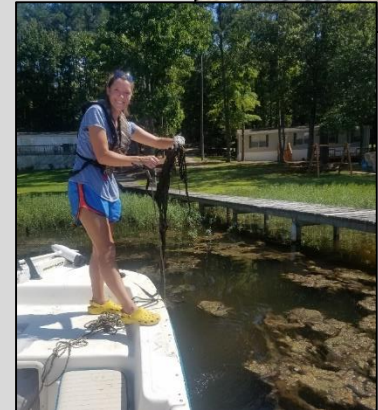


Lake Gaston

Technical Advisory Group Meeting

February 5th, 2019



Membership List

Voting		Non- Voting
Stakeholders Chair	Pete Deschenes	Justin Nawrocki
Grass Carp Expert	Rich Noble	West Bishop
DEQ AWP	Rob Emens	Mark Heilman
NCSU AWP	Rob Richardson	Todd Horton
NCWRC – Fish	Kirk Rundle	Wally Sayko
NCWRC – Habitat	Mark Fowlkes	Steve Hoyle
VADGIF	Dan Michaelson	Andrew Gay
USACE	Kurt Getsinger	
Dominion		
NCSU AT	Greg Cope	

Lake Gaston

Technical Advisory Group Meeting

February 5th, 2019



Jessica R. Baumann

Extension Associate, Lake Gaston
Aquatic Plant Management Program



Jessica Baumann

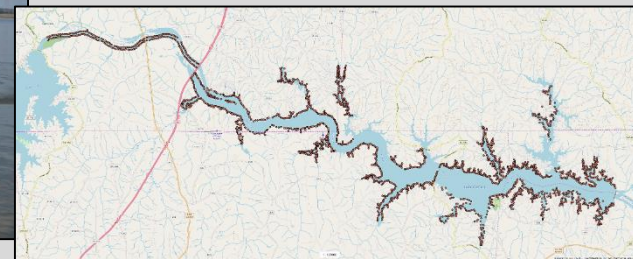
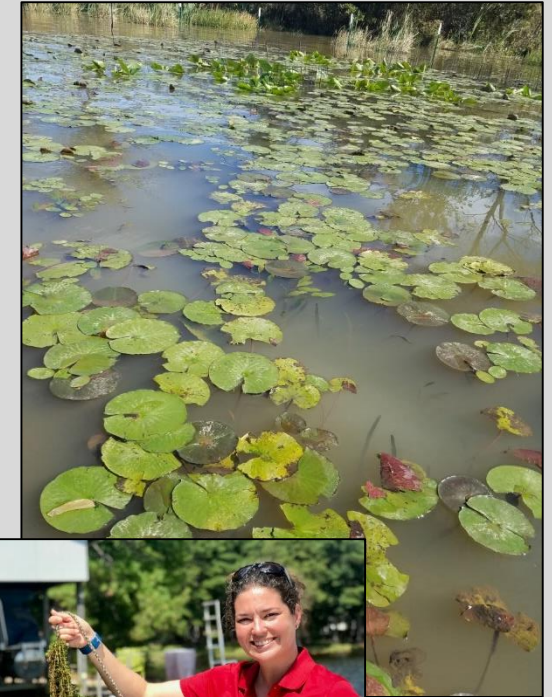
- * Bachelors in Biology
 - Augusta State University, GA
- * GA Stream Survey Unit
- * Masters in Fisheries & Wildlife
 - NC State University, 2007
 - *Diets of Introduced Flathead Catfish*
- * NC Wildlife Resources Commission
 - Fisheries Biologist – 11 years
 - Lake Gaston – 1 year

AquaticPlants
@ncsu.edu



Outline

- **Hydrilla**
 - 2018 Treatments
 - Survey Results
 - Volunteer
 - Sonar
 - 2019 Treatment Options
- **Lyngbya**
 - 2018 Survey Results
 - Volunteer
 - Pilot Study Update



2018 Hydrilla Treatments



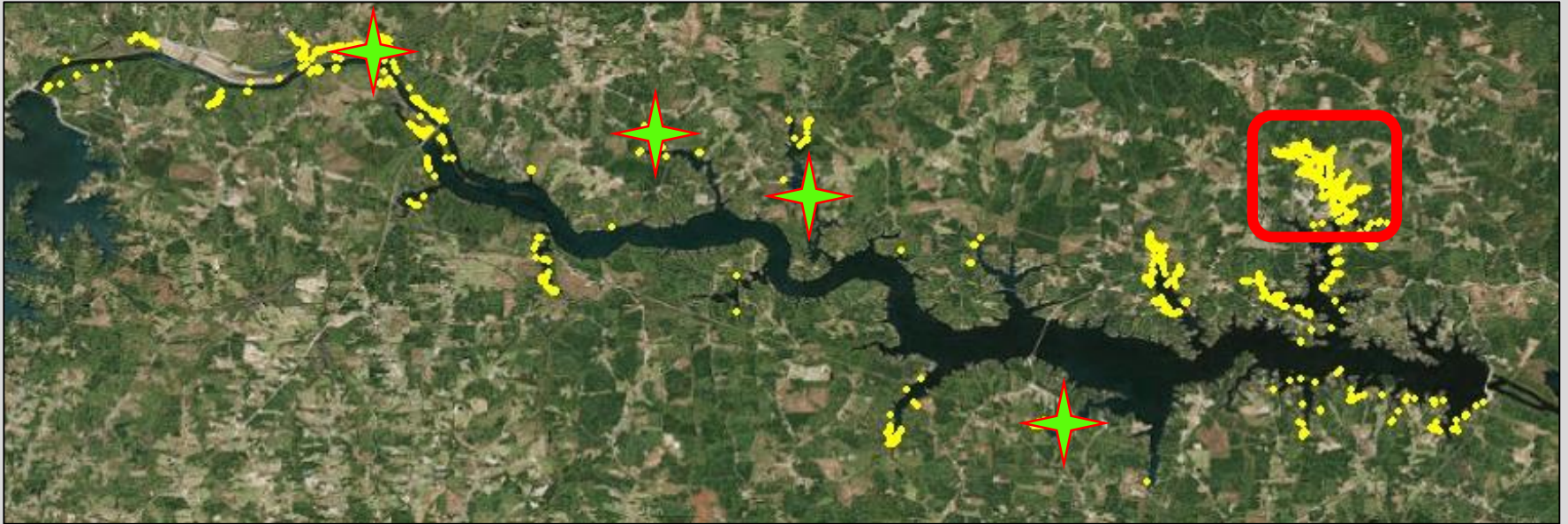
2018 Hydrilla Treatments



Rake Toss: 13%

Estimated Hydrilla Acreage: 374

2018 Hydrilla Treatments



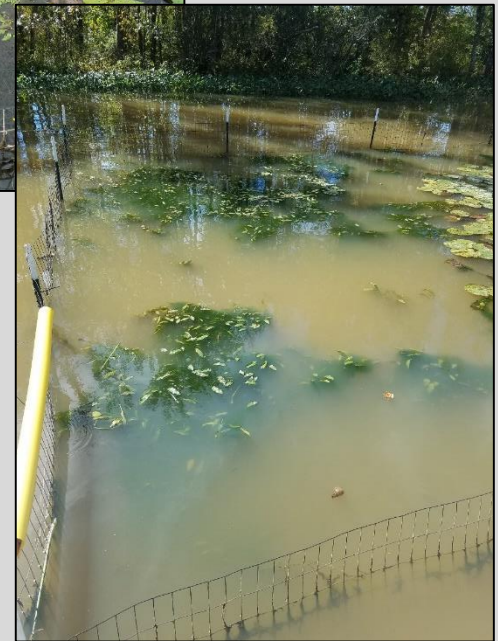
Rake Toss: 13%

Estimated Hydrilla Acreage: 374

Treatment Acreage: 200

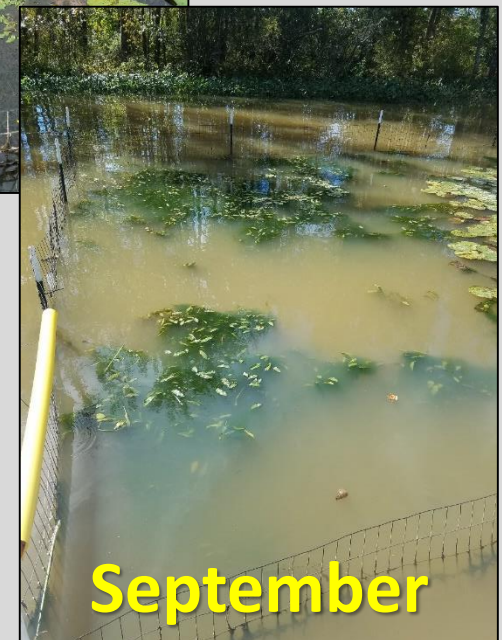
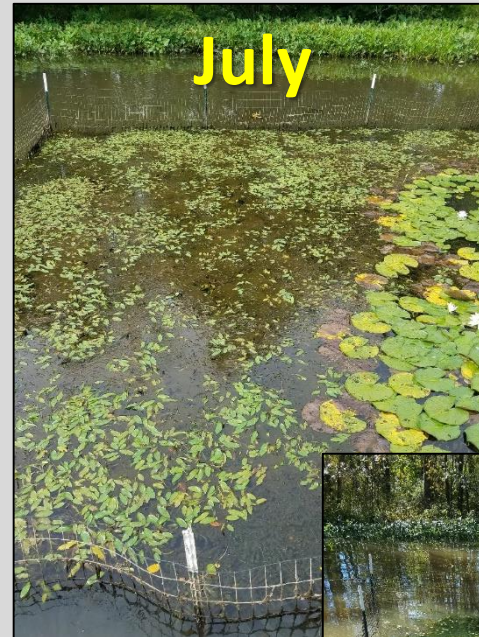
2018 Hydrilla Treatments

- **Treatments**
 - **Sonar (June – August)**
 - Upper Pea Hill (100 acres)
 - Beechwood (4.4 acres)
 - Big Stonehouse (11.5 acres)
 - Great Creek (5.9 acres)
 - Poplar Creek (21.4 acres)
 - **Contact (September)**



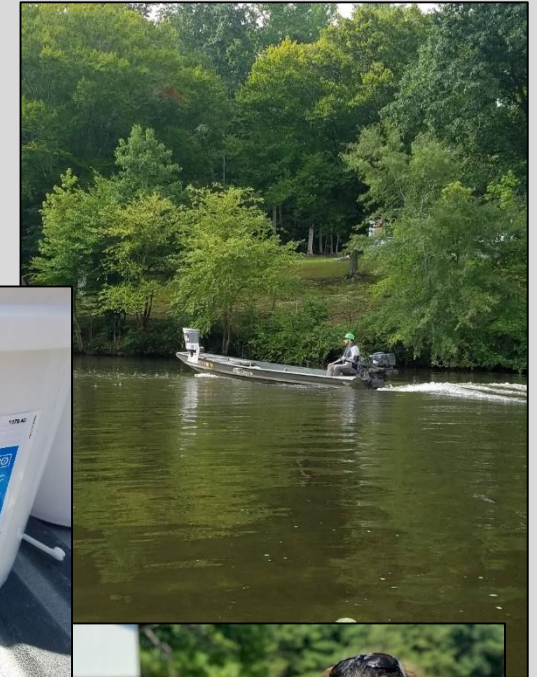
2018 Hydrilla Treatments

- **Treatments**
 - **Sonar (June – August)**
 - Upper Pea Hill (100 acres)
 - **Beechwood** (4.4 acres)
 - Big Stonehouse (11.5 acres)
 - Great Creek (5.9 acres)
 - Poplar Creek (21.4 acres)
 - **Contact (September)**



2018 Hydrilla Treatments

- **Treatments**
 - **Sonar (June – August)**
 - Total of 143.2 acres
 - **Contact (September)**



2018 Hydrilla Treatments

- **Treatments**
 - **Sonar (June – August)**
 - Total of 143.2 acres
 - **Contact (September)**
 - Boat Ramps
 - Water Hydrants Sites
 - Left with 30 undesignated acres



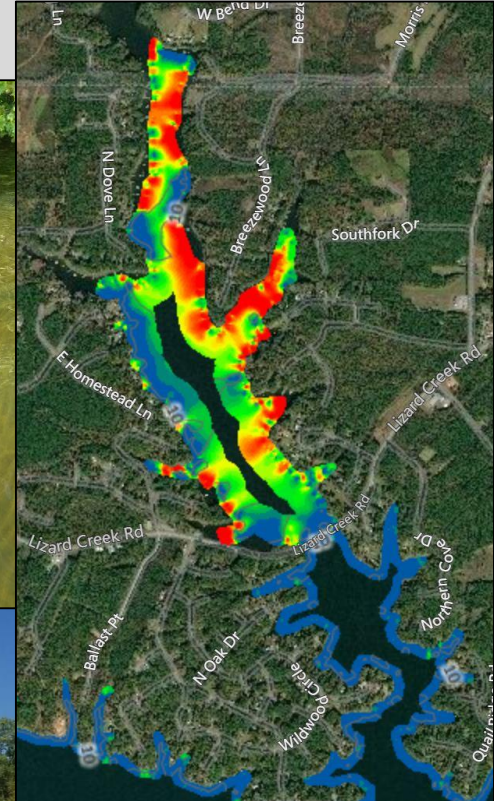
2018 Hydrilla Treatments

- **Treatments**
 - **Sonar (June – August)**
 - Total of 143.2 acres
 - **Contact (September)**
 - Boat Ramps
 - Water Hydrants Sites
 - Left with 30 undesigned acres
- **Lizard Creek**



