INVASIVE SPECIES

COMMUNITY ACTION COMMITTEE (CAC)

Goals for Today

Why invasive species are problematic → Common invasive species

Planning for invasive species management → Case Study: Three Mile Creek Invasive Control Plan

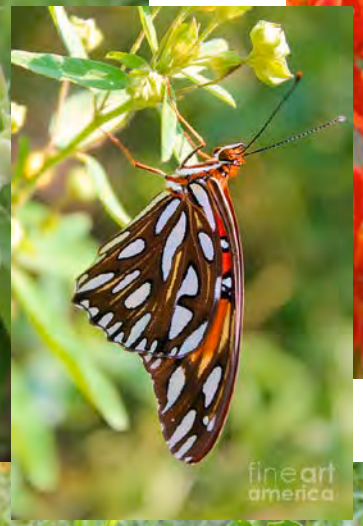
Partnerships and community buy-in → Contacts and resources available

Native Species Benefits

- Indigenous to the area, exist here without humans having brought them here
- Provide food, habitat, host sites to native insects and animals
- Don’t take more than they need
- Adapted to our climate
- It’s not a competition!

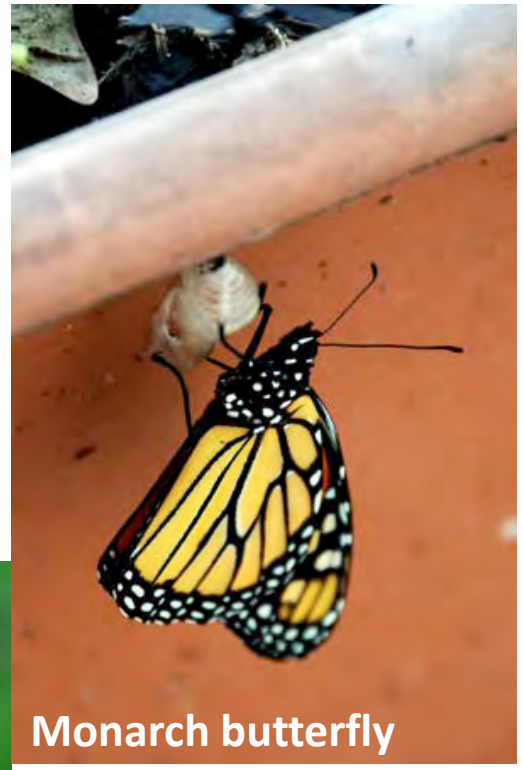
Plant Relationships


Passion flower




Passion Butterfly


Butterfly weed


Monarch butterfly

The Problem with Invasive Species

- No predators
- Outcompete native species for food, water, nutrients, etc.
- Highly adaptable to various habitats
- Disrupt relationships within native plant and animal communities
- Loss of biological diversity
- Unintended consequences

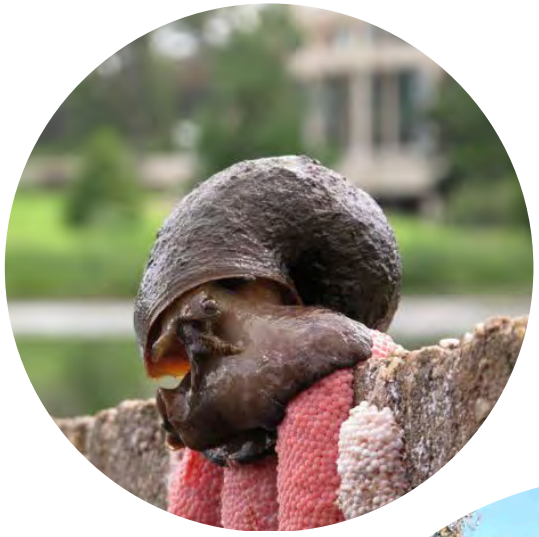
Mobile Bay National Estuary Program

Let’s Get Our Story Straight…

- Nonnative = exotic
- Nonnative does not mean it is invasive
- Invasive = causes harm to an ecosystem
- OR is likely to cause economic harm or harm human health
- Invasiveness is location dependent
- Some natives can be aggressive and considered nuisance

Types of Invasive Species

- Animals (ex: wild hog, Island apple snails)
- Plants
  - Terrestrial (ex: Chinese privet)
  - Submerged Aquatic (Eurasian watermilfoil)
  - Emergent (Alligatorweed)



Submerged Aquatic or Emergent Vegetation

Submerged Aquatic Vegetation (SAV)

Positive Aspects:

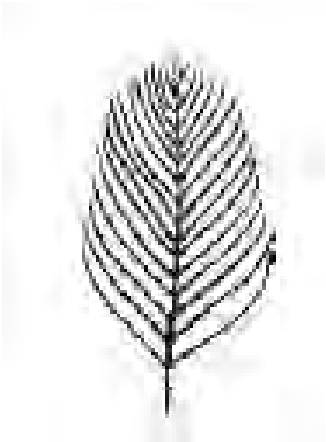
- Provides fish habitat
- Increases dissolved oxygen
- Can increase species diversity
- Provides food for waterfowl
- Can improve water clarity
- Environmental based

Negative Aspects:

- Can decrease open water getting tangled in boat motors
- Can create a scummy appearance
- Can limit fishing and swimming access
- Human / recreational based

Eurasian watermilfoil

- Submerged aquatic plant
- Forms dense mats
- Spreads by fragmentation
- Feather like leaves, **leaflets same length**
- Leaves in **whorls of 3-5 around stem**
- Usually 12-21 leaflets pairs per leaf
- Small reddish flowers in summer
- **Native look-alikes:**
  - Coontail
  - Fanwort
  - Bladderwort



Photos: Richard Becker

EXOTIC

Coontail

- Submerged aquatic plant
- Forms dense colonies
- Free floating without roots
- **Stiff leaves in whorls**
- Each leaf divided in forked pattern
- **Teeth on margins** of leaflets

Benefits:

- Leaves and seeds eaten by waterfowl
- Habitat for aquatic insects (more food for fish and waterfowl)

