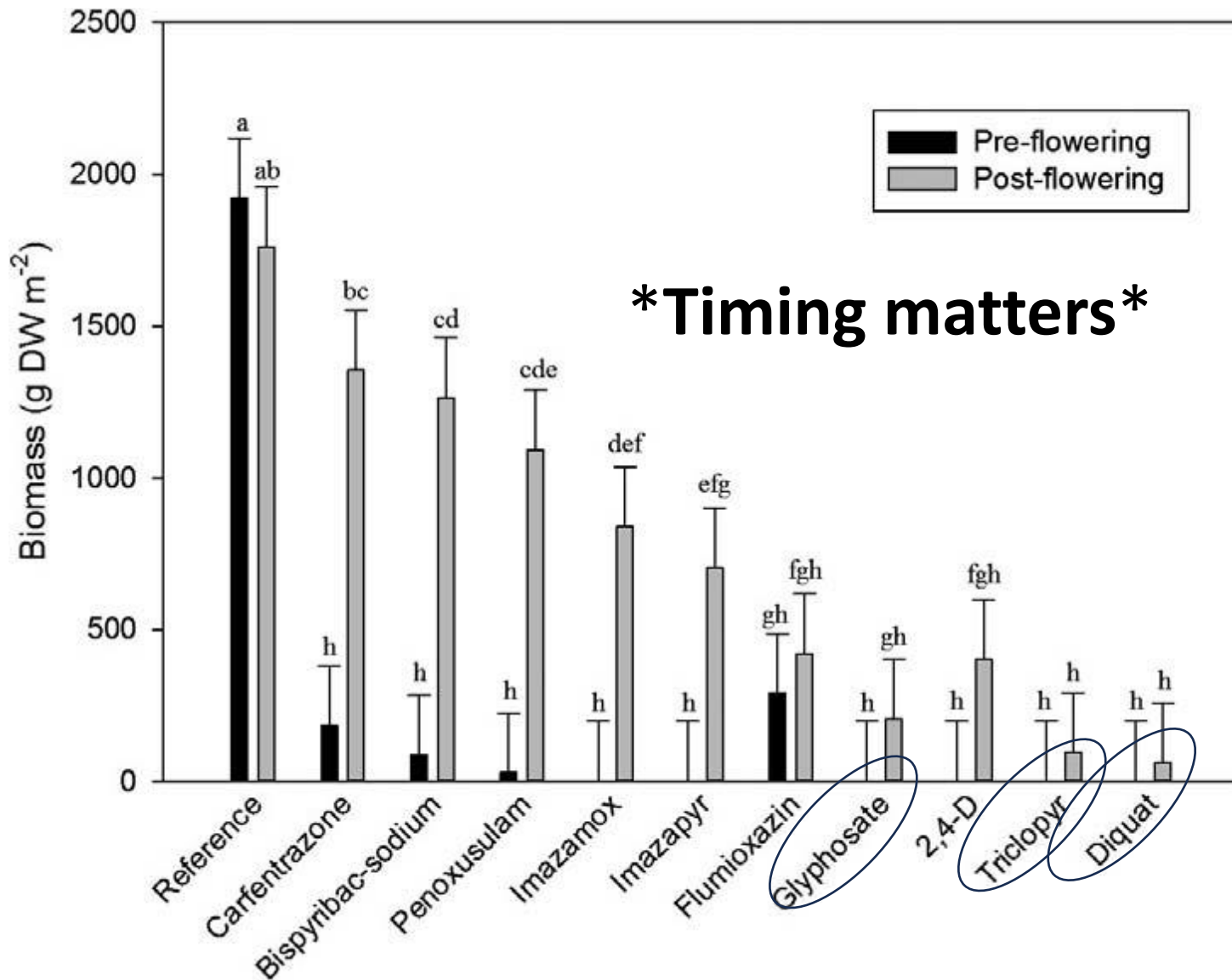


Florida Fish & Wildlife Top 6 AIs since 2010



FWC data 2010-2024

*Water hyacinth/water lettuce



- All herbicides >80% control when applied pre-flowering
- Only **glyphosate**, **triclopyr**, and **diquat** were >85% controlled post-flowering (6 WAT)

Figure: Watson & Madsen 2014

Ongoing project: USACE Contract

Main objective: *to develop consistent, reliable approaches to control Cuban bulrush while conserving aquatic resources.*

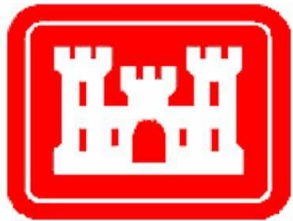
#1 Engage aquatic plant managers to form a network & collect information