2018 Hydrilla Treatments

- **Treatments**
 - **Sonar (June – August)**
 - Total of 143.2 acres
 - **Contact (September)**
 - Boat Ramps
 - Water Hydrants Sites
 - Left with 30 undesigned acres
- **Lizard Creek**
 - Contact Treatment
 - Late August
 - Needs to be Addressed in 2019



Fall Volunteer Survey

- 4 Training Sessions
 - Collections Methods / Plant ID
- 60+ Volunteers



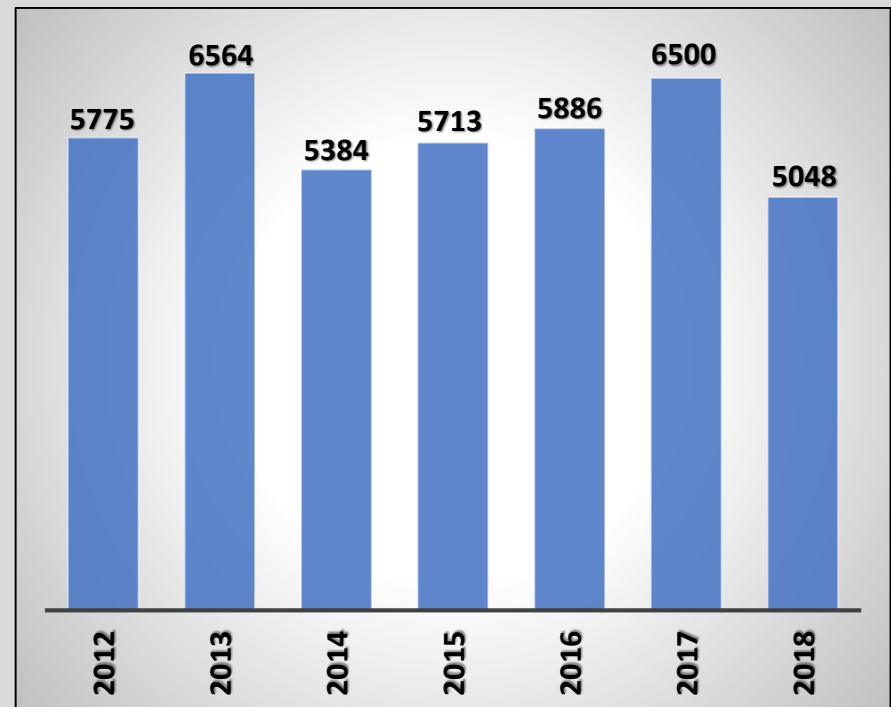
Fall Volunteer Survey

- 4 Training Sessions
- 60+ Volunteers
- Conducted from Sept 1st to Oct 31st
 - Two Hurricanes this Year



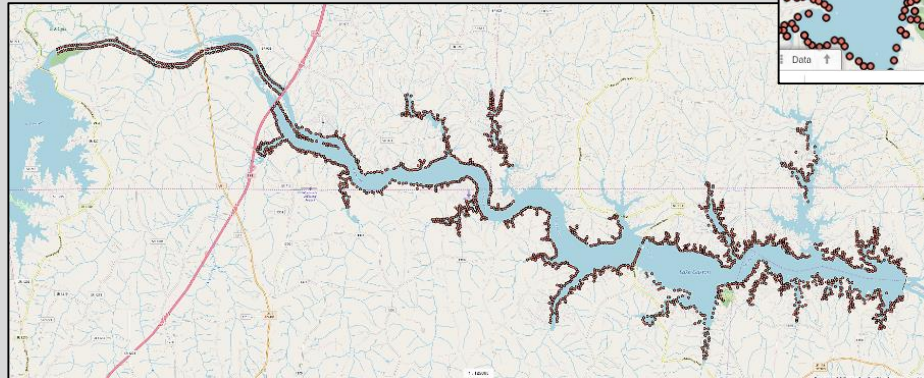
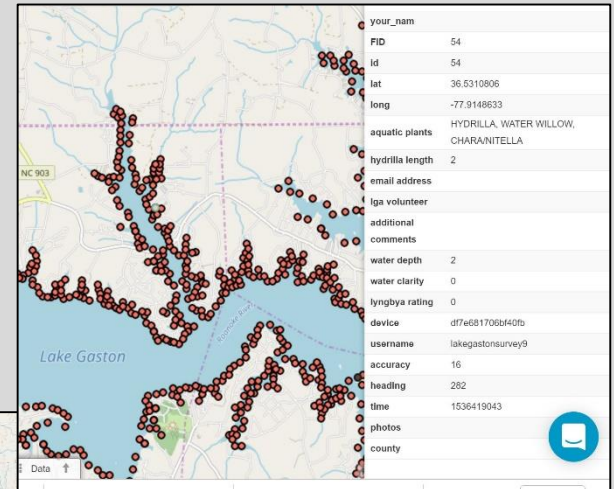
Fall Volunteer Survey

- 4 Training Sessions
- 60+ Volunteers
- Conducted from Sept. 1st to Oct 31st
- Put in 720 Volunteer Hrs
- 5,048 Points Collected
 - Goal Every 200 ft



Fall Volunteer Survey

- 4 Training Sessions
- 60+ Volunteers
- Conducted from Sept. 1st to Oct 31st
- Put in 720 Volunteer Hrs
- 5,048 Points Collected
- All Data Uploaded to Cloud Server



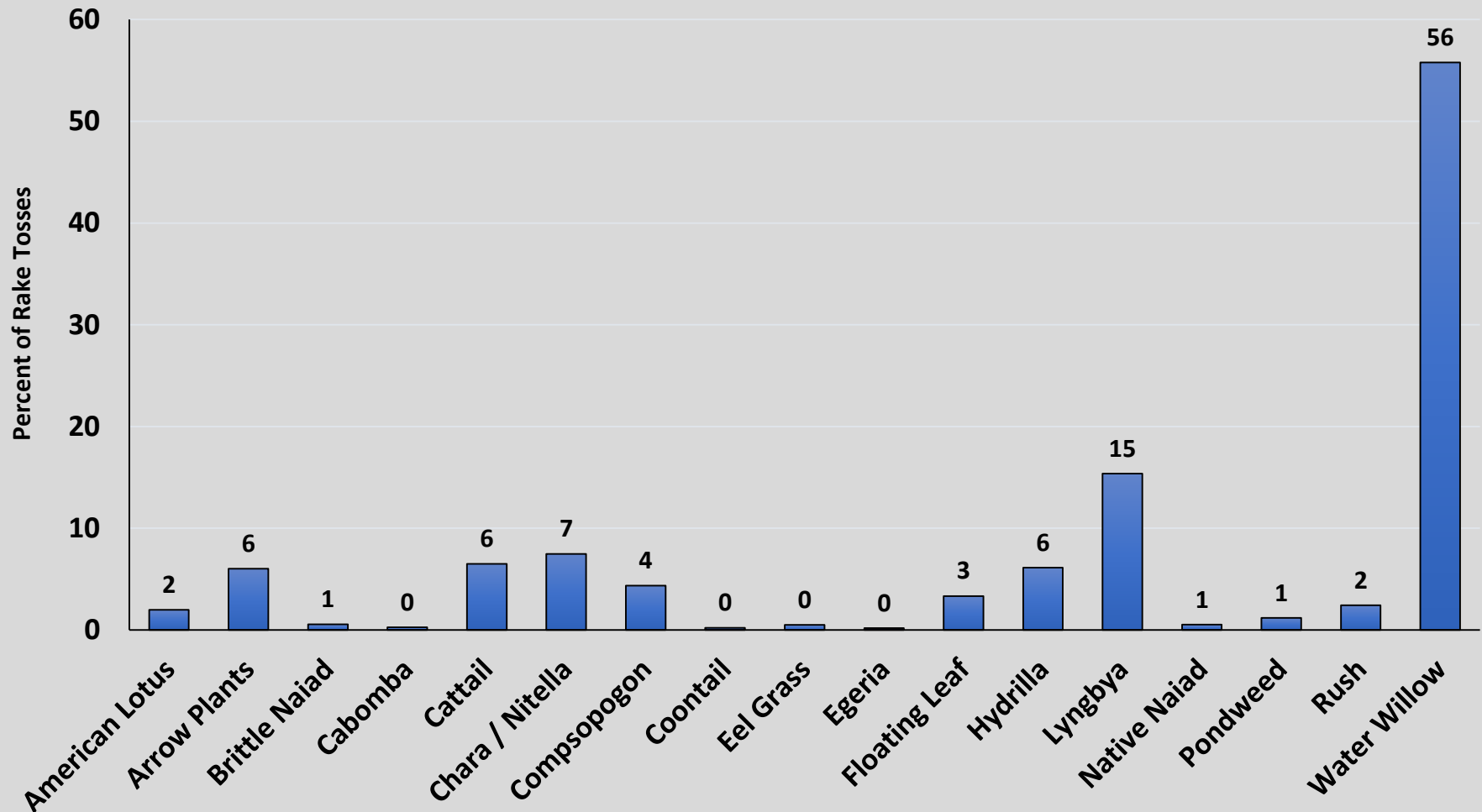
Fall Volunteer Survey

- Plants Identified

Emergent	Submergent	Floating Leaf	Algae
American Lotus	Brittle Naiad	Floating Leaf	Chara / Nitella
Arrow Plants	Cabomba	Pondweed	Compsopogon
Cattail	Eel Grass		Lyngbya
Coontail	Egeria		
Rush	Hydrilla		
Water Willow	Native Naiad		
	Watermilfoil		