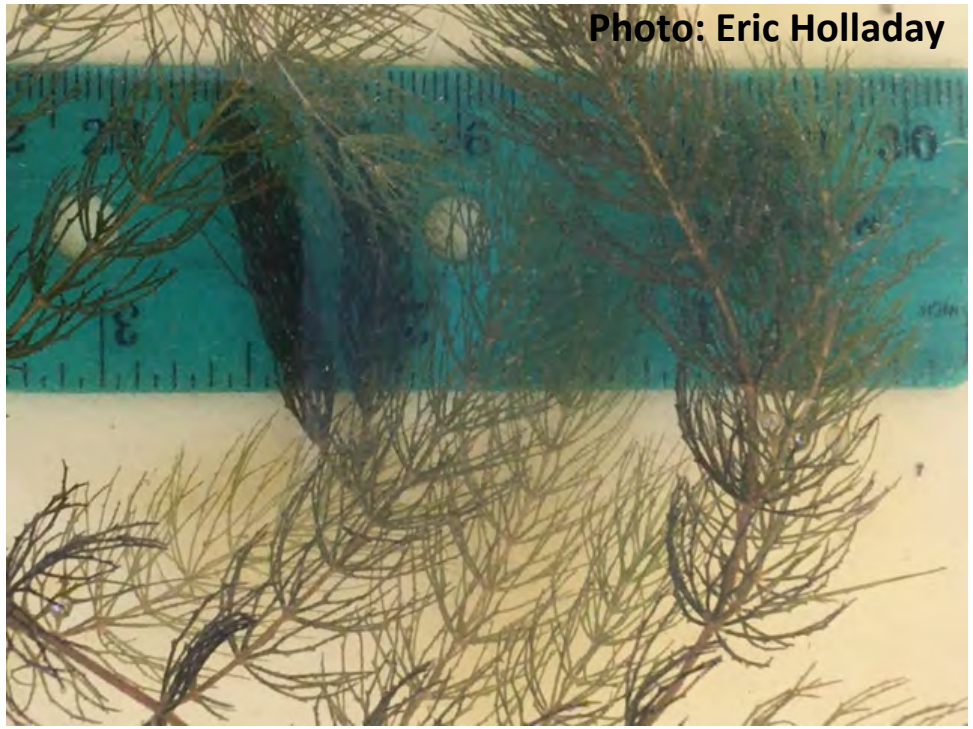


Photo: Eric Holladay


Photo: Joe Berardinelli

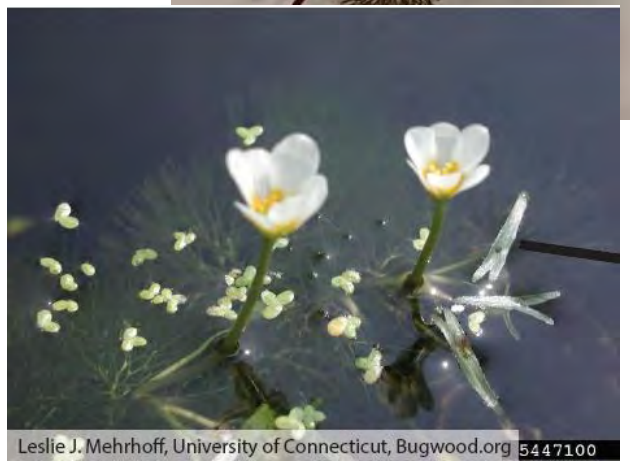
NATIVE

Fanwort

- Submerged aquatic plant
- Forms thick mats in low-energy water
- **Opposite leaves**, multi-branched in a **fan shape**
- Floating leaves appear only during flowering
- Small emergent white flowers with a yellow center

Benefits:

- Habitat for aquatic insects (more food for fish, waterfowl, and other wildlife)
- Provides cover for juvenile and some bait fish



NATIVE

Bladderwort


Photo: Outdoor Alabama

- Submerged aquatic plant
- Forms dense mats
- Multi-branching stems with no leaves
- **Tiny bladders (green or black) trap insects (carnivorous!)**
- Yellow flowers above the water on frail stems

Benefits:

- Population maintenance of mosquitoes
- Consumed by insects, waterfowl, and mammals
- Stems are used for shelter or to lay eggs

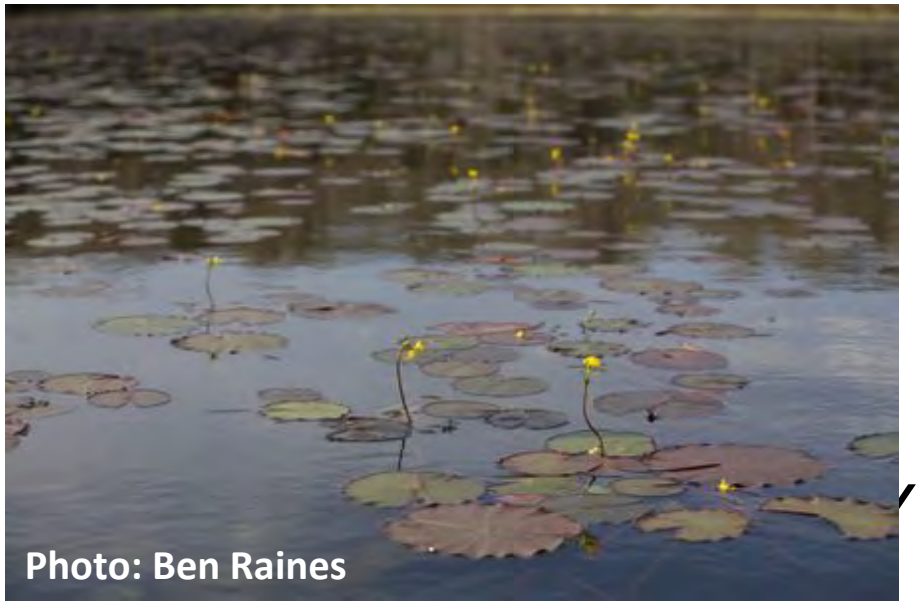


Photo: Ben Raines

NATIVE

Southern Naiad


Photo: Outdoor Alabama


Photo: Joe Berardinelli

- Submerged aquatic plant
- **Opposite or whorled, strap-like leaves**
- Spreads through fragmentation and seeds
- Can completely cover shallow water areas

Look-a-like:

- Sago pondweed

Benefits:

- Whole plant is a food source for ducks and other waterfowl

NATIVE

Sago Pondweed

- Submerged aquatic plant
- Forms a dense mass
- Thin stems with long and grass-like, **alternate leaves**
- Found in low-energy water
- Thread-like leaves

Benefits:

- Seeds, foliage, and tubers are excellent food source for waterfowl
- Insect larvae feed on tubers or foliage and bore into the plant to become filter feeders
- Habitat for fish

Photo: Chan Ogburn

NATIVE

Eelgrass

- Submerged aquatic plant
- Found in shallow, calm water
- Entirely submerged with upper part floating
- **Limp, tape-like leaves** that are up to several feet long

Benefits:

- Seeds, roots, and leaves consumed by ducks and other waterfowl
- Habitat for invertebrates and fish
- Filters polluted runoff


Photo: Outdoor Alabama


Photo: Chan Ogburn


Photo: USDA

NATIVE

Filamentous Algae

- Forms large mats and is commonly referred to pond scums
- Single algae cells form long threads or filaments
- Filaments intertwine to form a mat that resembles wet wool
- Starts growing at the bottom of the water and floats to surface
- No direct value to wildlife


Photo: Joe Berardinelli

Planning for Invasive Species Management

- Form a Steering Committee
- Find a local champion
- Seek help and guidance from experts
- Explore reputable resources / research
- Know what you are getting into (risks and consequences)
- Start upstream and work downstream
- Long-term maintenance plan
- Experienced contractor or professionals recommended

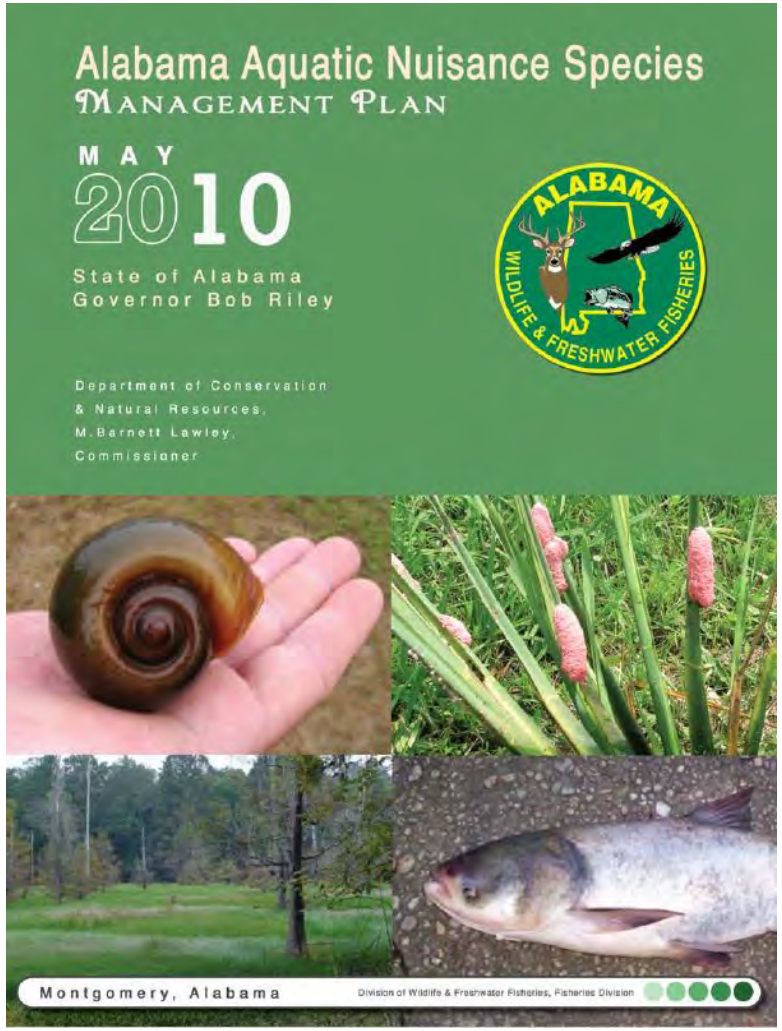
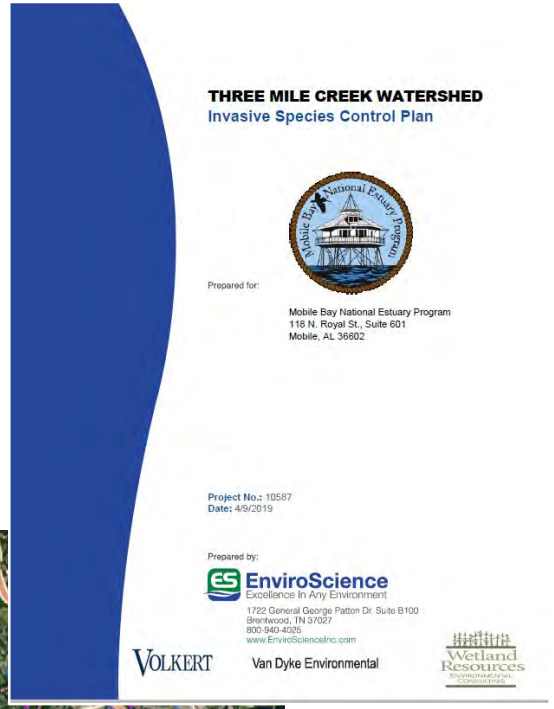