#2 Establish in-field monitoring of current control efforts

#3 Assess new control strategies (chemical, physical, & IPM) in mesocosms

#4 Expand & assess promising methods at field scale

Project Collaborators



**US Army Corps
of Engineers®**



Picture: Google earth

UF | IFAS
UNIVERSITY of FLORIDA



**CENTER FOR AQUATIC
AND INVASIVE PLANTS**



Photos: Patrick Belk

Study One

Diquat

2,4-D

Diquat +
2,4-D

Control

Study Two

Flumioxazin +
Florpyrauxifen-benzyl

Flumioxazin + Glyphosate

Flumioxazin + 2,4-D

Flumioxazin + Diquat

Control

Study Three

Triclopyr

Triclopyr +
Diquat

Triclopyr +
Flumioxazin

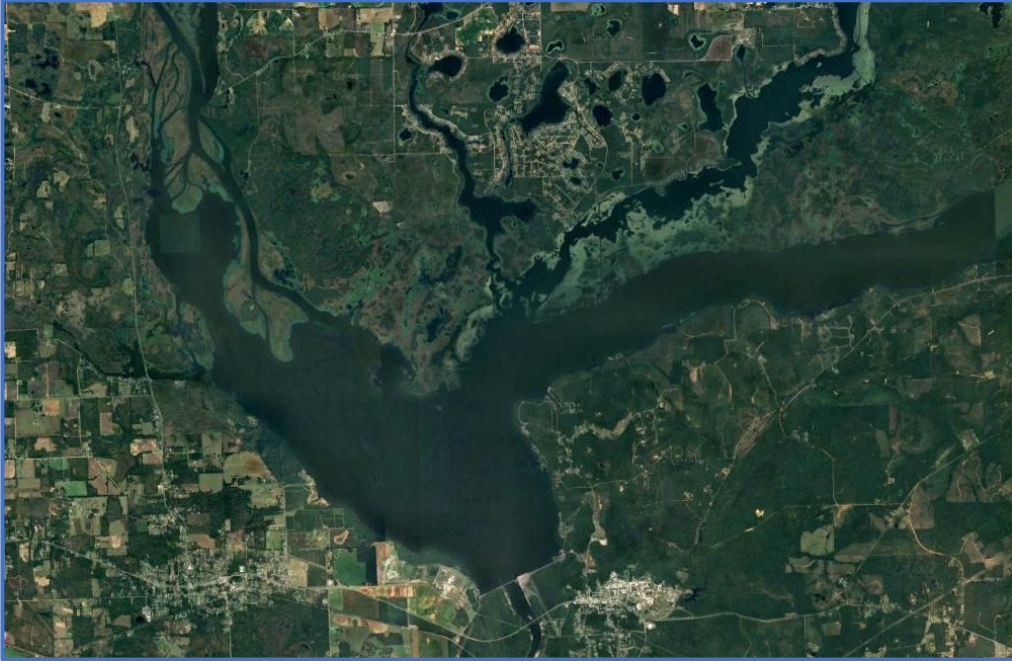
Triclopyr + 2,4-D

Control

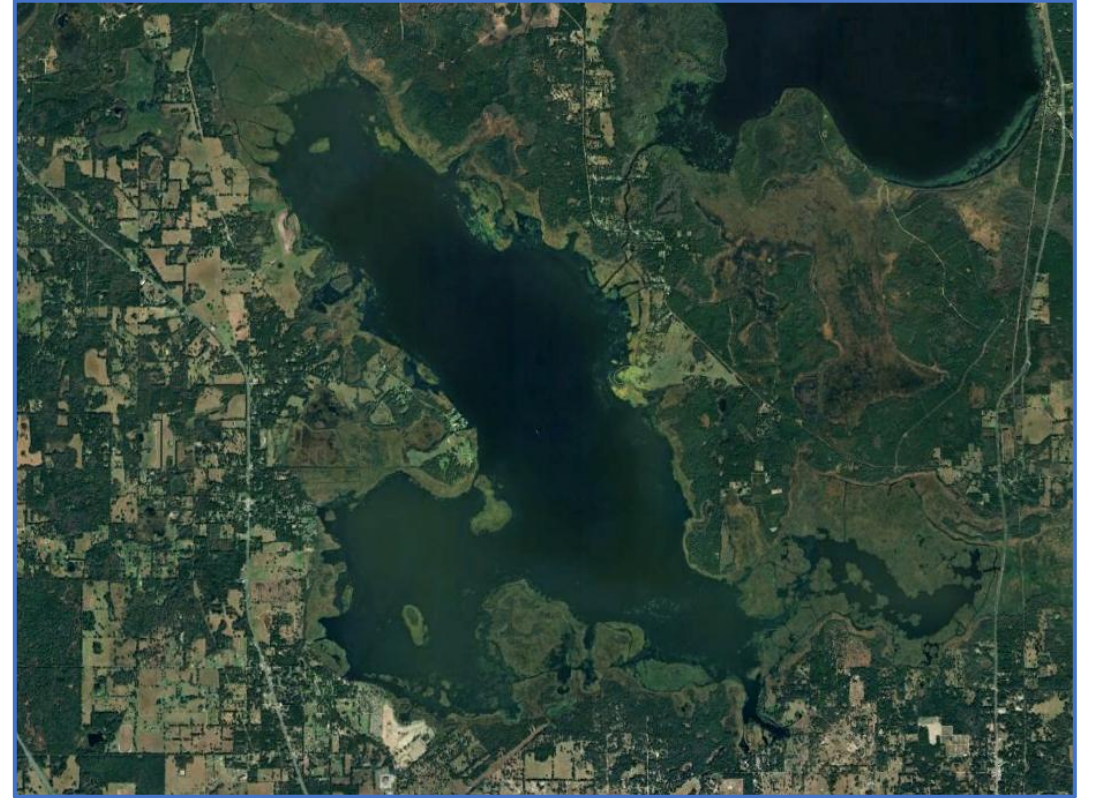




UF Field sites



Lake Seminole FL/GA: Mono



Orange Lake FL: Poly

Photos: Google earth

qualtrics^{XM}



Please take our 8-min survey!



I WANT YOU

UF | IFAS
UNIVERSITY of FLORIDA



**CENTER FOR AQUATIC
AND INVASIVE PLANTS**

QUESTIONS?

Patrick Belk
pbelk@ufl.edu

Dr. Stephen Enloe
sfenloe@ufl.edu



Dr. Gray Turnage
gturnage@gri.msstate.edu

Dr. Chris Mudge
christopher.r.mudge@usace.army.mil