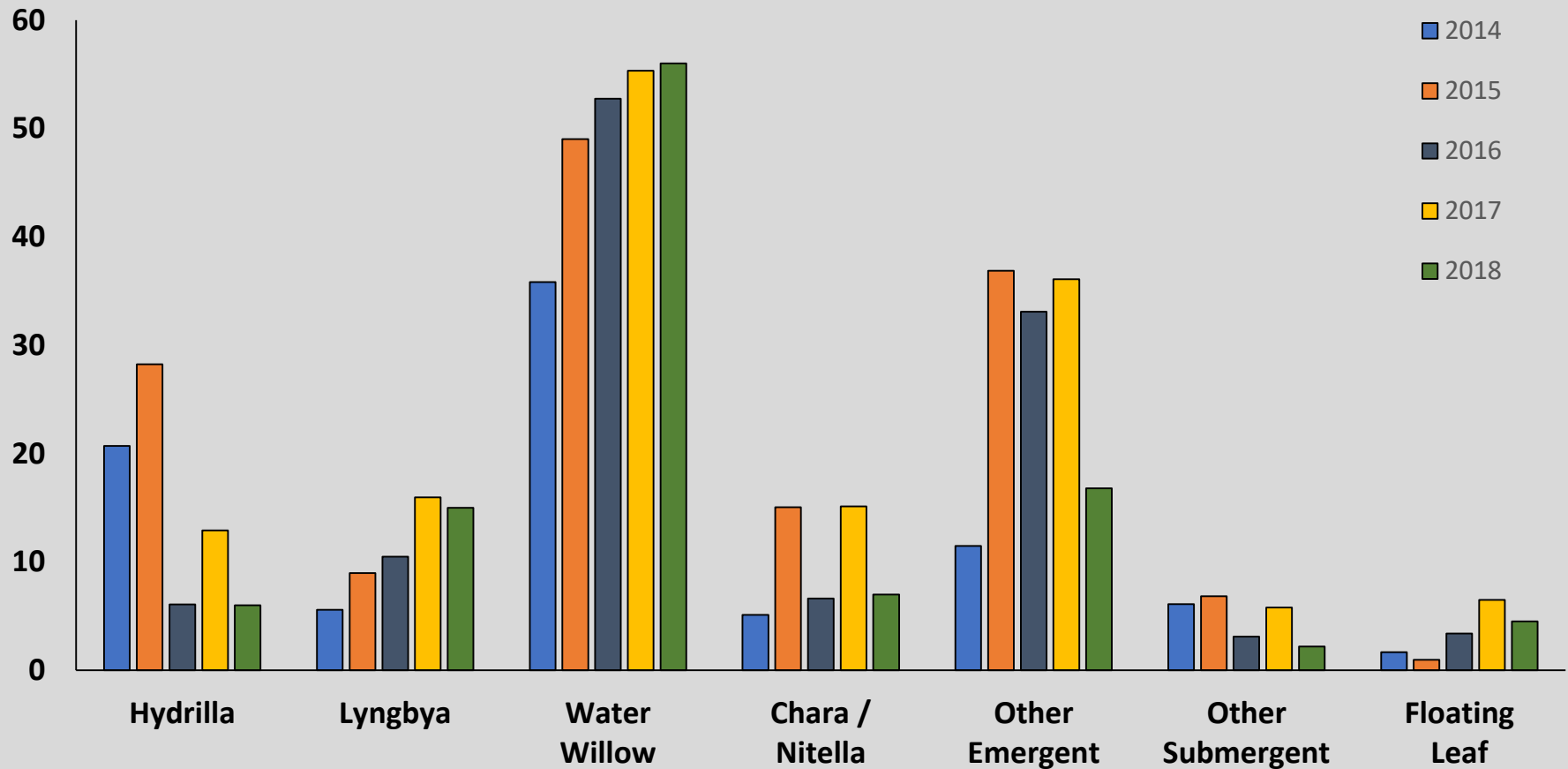
Fall Volunteer Survey

Aquatic Plant Abundance 2018



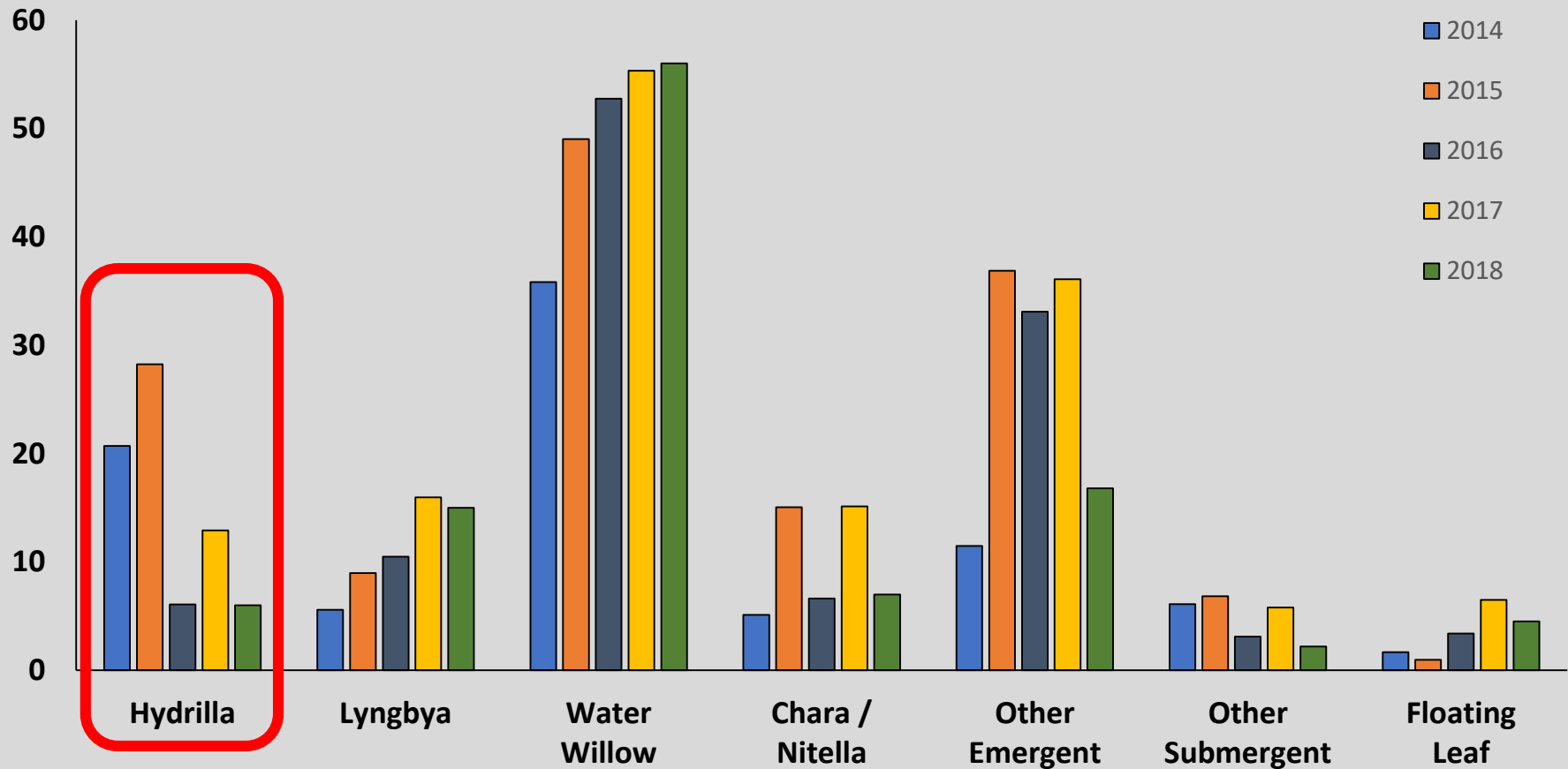
Fall Volunteer Survey

Aquatic Plant Abundance



Fall Volunteer Survey

Aquatic Plant Abundance

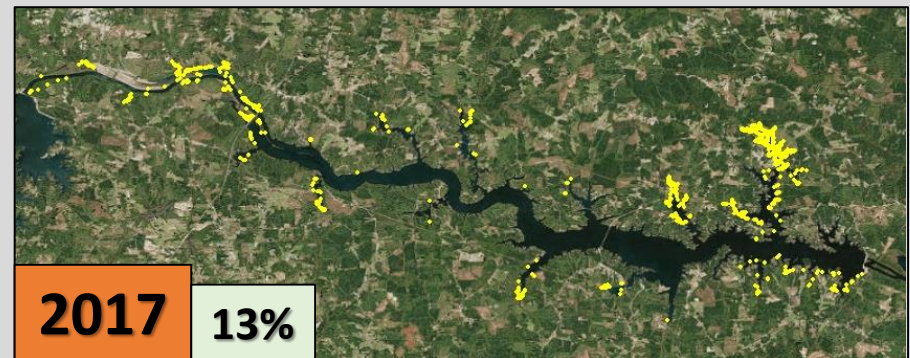
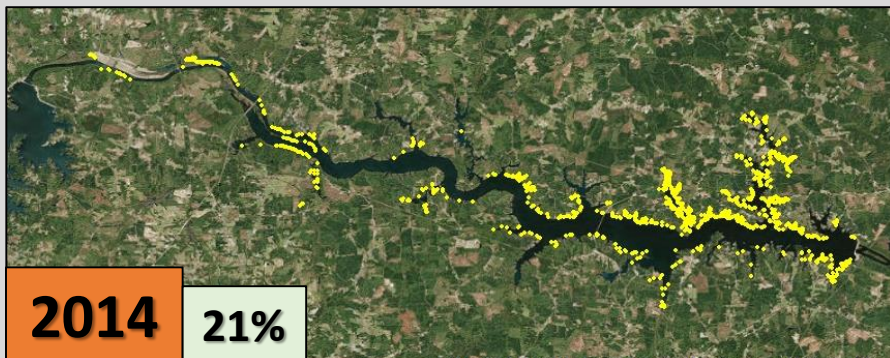
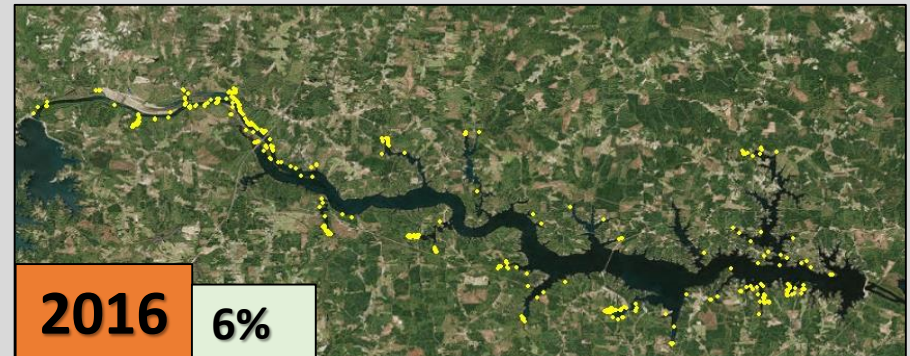
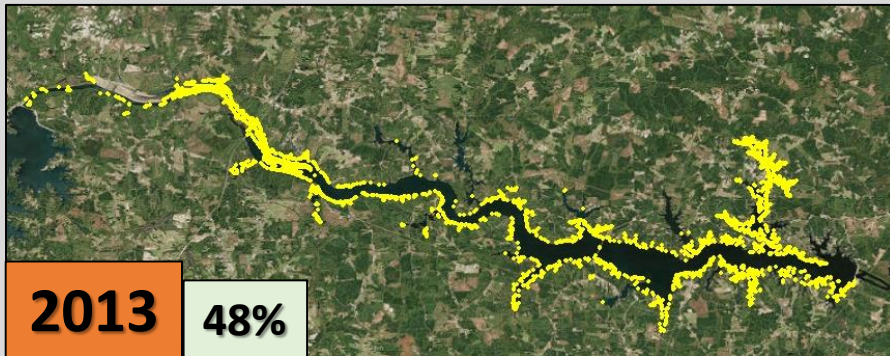
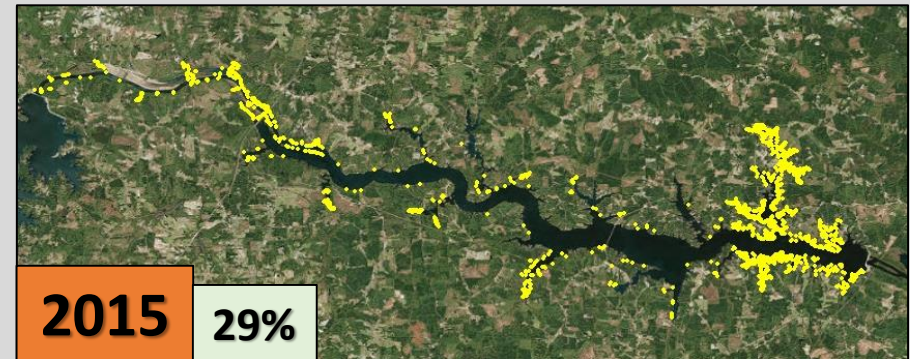
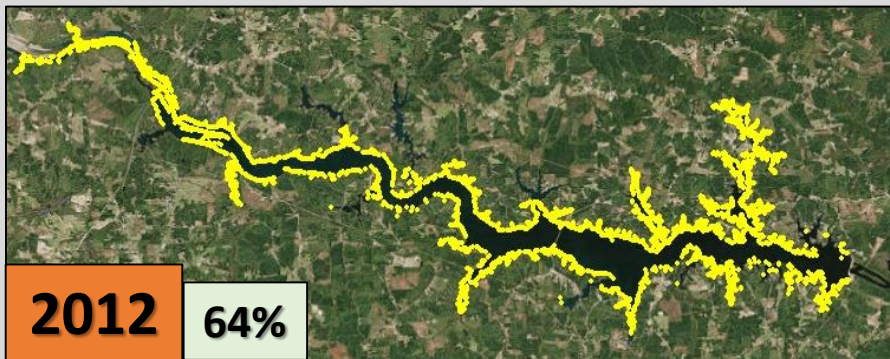