Photo: Chan West

Case Study: Three Mile Creek

- Surveyed entire watershed for invasive plants and animals
- Catalogued native plants
- Identifies primary and secondary options
- Provides a calendar for scheduling management activities
- Identifies equipment and personnel needed
- Includes a cost calculator for implementation
- Transferable across the state



THREE MILE CREEK WATERSHED
Invasive Species Control Plan

Prepared for:

Mobile Bay National Estuary Program
118 N. Royal St., Suite 601
Mobile, AL 36602

Project No.: 10587
Date: 4/9/2019

Prepared by:

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VOLKERT
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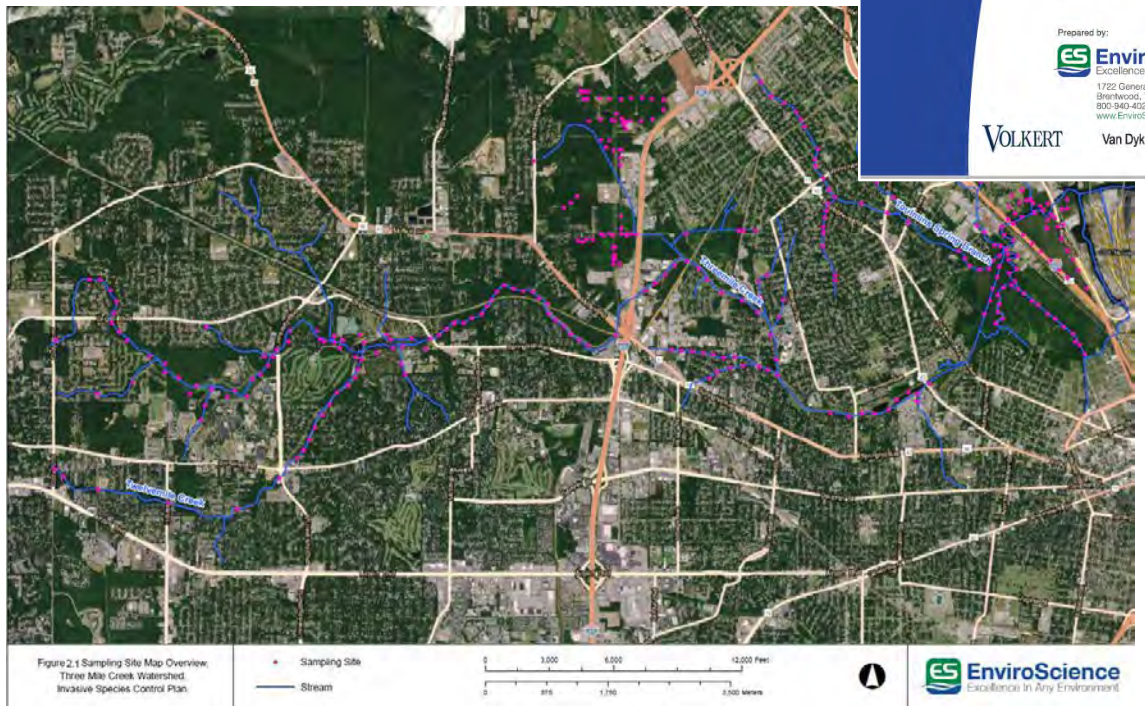

5.2 *ALTERNANTHERA PHILOXEROIDES*, ALLIGATORWEED

# of 2018 Plots	% Occurrence in Plots	Average % Cover in 2018	ALIPC Rating	Acres in 2018
142	38.58%	9.37%	1	29.38

A sprawling mat of alligatorweed at Langan Park on April 24, 2018. JVD

Alligatorweed (*Alternanthera philoxeroides*) is an invasive South American perennial herb that prefers aquatic sites but can also grow on damp soil in riparian and agricultural areas. Its elliptical leaves have smooth margins and are on opposite sides of smooth hollow stems. Roots appear at the nodes, and white flower clusters grow on 5 cm (2") stalks. Though alligatorweed forms viable seeds in its native range, this emersed semi-aquatic plant relies entirely on vegetative reproduction elsewhere. Hollow stems up to 15 m (50 ft.) in length provide excellent buoyancy in water. Free-floating fragments with two or more nodes can easily move downstream and root along the shoreline. Subsequently, this sprawling invasive species can form dense floating mats in slow-moving freshwater systems that can impede navigation, reduce light penetration, and displace native species.[1]

Transported to the U.S. in the ballasts of ships in the early 1900s, alligatorweed became a severe problem by 1963, covering an estimated 97,000 acres in the South. In response, alligatorweed was the first aquatic plant targeted for biological control using co-evolved insects from its native range. Biological control research of alligatorweed began in 1960 with surveys in South America for natural enemies. These field studies by U.S.D.A. entomologists resulted in the screening and introduction of three species of South American insects into the United States. By 1981, the combined predation by the alligatorweed flea beetle, thrips, and stem borer had reduced the alligatorweed infestation to only 1000 acres.[2]

Specific Control procedures:

The striped, black and yellow adult flea beetle severely damages the leaves of alligatorweed. JVD

Biological Control

Alligatorweed Flea Beetle (*Agasicles hygrophila*)

Native to southern Brazil and northern Argentina, the alligatorweed flea beetle (*Agasicles hygrophila*) was chosen to be the first insect studied for biological control of aquatic plants. Released in the U.S. in 1964, this species is now widespread and naturalized throughout the South where this insect's numbers peak in the spring and fall. Adults and larvae consume the emergent leaves and stems of alligatorweed and can decimate the densest mats within three months.[3]

Alligatorweed Thrips (*Amynothrips andersoni*)

A second natural enemy of alligatorweed, the alligatorweed thrips (*Amynothrips andersoni*), was released into the U.S. in 1967. The black and shiny adults are only 2 millimeters long. This tiny insect attacks the new growth of rooted alligatorweed causing leaf distortion and reduced plant vigor.[4]

Alligatorweed Stem Borer (*Arcola malloi*)

In 1971, the alligatorweed stem borer (*Arcola malloi*) was the third and final South American insect introduced into the U.S. to control Alligatorweed. The larvae of this small, brown moth devour the stems from the inside, killing the leaves. A heavy infestation can quickly eliminate a floating mat, and when this moth and the alligatorweed flea beetle work together the alligatorweed rarely recovers.[5]

Chemical Control

An airboat is standard equipment for aquatic herbicide applications. SFWMD

Biological control of alligatorweed can be quite economical and effective but often requires patience. The population densities of the insect control agents vary in relation to the harshness of the previous winter. While alligatorweed thrips are hardier, many alligatorweed flea beetles and stem borers succumb to cold winters. Because insect numbers may rebound slowly, alligatorweed can form dense mats the following spring. If the need for rapid control arises in selected areas, however, chemical control is an available option.