Hydrilla Survey

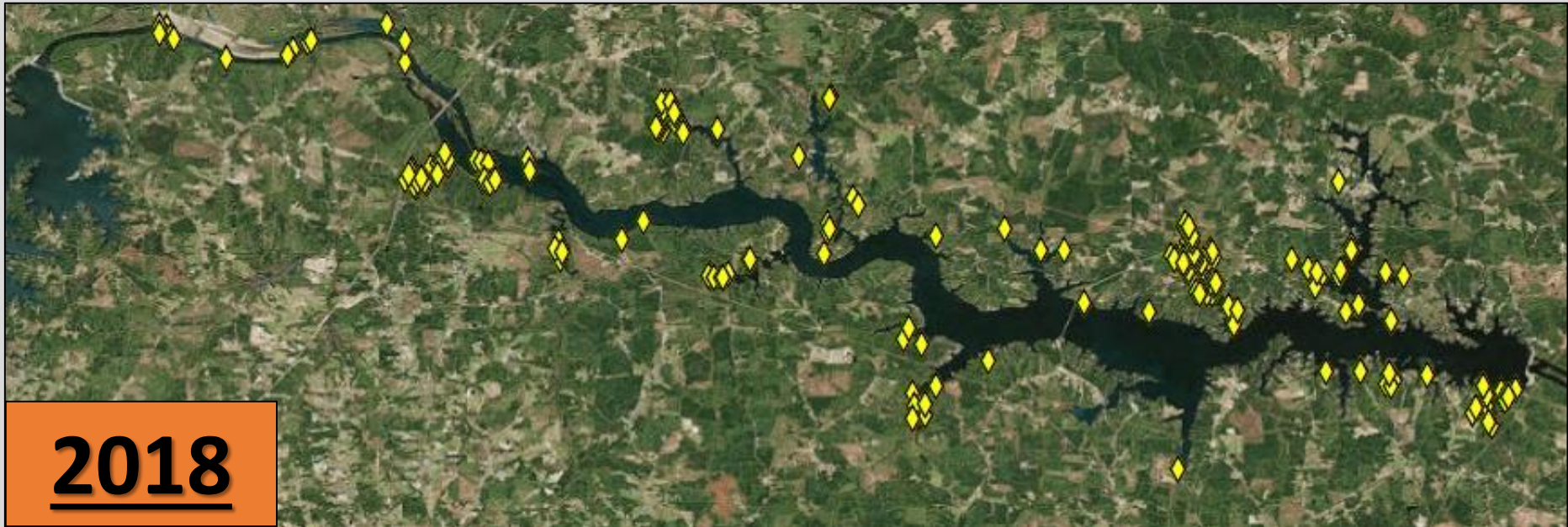


64% Rake Toss

Hydrilla Survey



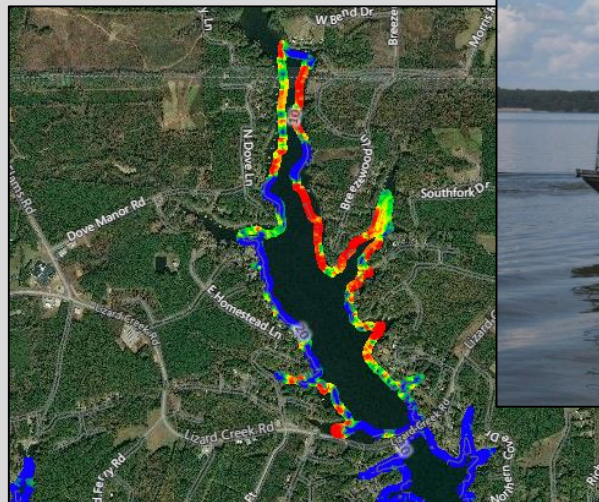
Hydrilla Survey



6% Rake Toss

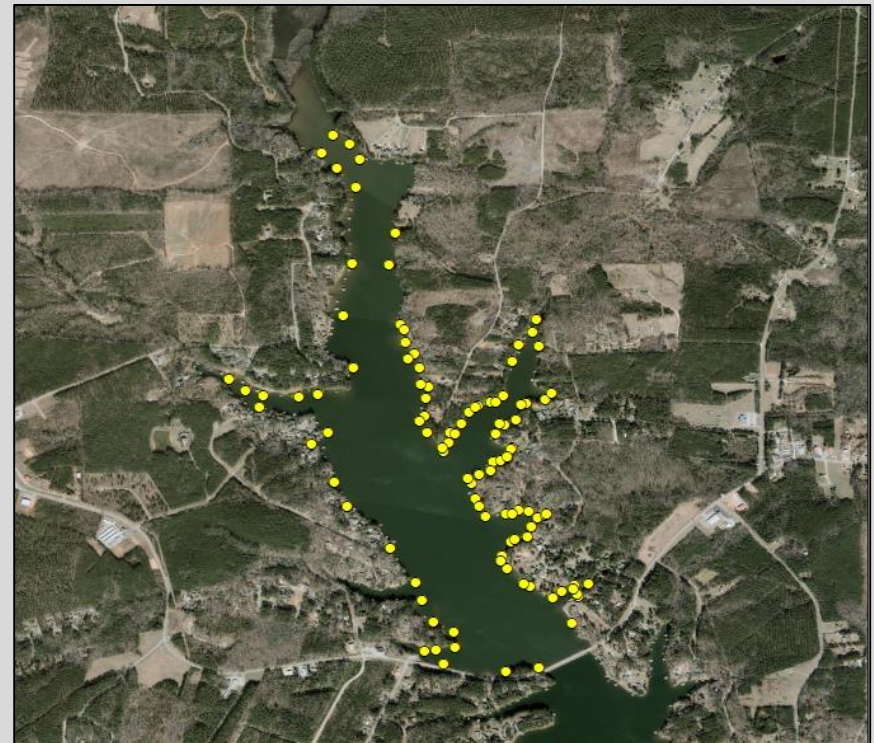
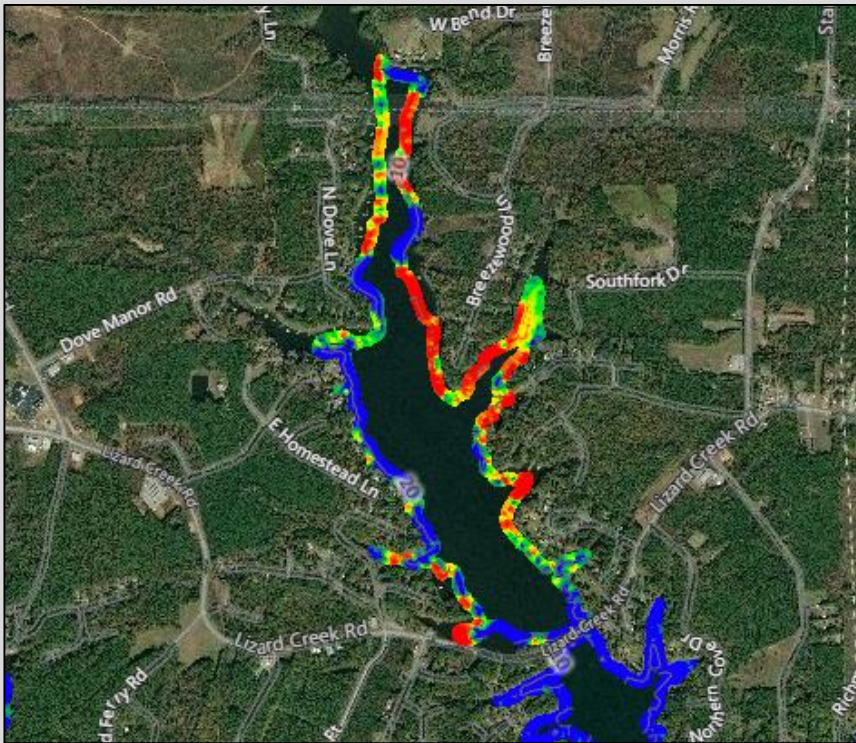
Fall Sonar Survey

- Entire Shoreline Sampled
- Dual Track Sonar
- Sept. 25th to Oct. 5th
- Data uploaded to BioBase
 - Calculate BioVolume



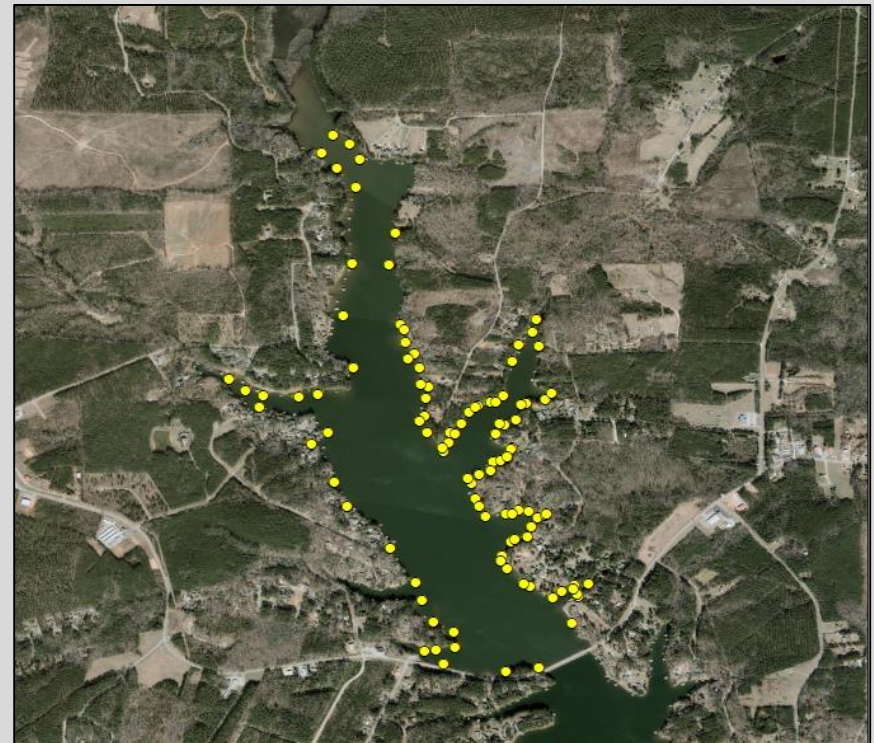
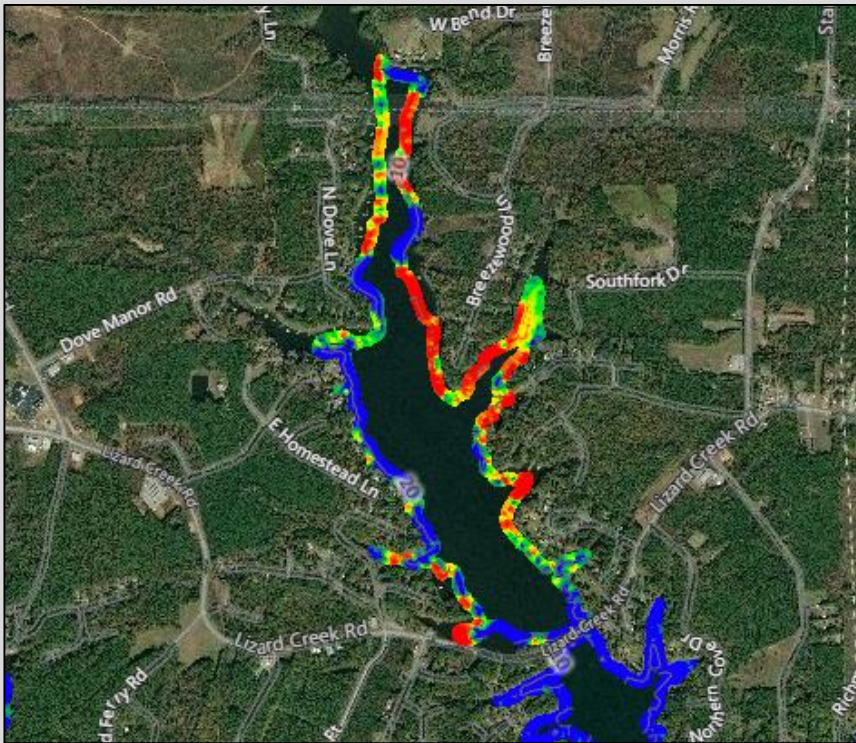
Hydrilla Survey

- **Acreeage Estimates**



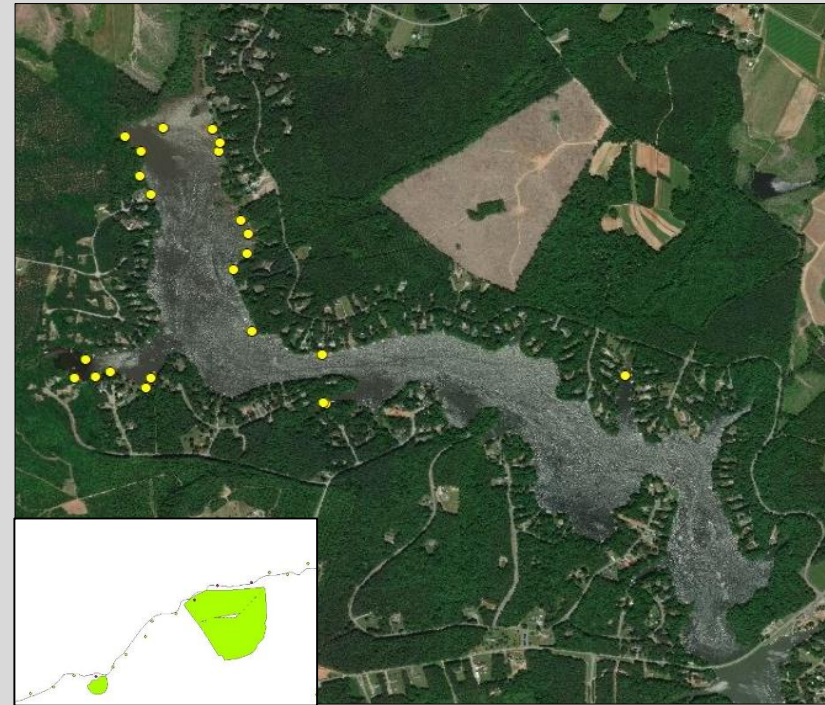
Hydrilla Survey

- **Acreage Estimates – Nuisance Level**
 - If Biovolume > 5% AND Volunteers detect Hydrilla



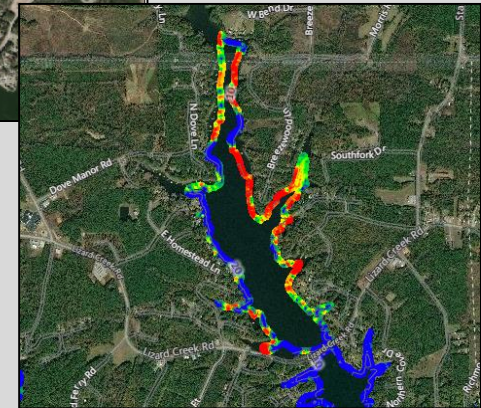
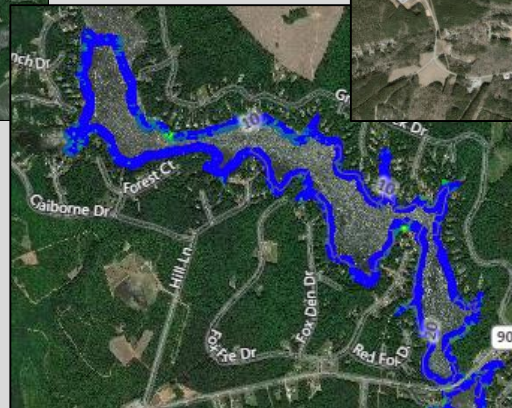
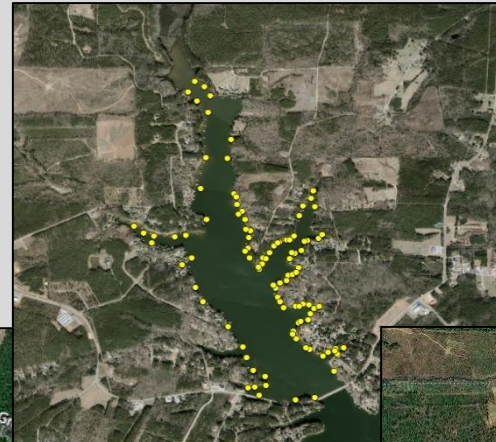
Hydrilla Survey

- **Acreage Estimates - Partial**
 - If Biovolume < 5% BUT Volunteers detect Hydrilla



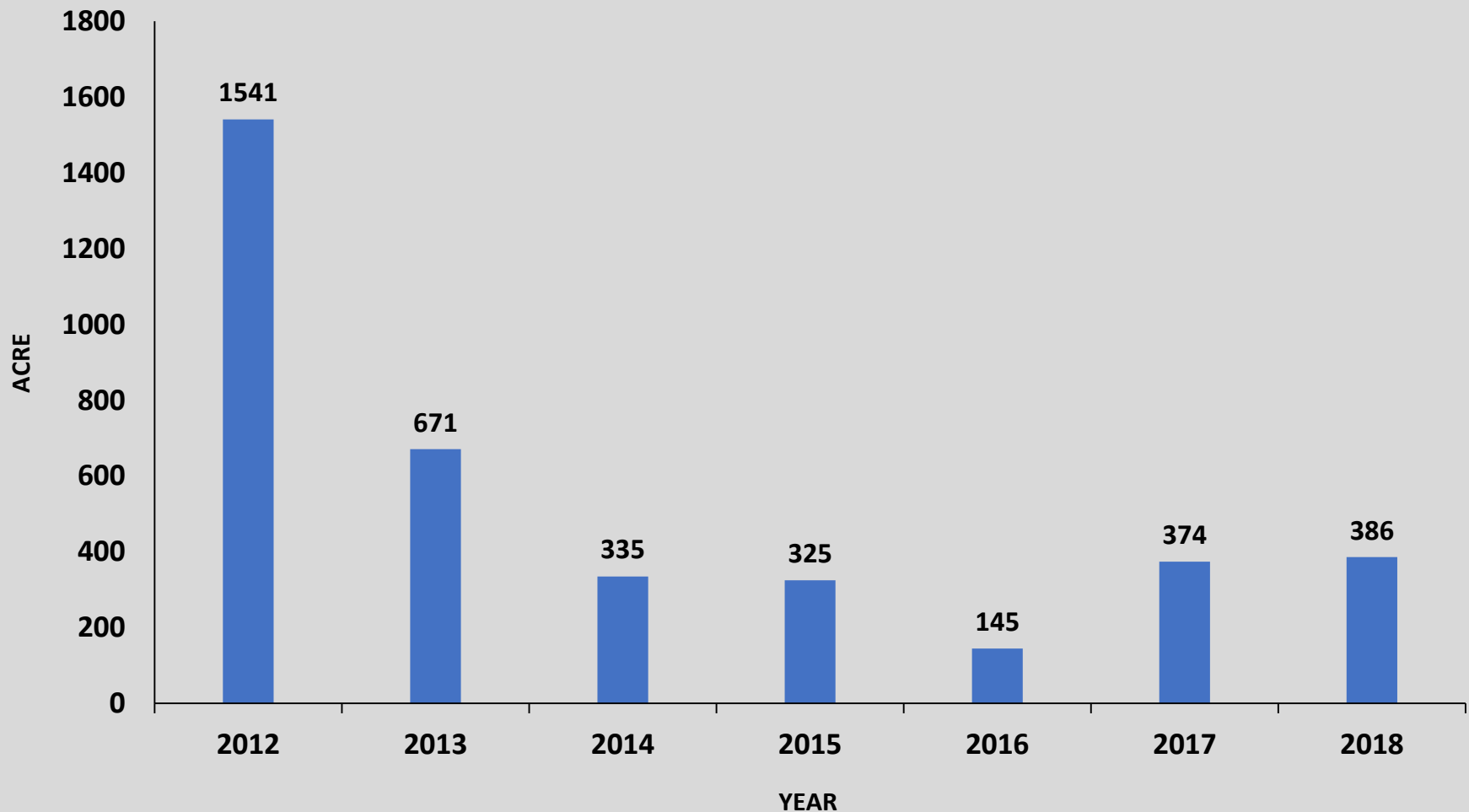
Hydrilla Survey

- Acreage Estimates
 - Total Estimated Acreage = Combination of Two
 - **2018 Total Estimated Acreage: 386 acres**



Hydrilla Survey

Hydrilla Acreage

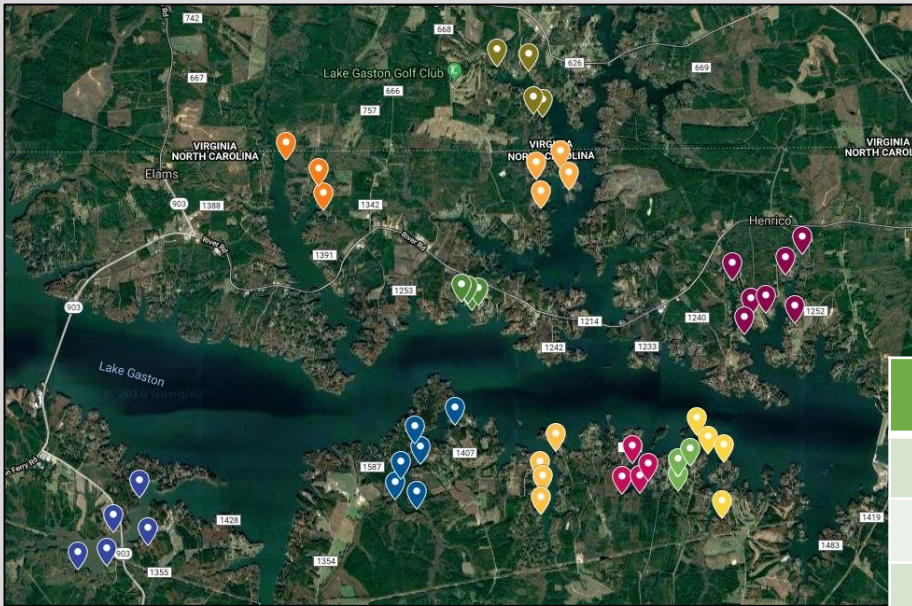


Tuber Survey

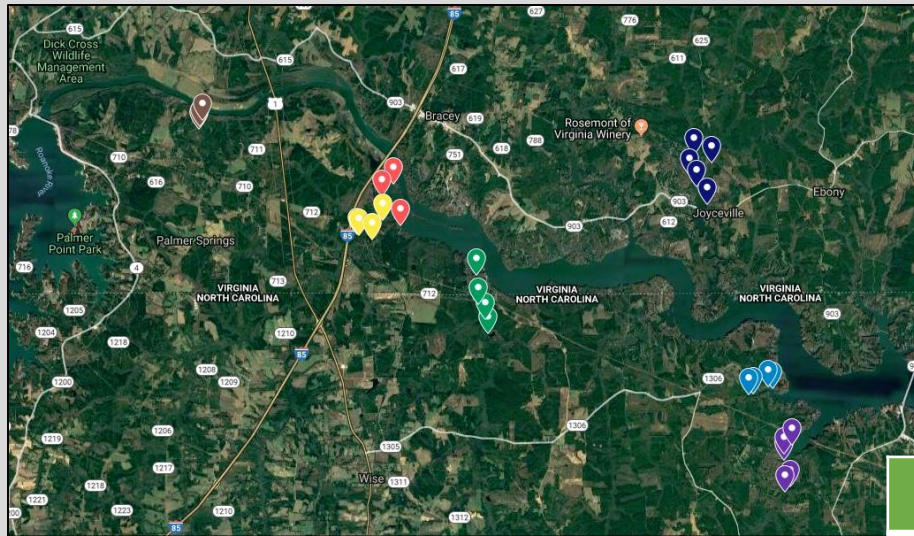


Tuber Density (m2)

	2012	2016	2017	2018
Jimmies Creek	36.41	2.06	0	0
Timberline Shores	3.08	0.62	0	0.82
Cold Springs Branch	34.95	16.03	0	1.23
Lakeview	124.37	0	0	0
Lizards Creek	N/A	3.29	0	49.34
Big Stone House	31.25	0.49	0	0
Pretty Creek	38.72	3.29	0	0
Poe Creek	125.40	3.70	0	0
Woodland Hurst	135.67	18.91	0	4.93
Sledge Creek	8.22	0	0	0
Hamlin	446.08	75.24	16.03	6.78



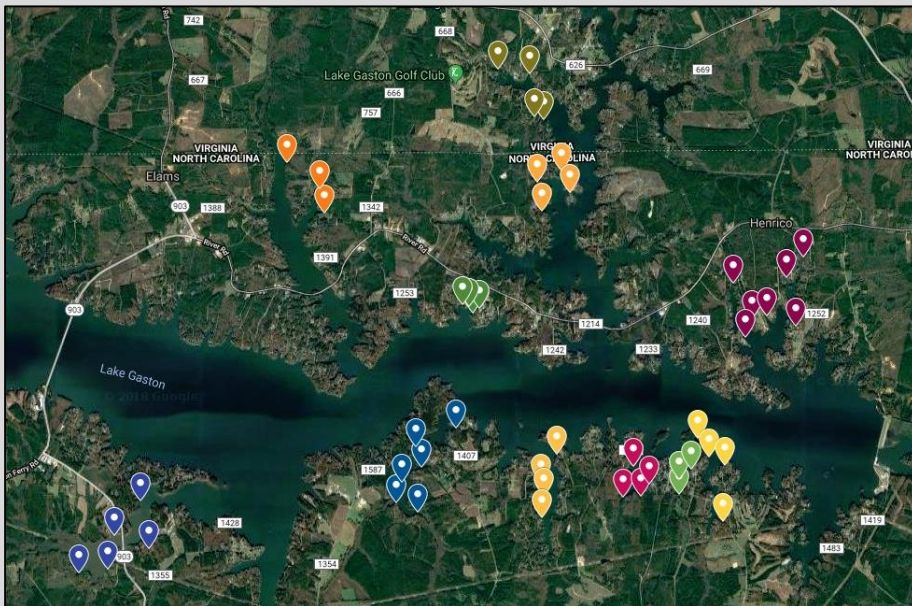
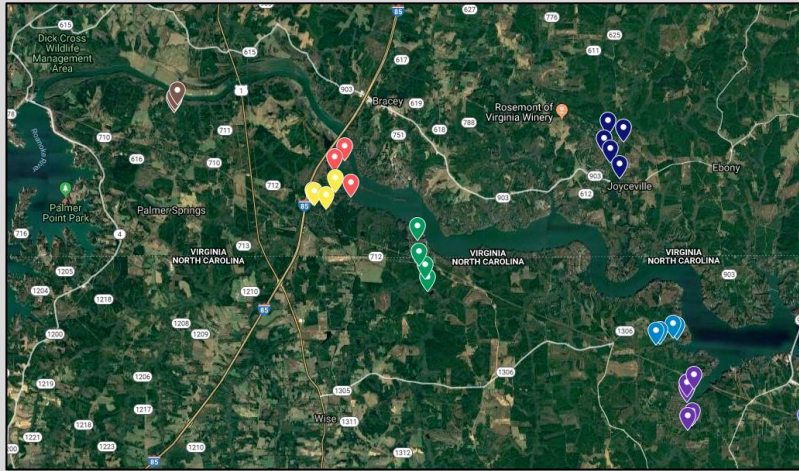
Tuber Survey