Alligatorweed is susceptible to several systemic herbicides labeled for water: glyphosate, triclopyr, and imazapyr. Glyphosate ("Rodeo," "Refuge," *et al.*)[6] works well on rooted alligatorweed but leaches quickly from floating plants and is often ineffective. Foliar applications of both triclopyr ("Renovate," "Navitrol," *et al.*)[7] and imazapyr ("Habitat," "Arsenal," *et al.*)[8] work well in controlling floating alligatorweed. Imazapyr controls alligatorweed better than triclopyr when applied in April, but the herbicides we
and multiple treatmer
require the addition o
Kick," *et al.*).[9]

There are a number c
The proper applicatic
equipment, most ofter
desirable native veg
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intakes. Most importa
is counter-productive
problem in Florida, h
success of biocontrol

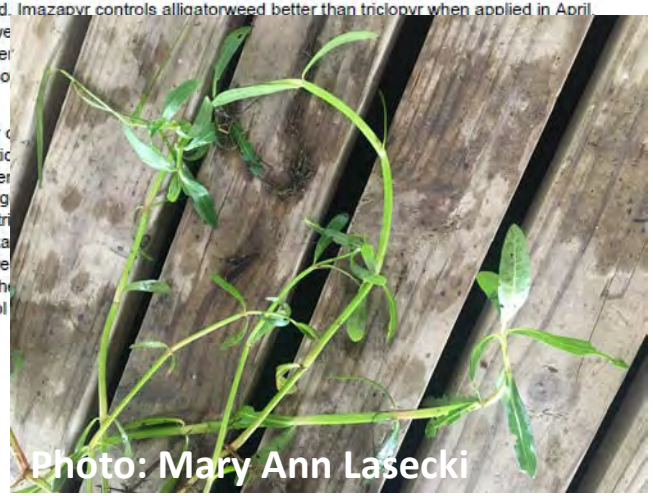


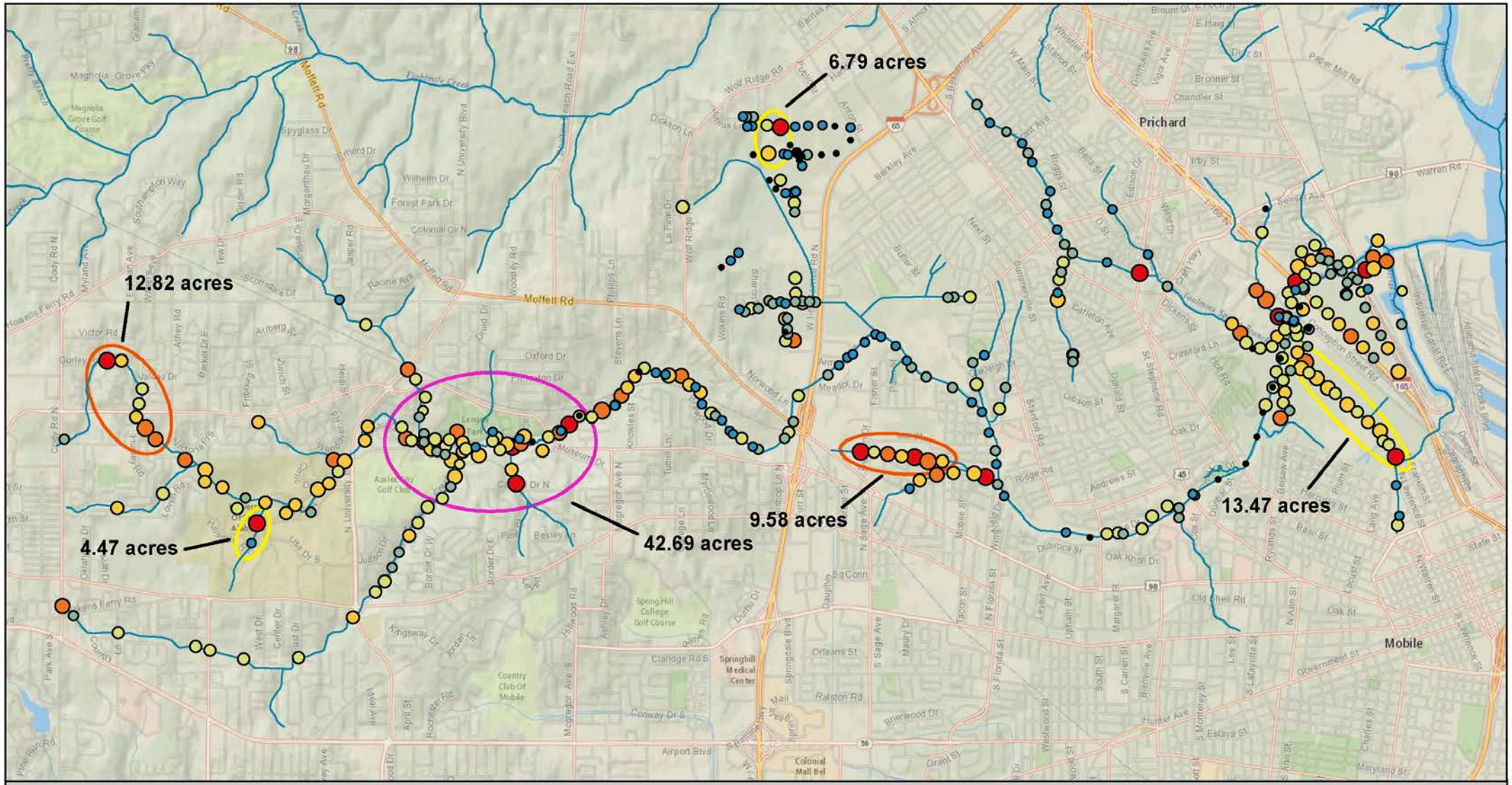
Photo: Mary Ann Lasecki

Table 4.3 Summary of Preferred Treatments and Schedule for Invasive Species

Scientific Name	Common Name	Preferred Treatment*	Secondary treatment*	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Albizia julibrissin	silktree (mimosa)	Garlon 4	Garlon 3A	CS	CS			CS	CS	CS	CS	CS	CS	CS	CS
		Garlon 4	Pathfinder II	BT	BT			BT	BT	BT	BT	BT	BT	BT	BT
		Glyphosate	Transline + Garlon 3A							F	F	F			
Alternanthera philoxeroides	alligatorweed	Biological				B									
			Imazapyr				AH	AH	AH						
Bambusa vulgaris	common bamboo	Glyphosate	Arsenal AC									F	F		
		Glyphosate	Arsenal AC									CS	CS		
Canna indica	Indian shot	Clearcast + Methylated seed oil		F	F	F	F	F	F	F	F	F	F		
Cinnamomum camphora	camphor tree	Garlon 3A	Garlon 4						CS	CS	CS				
		Garlon 4							BT	BT	BT				
		Garlon 3A							SI	SI	SI				
		Glyphosate	Garlon 3A						F	F	F				
Clematis terniflora	sweet autumn virginsbower	Garlon 4	Glyphosate							F	F	F	F		
		Garlon 4	Pathfinder II	BT	BT			BT	BT	BT	BT	BT	BT	BT	BT
Colocasia esculenta	wild taro	Clearcast + Methylated seed oil		AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH
Deparia petersenii	Petersen's spleenwort	Glyphosate			F	F	F								
Dioscorea bulbifera	air potato			MR	MR										MR
		Garlon 3A	Glyphosate					F	F	F	F	F	F		
Egeria densa	Brazilian elodea	Sonar	Reward	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH	AH
				B	B	B	B	B	B	B	B	B	B	B	B
				D	D	D	D	D	D	D	D	D	D	D	D
Eichornia crassipes	water hyacinth	Weedar 64					AH	AH	AH	AH	AH	AH			
Firmiana simplex	Chinese parasoltree	Glyphosate	Arsenal AC	F	F	F	F	F	F	F	F	F	F	F	F
		Glyphosate	Garlon 3A	CS	CS					CS	CS	CS	CS	CS	CS
		Glyphosate	Garlon 3A	SI	SI	SI	SI	SI	SI	SI	SI	SI	SI	SI	SI
		Garlon 4		BT	BT	BT	BT	BT	BT	BT	BT	BT	BT	BT	BT

AH = Aquatic Herbicide, BT = Basal Treatment, B = Biological, CT = Chemical Treatment, CS = Cut Stump, D = Dewater, F = Foliar, MR = Manual Removal, SI = Stem Injection

* This is a summary of treatments and the individual prescriptions should be reviewed for full recommendations.