Tuber Density (m2)

	2012	2016	2017	2018
Hubquarter	292.73	53.12	14.14	6.78
Lyons Creek	293.96	22.82	21.58	29.33
Poplar Creek	89.63	15.95	19.12	0
Hawtree	38.03	29.19	123.13	59.41
Smith Creek	8.22	0	0	0
Flats	119.23	21.93	7.40	2.47
Cotton Creek	217.90	165.82	76.74	67.15

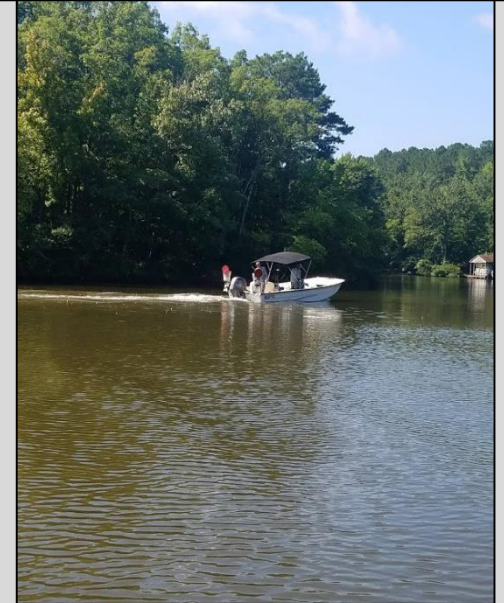
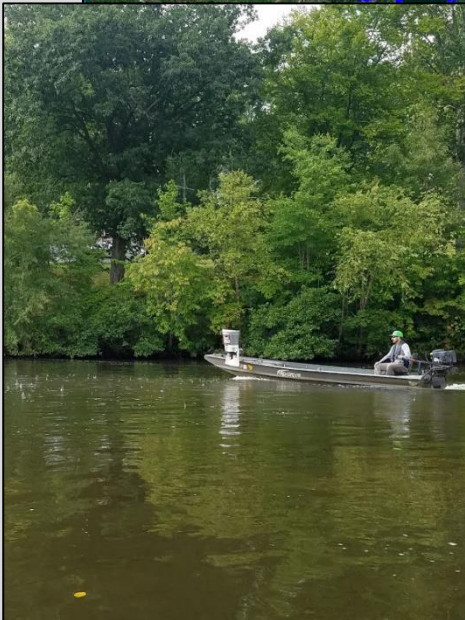
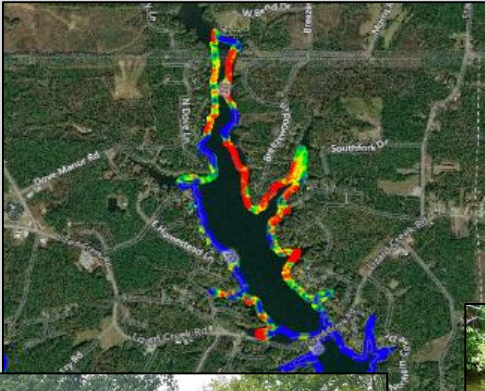




Tuber Density (m2)

	2012	2016	2017	2018
Hubquarter	292.73	53.12	14.14	6.78
Lyons Creek	293.96	22.82	21.58	29.33
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Lakeview	124.37	0	0	0
Lizards Creek	N/A	3.29	0	49.34
Big Stone House	31.25	0.49	0	0
Pretty Creek	38.72	3.29	0	0
Poe Creek	125.40	3.70	0	0
Woodland Hurst	135.67	18.91	0	4.93
Sledge Creek	8.22	0	0	0
Hamlin	446.08	75.24	16.03	6.78

Hydrilla Control

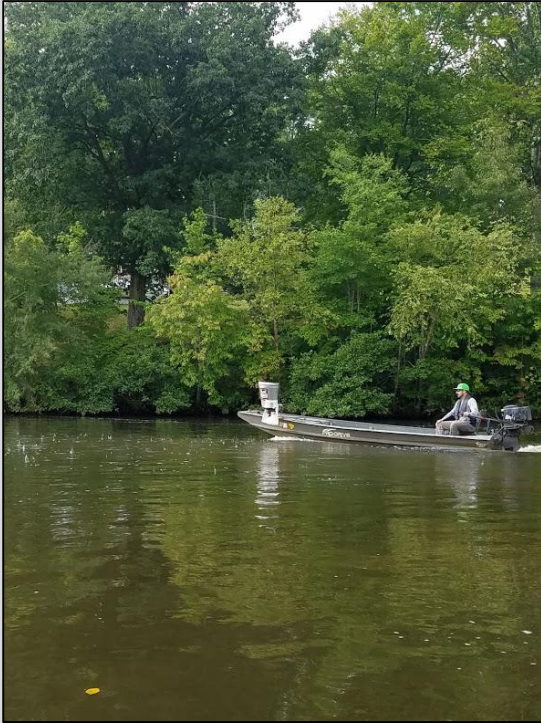


Grass Carp

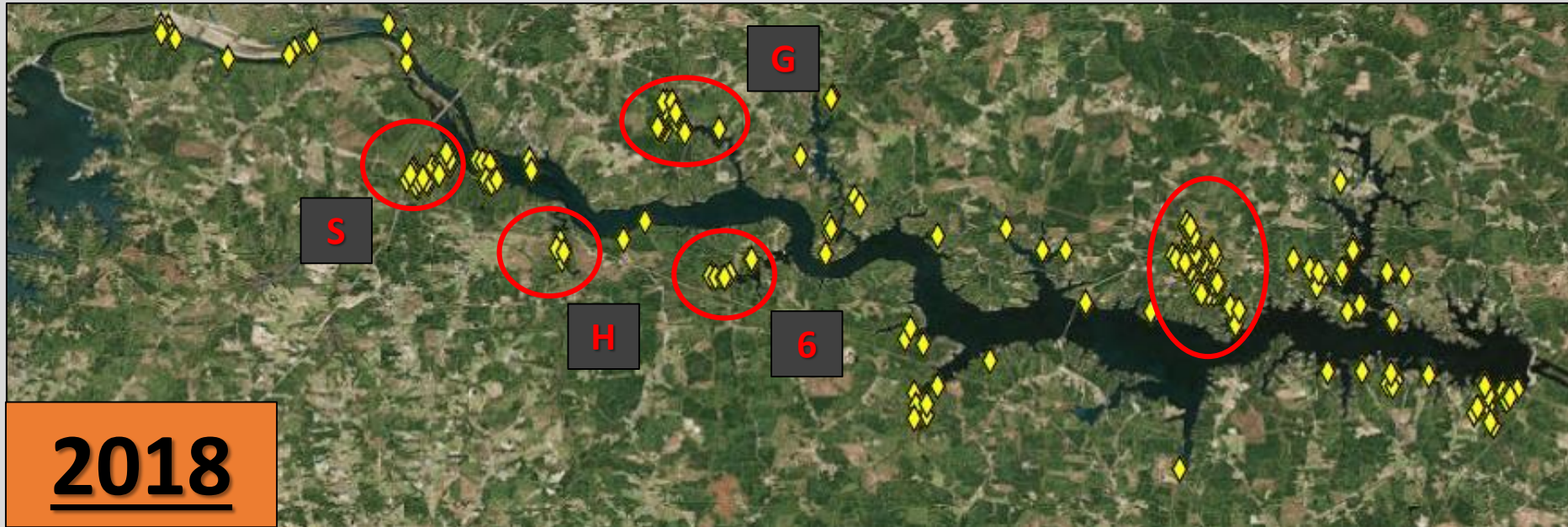
- **Grass Carp Stocking Model - NCWRC**
 - 2018 Standing Hydrilla Acreage: 386 acres
 - **7,554 Grass Carp**
 - **To Be Stocked in Lizard Creek?**



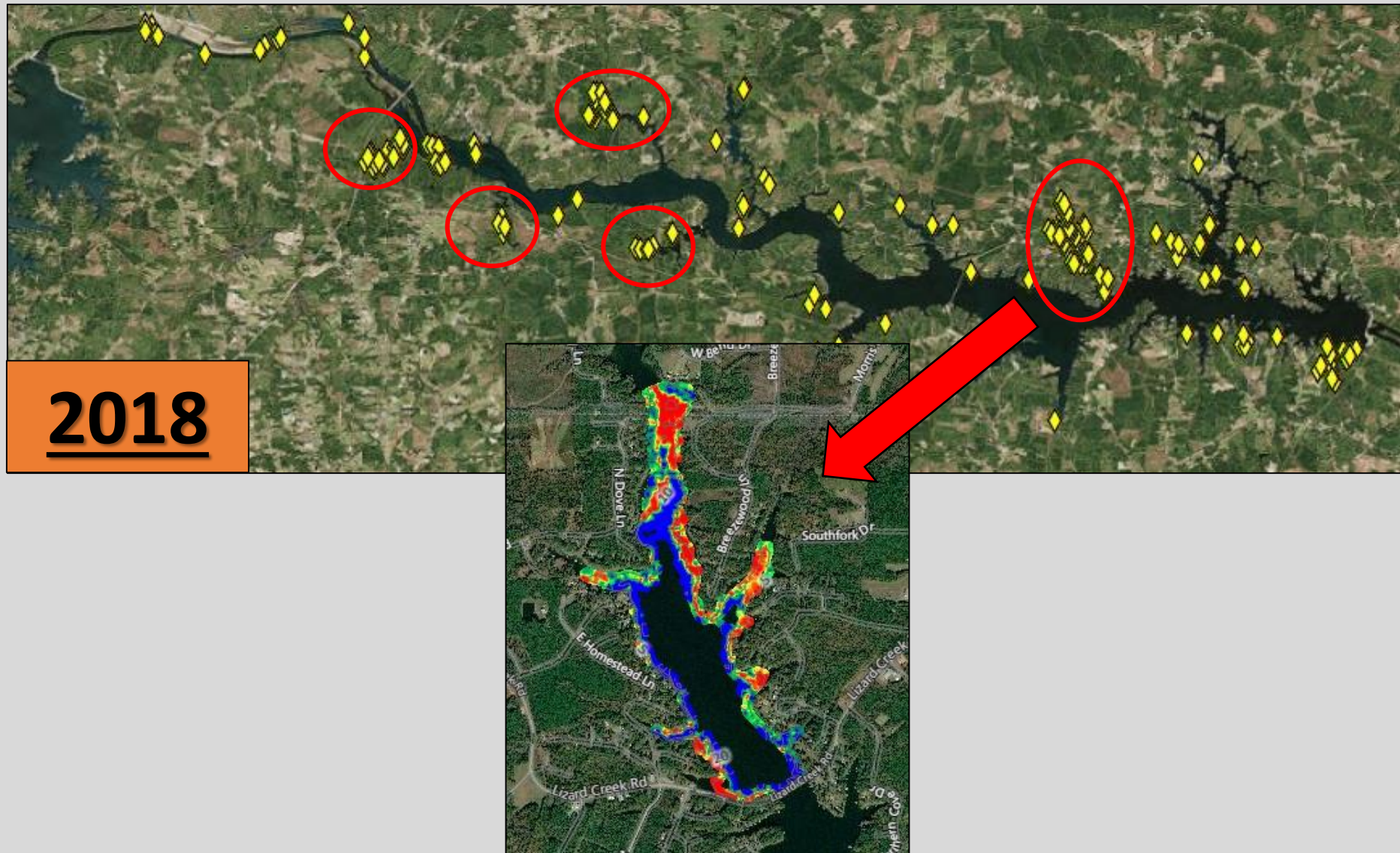
Herbicide



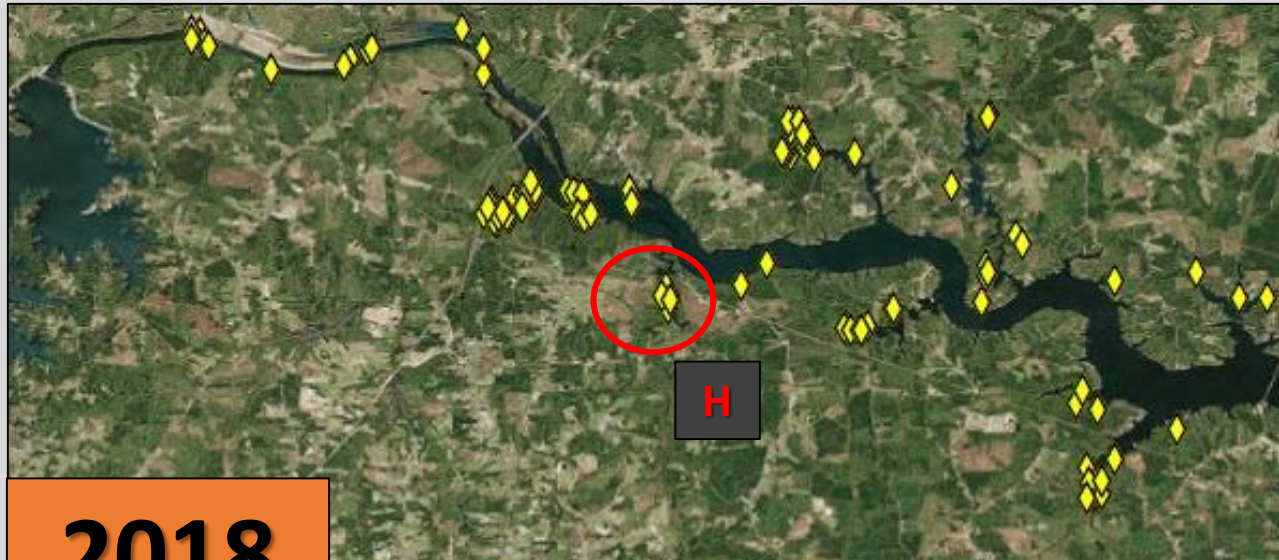
Hydrilla Sonar Survey



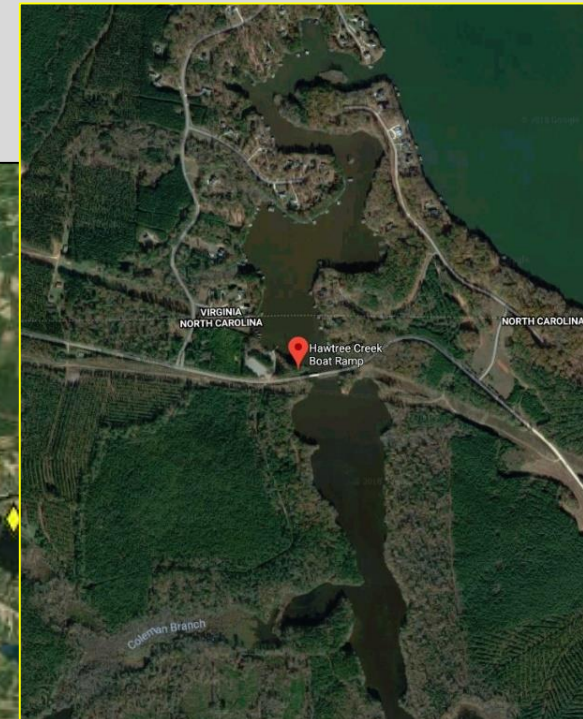
Hydrilla Sonar Survey



Hydrilla Survey



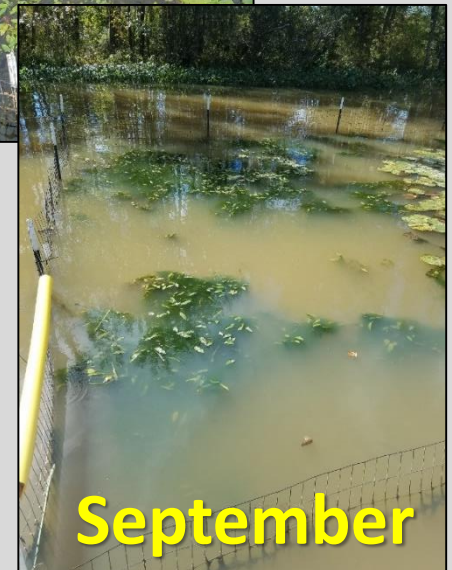
2018



Tuber Density (m2)	2012	2015	2016	2017	2018
Hubquarter	292.73	59.20	53.12	14.14	6.78
Lyons Creek	293.96	31.86	22.82	21.58	29.33
Poplar Creek	89.63	11.51	15.95	19.12	0
Hawtree	38.03	33.92	29.19	123.13	59.41
Smith Creek	8.22	4.11	0	0	0
Flats	119.23	30.15	21.93	7.40	2.47
Cotton Creek	217.90	104.15	165.82	76.74	67.15

2019 Hydrilla Treatments

- **Treatments Recommendations**
 - **Sonar (June – August)**
 - Lizard Creek (___ acres)
 - Cages (___ acres)
 - Adaptive Management
 - Beechwood
 - Big Stonehouse
 - Great Creek
 - Poplar Creek
 - Unexpected Infestations (___ acres)
 - **Total Acres (___)**



Lyngbya

- Filamentous Cyanobacteria
- Surface mats prevalent during summer months
- Two Graduate Students
 - Emily Vulgamore (Master's)
 - Jens Beets (PhD)

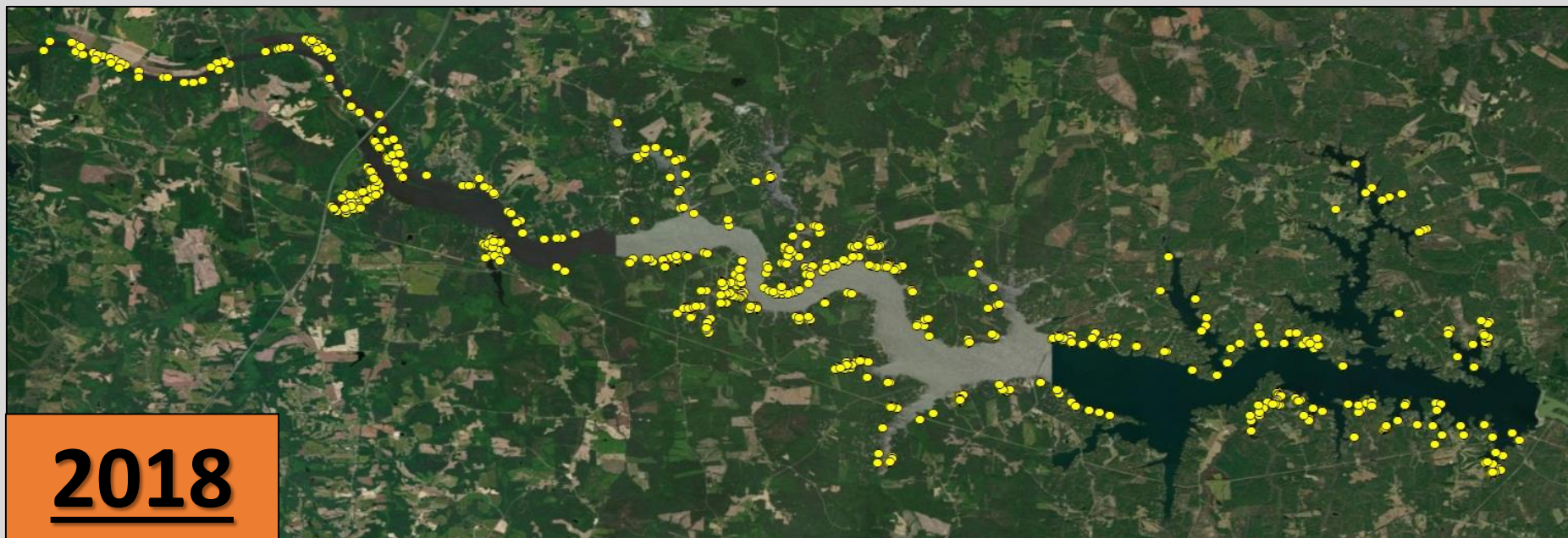


Lyngbya Survey



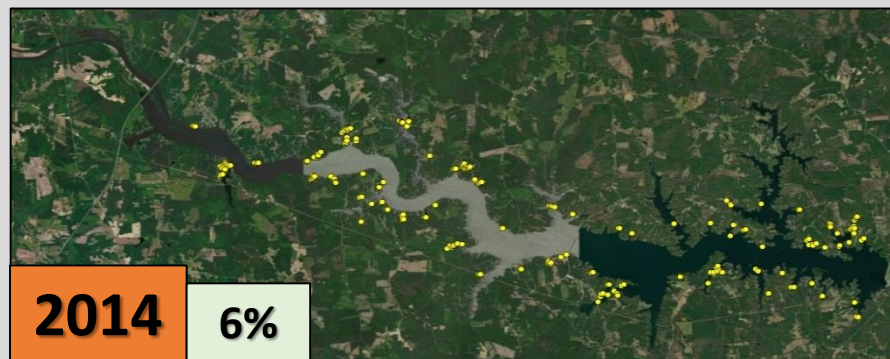
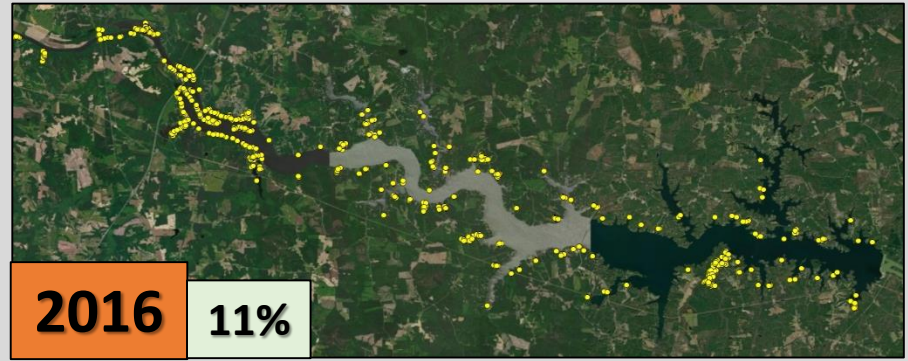
8.1% Rake Toss