Invasive Control Plan Areas

Strategy 1 Strategy 2 Strategy 3

Percent Cover, All Invasive Plants (Number of Plots)

- 0% (28)
- ≤10% (67)
- 11 - 25% (80)
- 26 - 50% (90)
- 51 - 75% (62)
- 76 - 100% (27)
- >100% (14)

0 0.5 1 2 Miles

0 1 2 4 km

Figure 4.1
Three Mile Creek Watershed
Priority Strategy Areas

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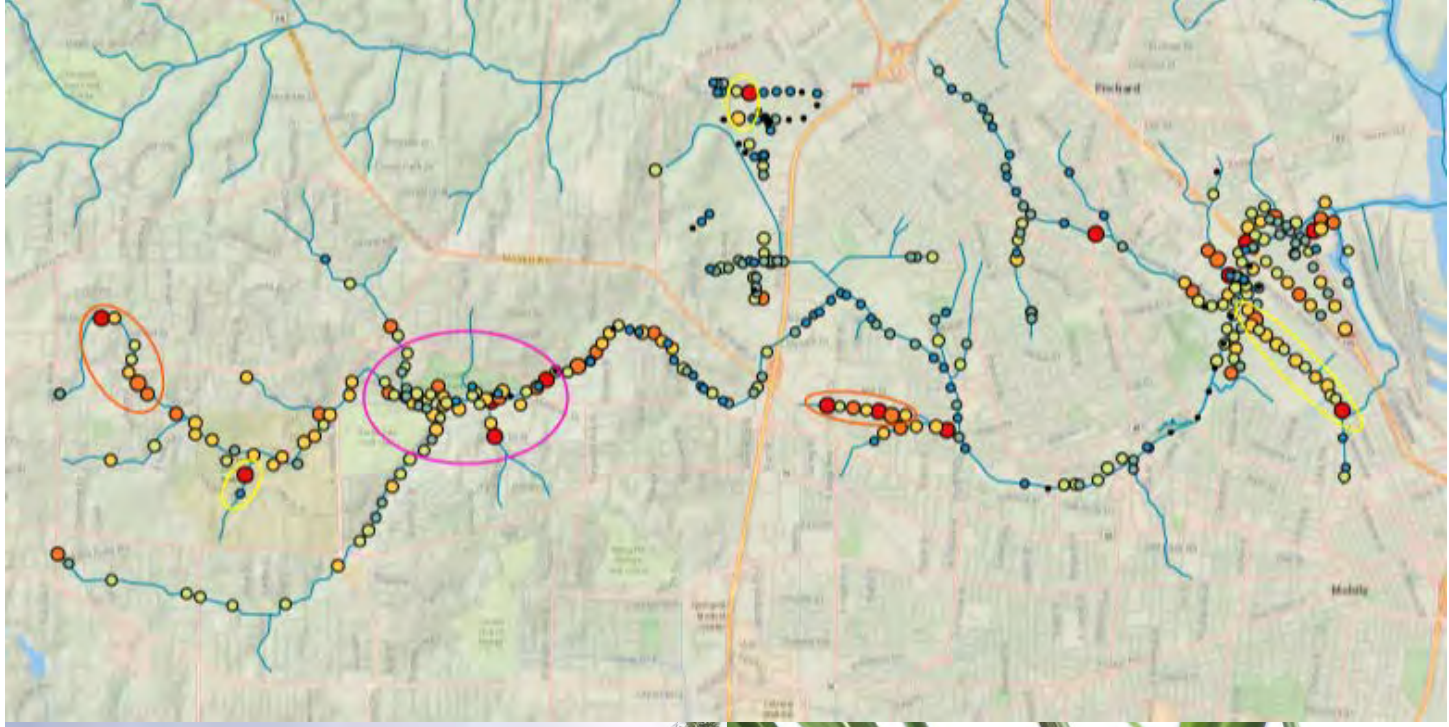
Path: C:\MENEP\GIS\StrategicMap_Acres.mxd

Date: 7/30/2019

Basemap courtesy of Esri

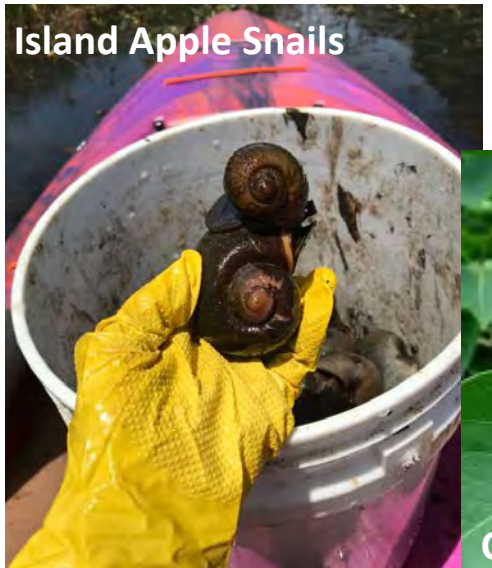
Invasive Species Control Plan

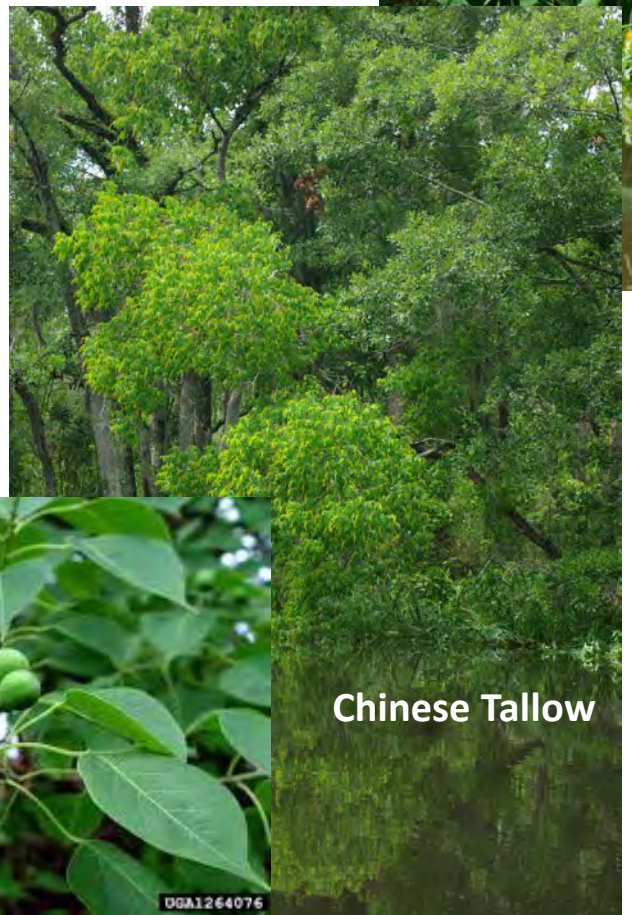
- Watershed wide approach
- Five priority areas with high invasive plant cover
- Island apple snails priority area in Langan Park lakes
- After controlling snails, dredging Langan Park lakes
- Received RESTORE funds to implement the plan



Priority Species

- Chinese tallow tree
- Chinese privet
- Alligatorweed
- Wild taro
- Island apple snails

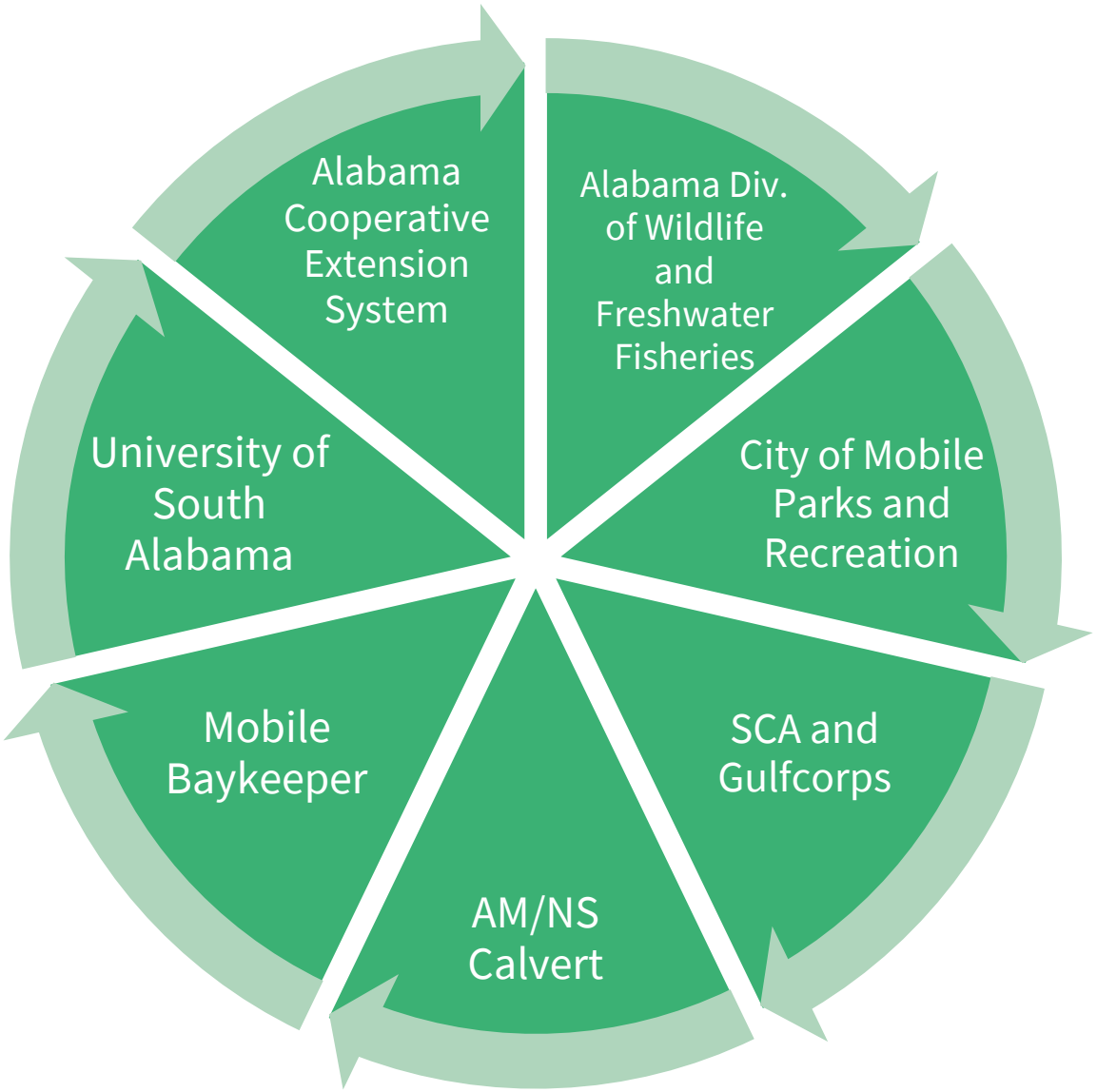




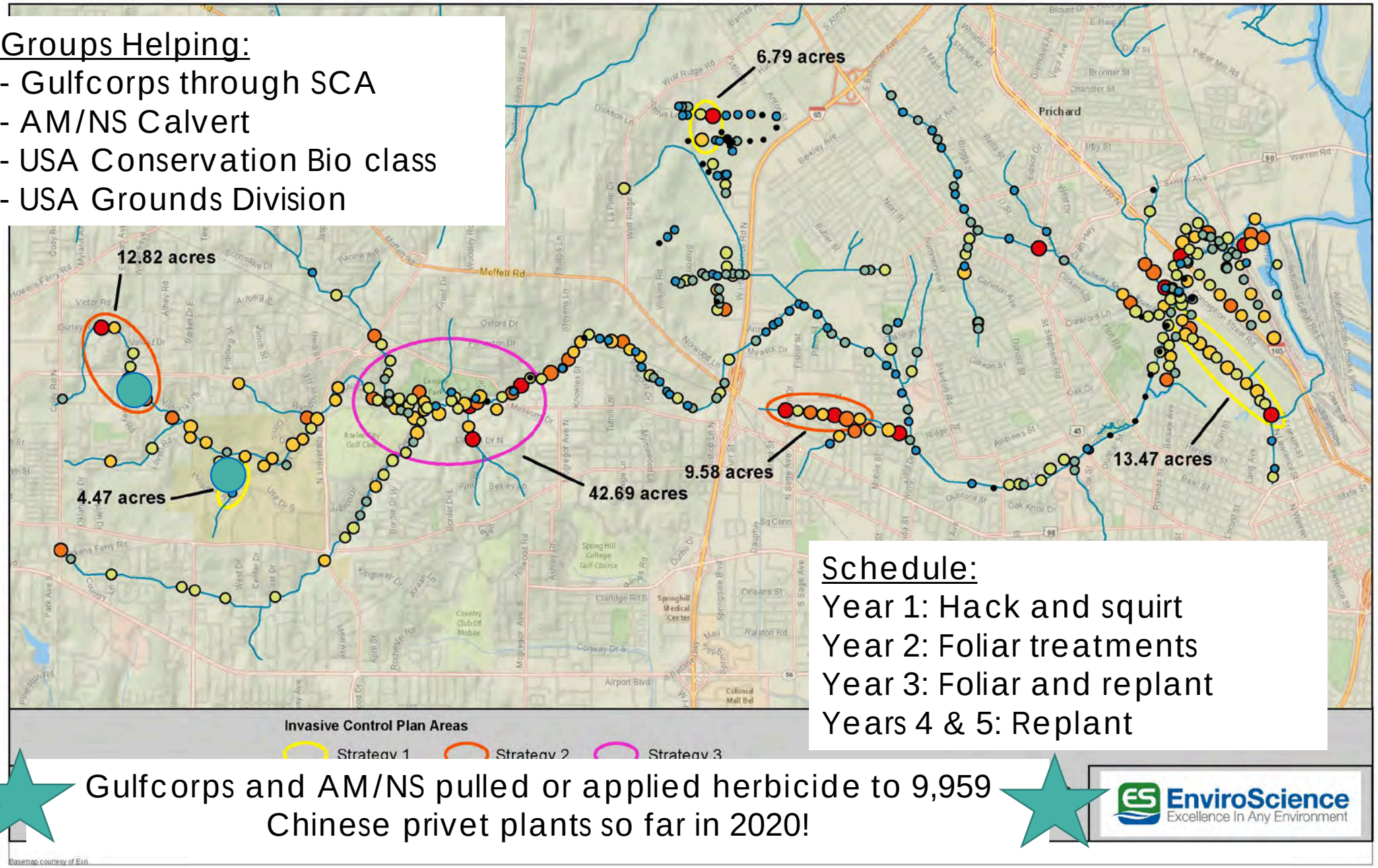

Chinese Privet


Chinese Privet

Teamwork Makes the Dream Work



Groups Helping:
- Gulfcorps through SCA
- AM/NS Calvert
- USA Conservation Bio class
- USA Grounds Division



Schedule:
Year 1: Hack and squirt
Year 2: Foliar treatments
Year 3: Foliar and replant
Years 4 & 5: Replant

Gulfcorps and AM/NS pulled or applied herbicide to 9,959 Chinese privet plants so far in 2020!

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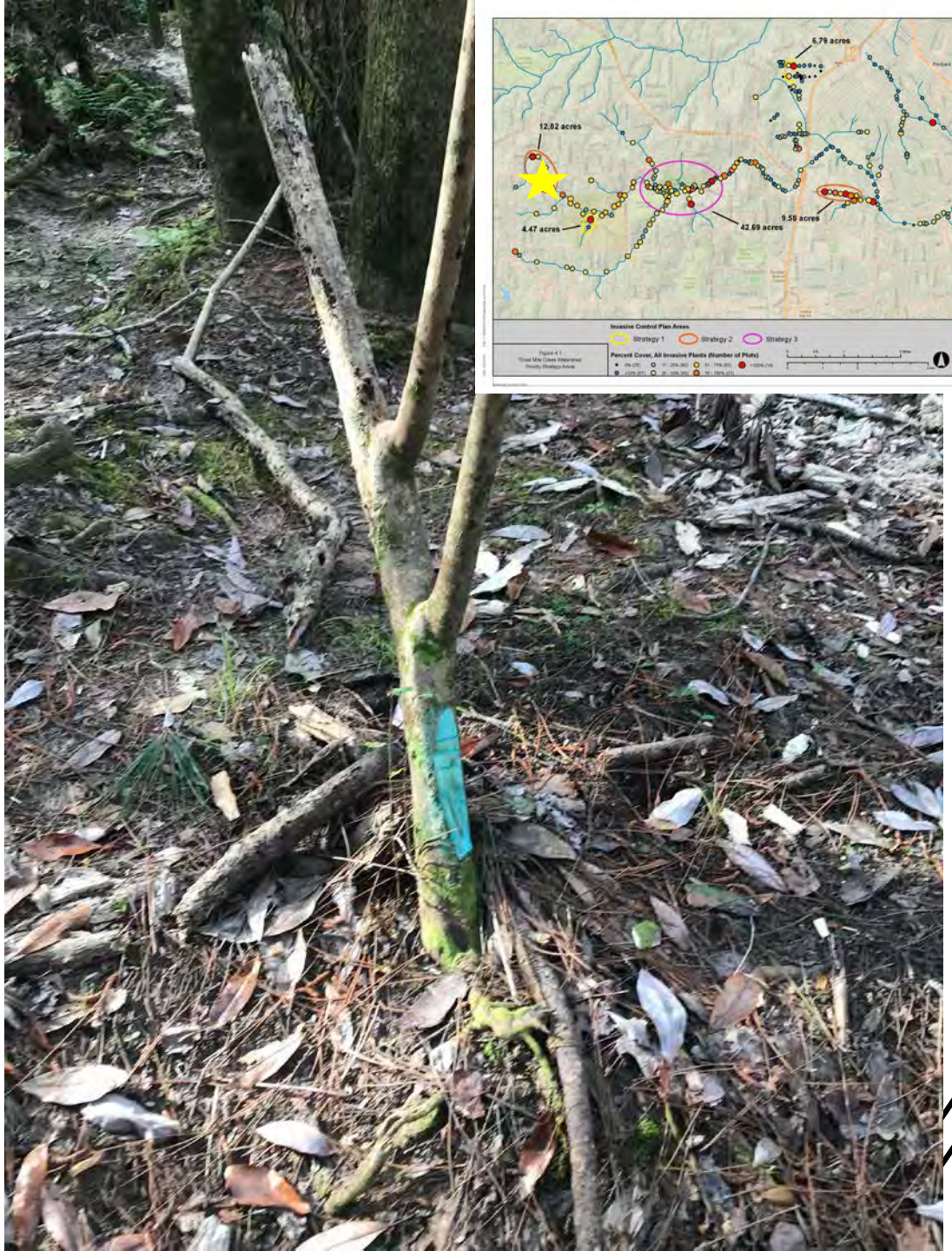
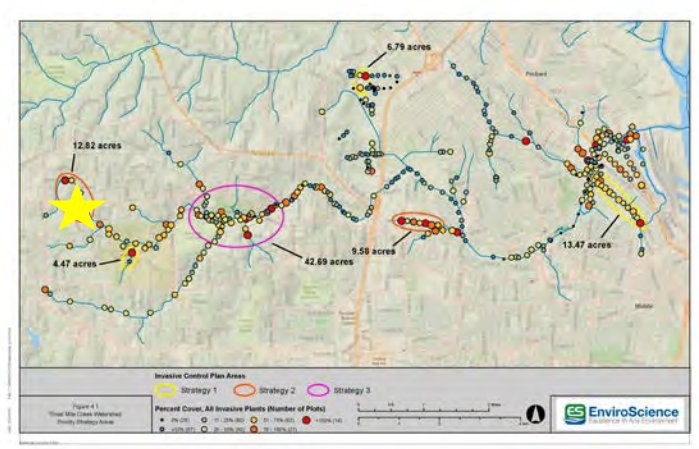
Before


3,555 lbs of trash and
80+ tires removed!
MCSW
44


After

Hack and squirt





3,226 Chinese privet seedlings!

Implementation To Date – Invasive Plants

- Volunteers pulled or applied herbicide to 9,959 Chinese privet plants in 2020.
- Managed approximately 18.4 acres in two priority areas.
- Set up sample plots on USA campus with students

The Problem with Island Apple Snails

- First observed in Langan Park in 2003
- No natural predators here
- Voracious feeders of vegetation
- Destroy wetland habitats
- Carry diseases
- Burrow into mud in cold weather
- Female:Male ratio is 2:1
- Can start laying eggs at 10 weeks old
- Each female lays eggs weekly from March through October
- Egg masses can contain up to 2,400 individual eggs
- MUST get ahead of their hatch rate!

Island Apple Snails Control Efforts

- Multi-pronged approach needed
- Mechanical and chemical treatments
- Reproductive from March to November
- Habitat control is KEY
- Planned chelated copper treatments this fall and again next spring

Partnerships are Critical

…

Community Buy-In

Gulfcorps through SCA

City of Mobile Parks and Recreation

Mobile Baykeeper

Groundwork Mobile County

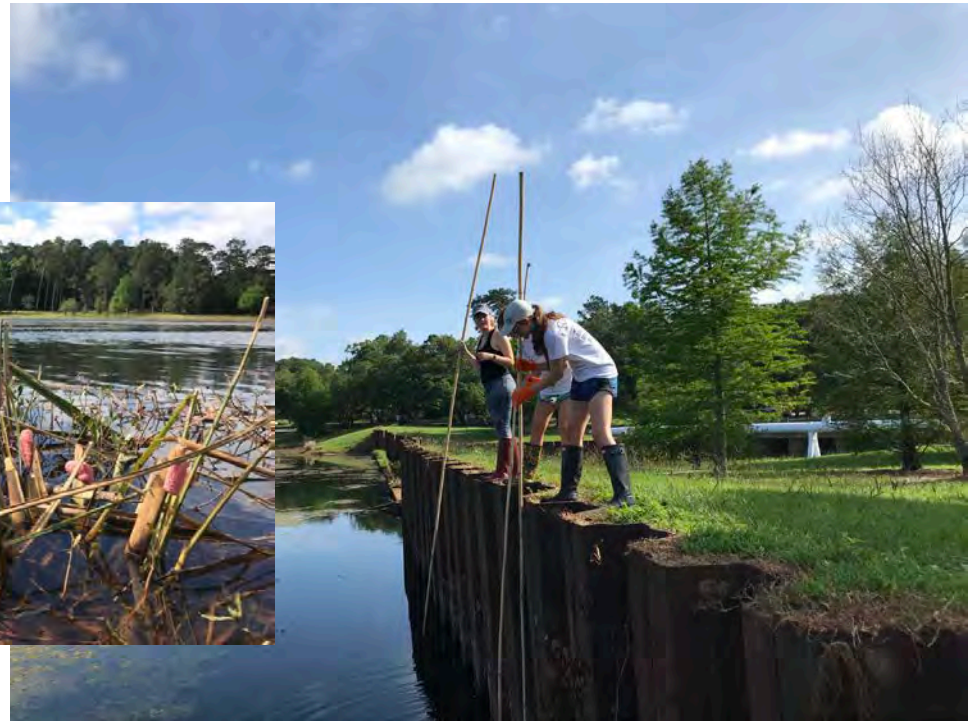
Volunteer Groups


Southern Wild Rice
Alligatorweed


Grip 'n Grab

Mechanical Removal Efforts

- Twice a week – Tuesdays and Fridays
- Destroy and collect egg masses and adult snails
- Gulfcorps began in mid-March
- MBNEP and volunteers from end of April through mid-July
- Outreach opportunity
- Contractor working out there now through end of September



Challenges with Using Volunteers

- Global pandemic – parents wanted to send kids
- Coordinator needed
- Varying levels of effort
- Need consistent, reliable volunteers
- Professional volunteer groups best
- More people does not mean better work
- How hard is what you are asking them to do?
- Alabama HEAT and HUMIDITY
- No more than 2.5-3 hrs

Come Volunteer with Us While Social Distancing!

We are looking for adult volunteers to help us destroy Island Apple Snail egg masses and collect adult/juvenile snails from the lakes at Langan Park. We are currently working in Langan Park on Tuesdays and Fridays from 9 a.m. to 3 p.m. and we need your help! Volunteers will be provided rubber gloves, bug spray, and tools needed to destroy egg masses and collect adults. **Please email Tom Herder at therder@mobilebaynep.com to sign up as a volunteer.** It is mating season right now and time is of the essence! Elimination of Apple snails must be undertaken before RESTORE-funded lake enhancement and dredging can occur.

Adult Island Apple Snail

What are Island Apple Snails?

The Island Apple Snail (*Pomacea maculata*) is a highly invasive aquatic snail from South America that has taken over the lakes at Langan Park. Island Apple Snails were first seen in Langan Park in 2003 and are thought to have been introduced by people releasing them from their aquariums.

Why are They a Threat?

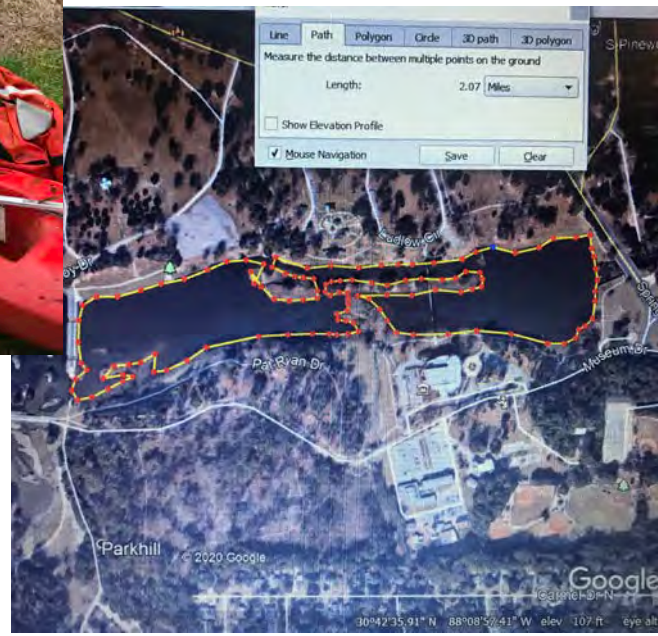
- **They colonize quickly.** Bright pink egg masses containing up to 2,000 eggs are laid by females every few days and eggs hatch after two weeks.
- **They destroy habitats.** Apple snails eat large amounts of vegetation and turn an aquatic plant-based system into an aquatic desert. Some of these snails have already made their way downstream in Three Mile Creek and they pose a huge threat to the Mobile Tensaw Delta if they continue to spread.
- **They carry diseases.** Apple snails can carry rat lungworm, liver flukes, and Schistosomiasis.

Island Apple Snail Egg Masses

Bamboo is used to scrape egg masses

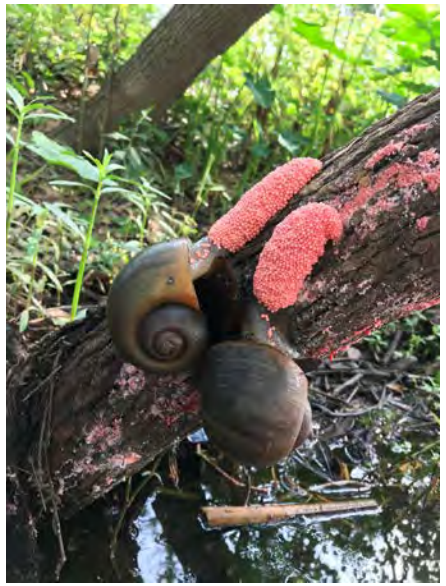
Safety Precautions:

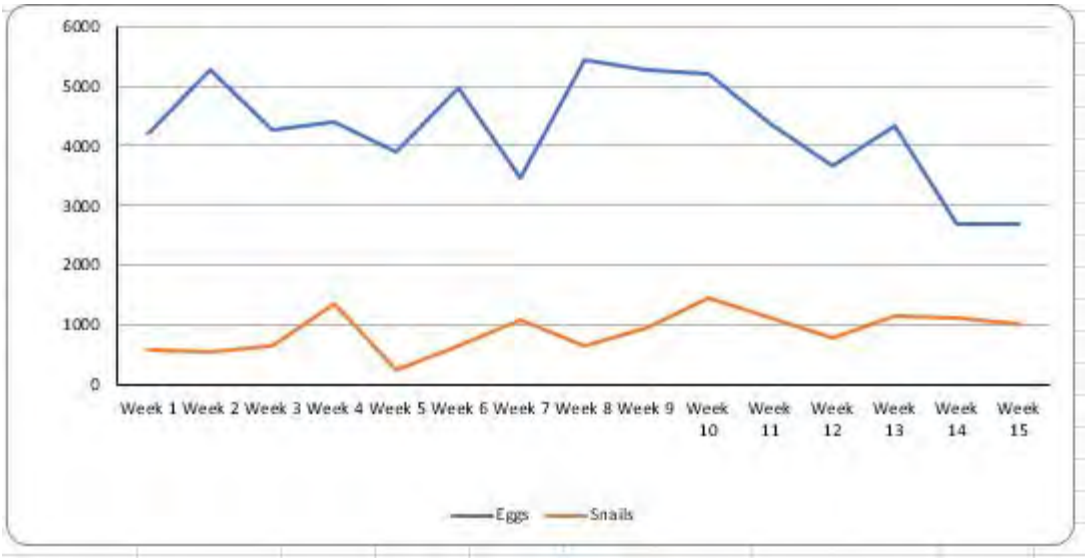
- Knee boots or rain boots are preferred. No open toed shoes will be allowed.
- Rubber gloves will be provided and are required to be worn at all times.
- A hat and sunscreen are recommended.
- Work in designated pairs staying a minimum of six feet apart but within sight and earshot of one another.



Why Data Tracking Matters

- Are you making a measurable impact?
- Is it worth the money you are spending?
- Are climate and precipitation affecting the data?
- Can trends this summer help inform us of what to expect next summer?
- How is the population changing over time?





Long-term Maintenance and Funding

- Not one and done
- Successful invasive management takes time
- Community buy-in and education of residents
- Funding for a contractor or professional needed
- Behavior changes are likely necessary to maintain work
- What can you do in your own backyard to make a difference?

Resources Available to You

- Three Mile Creek Invasive Species Control Plan
- Alabama Native Plant Atlas – www.floraofalabama.org
- Alabama Cooperative Extension publications
- Management/control questions – Dave Armstrong (ADCNR DWFF) dave.armstrong@dcnr.alabama.gov
- Identification of aquatic plants – PJ Waters (ACES) waterph@auburn.edu