Lyngbya Survey



15% Rake Toss

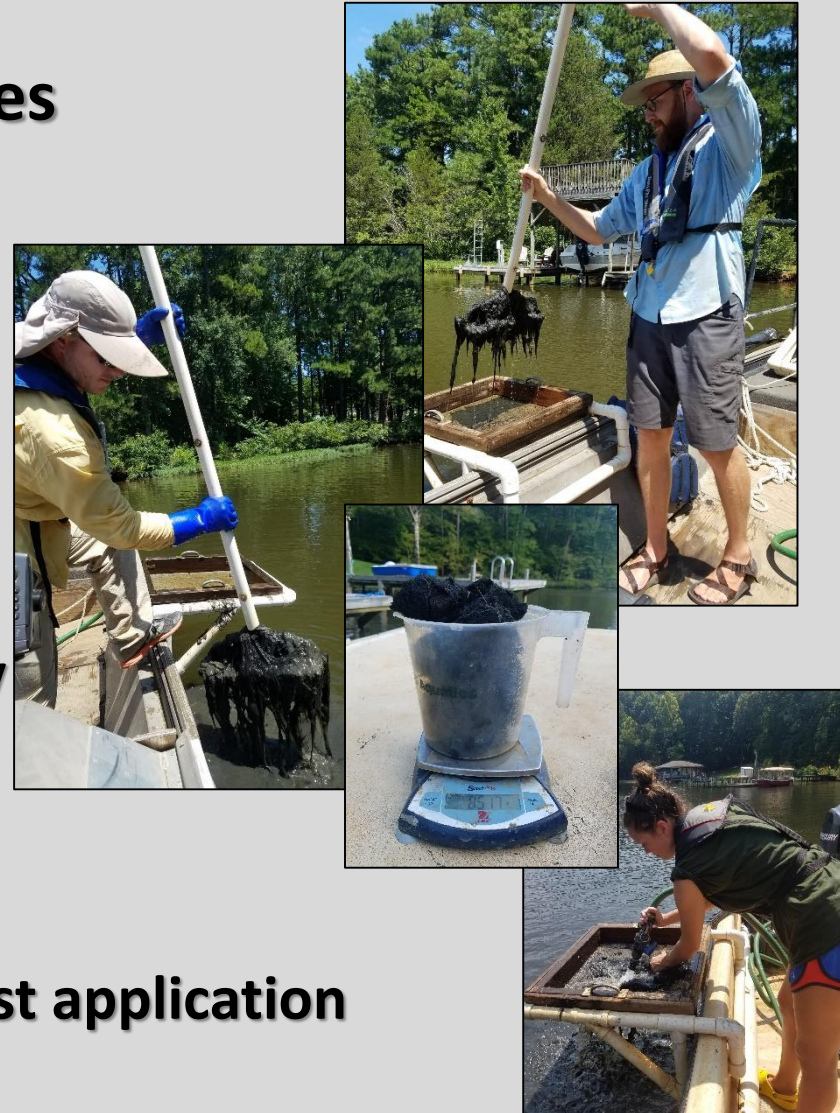
Lyngbya Survey



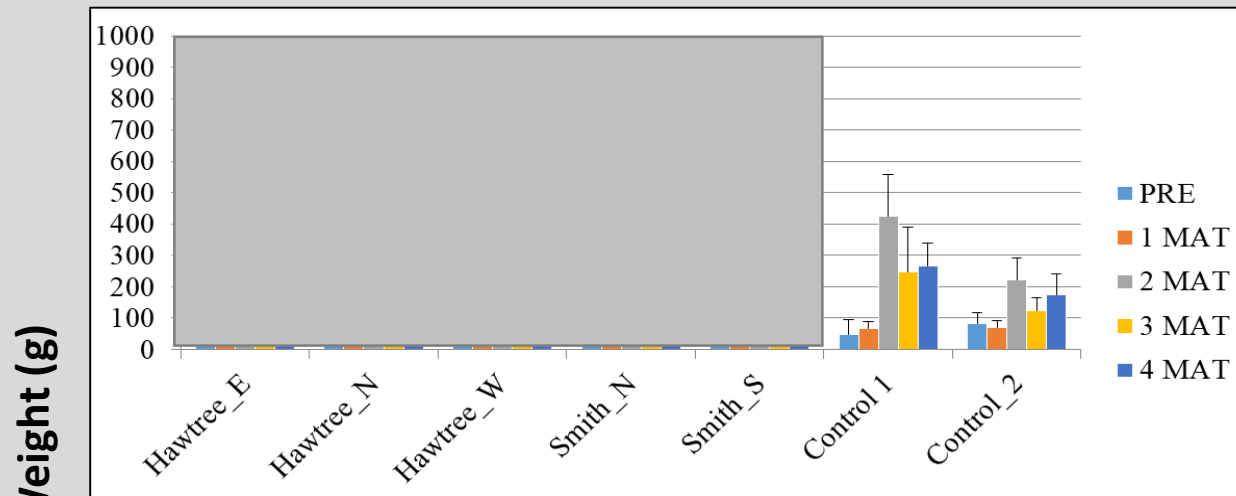
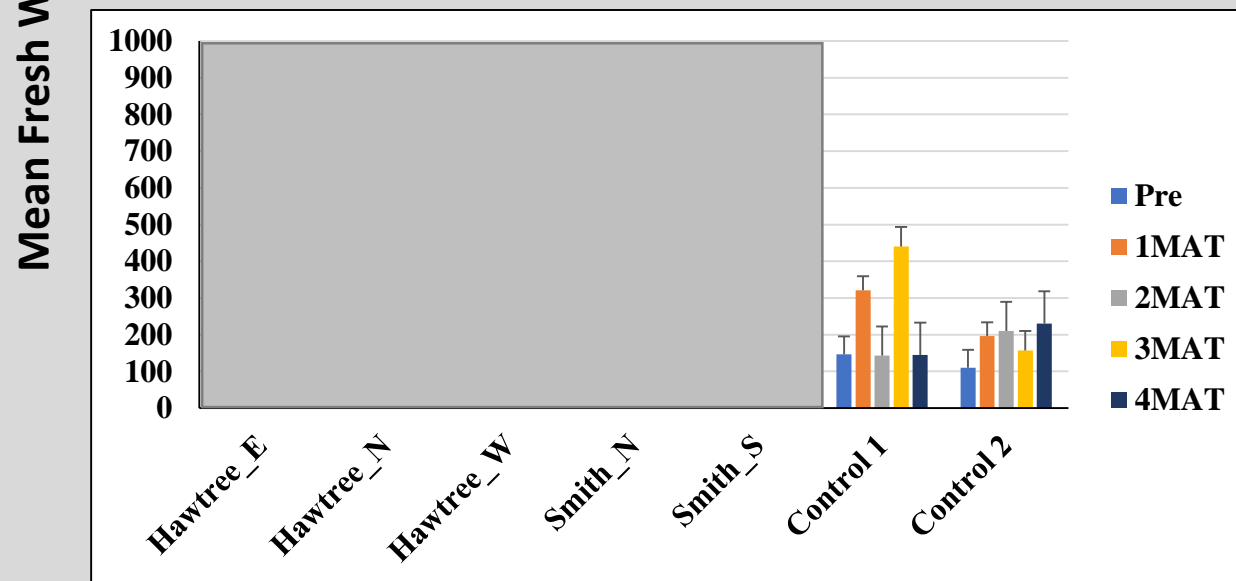
-
- Legend**
- Sample Points
 - Boat Launches
- USGS The National Map: National Boundaries Dataset, National Elevation Dataset, Geographic Name Information System, National Hydrography Dataset, National Land Cover Database, National Structure Dataset, and National Transportation Dataset; U.S. Census Bureau - TIGER/Line; HERE Road Data. Data Refreshed July, 2017.

Lyngbya Treatments (2017 / 2018)

- 3 Different Product Companies
- 2 Control Sites
- Treatments
 - July – October
 - Hawtree / Smith / Great
 - Lees / Pretty / Rocky
 - St. Tammany / Lyons / Pretty
- Biomass Sampling
 - June – November
 - Pre-treatment / 30 days post application

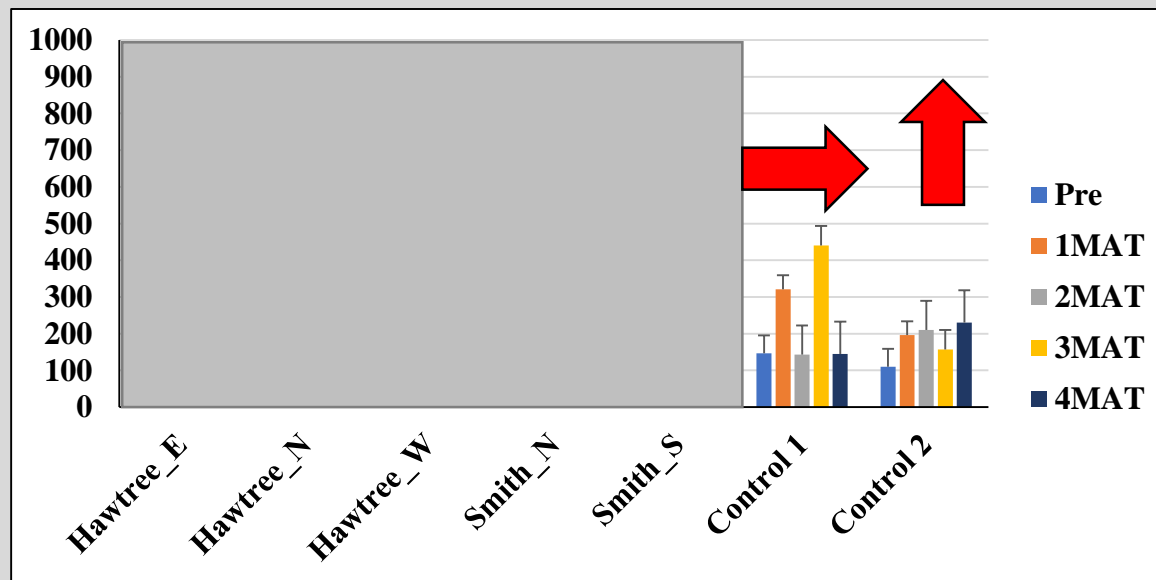
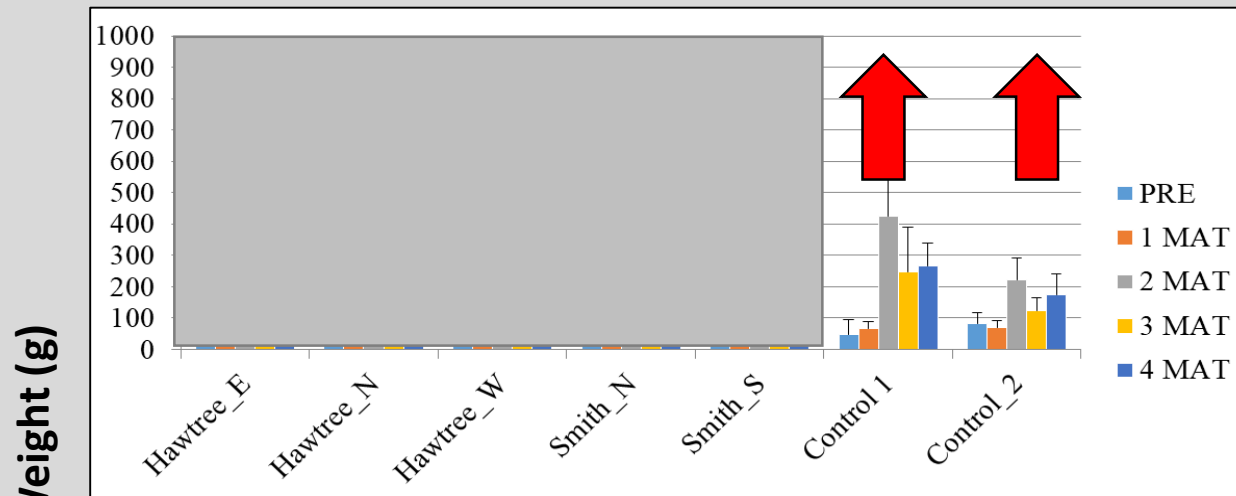


Lyngbya Treatments (2017 / 2018)

**2017****2018**

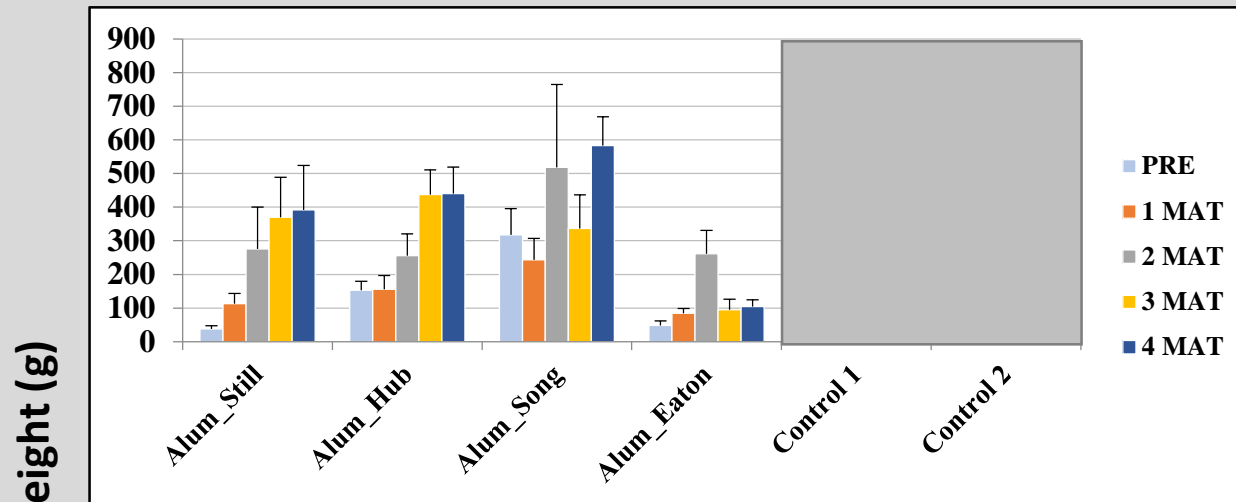
Plots

Lyngbya Treatments (2017 / 2018)

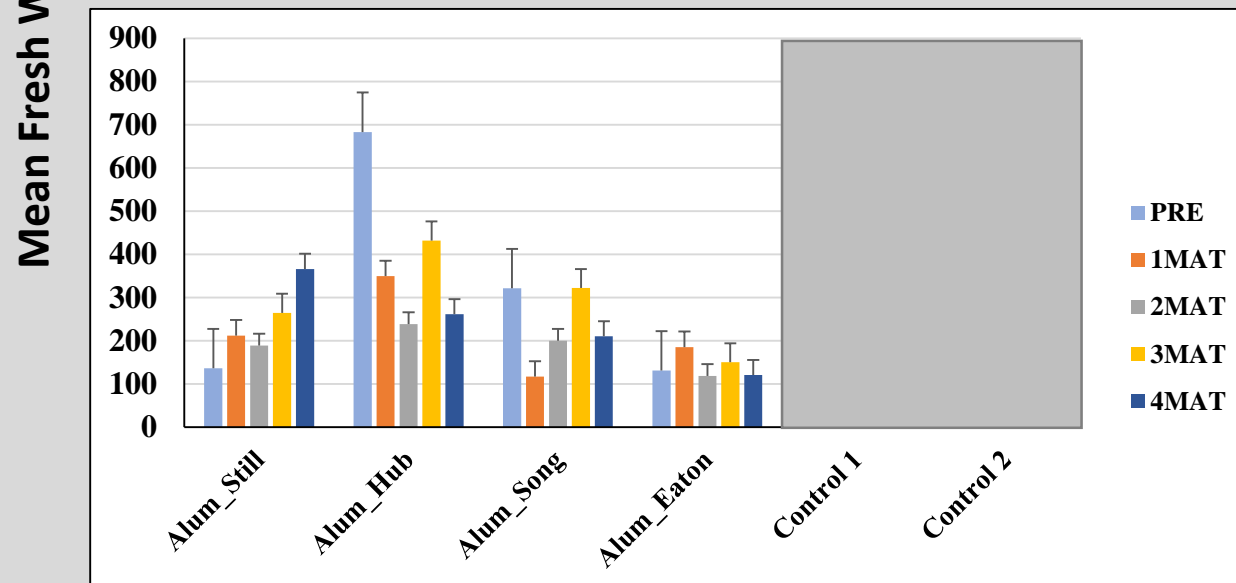


Plots

Alum



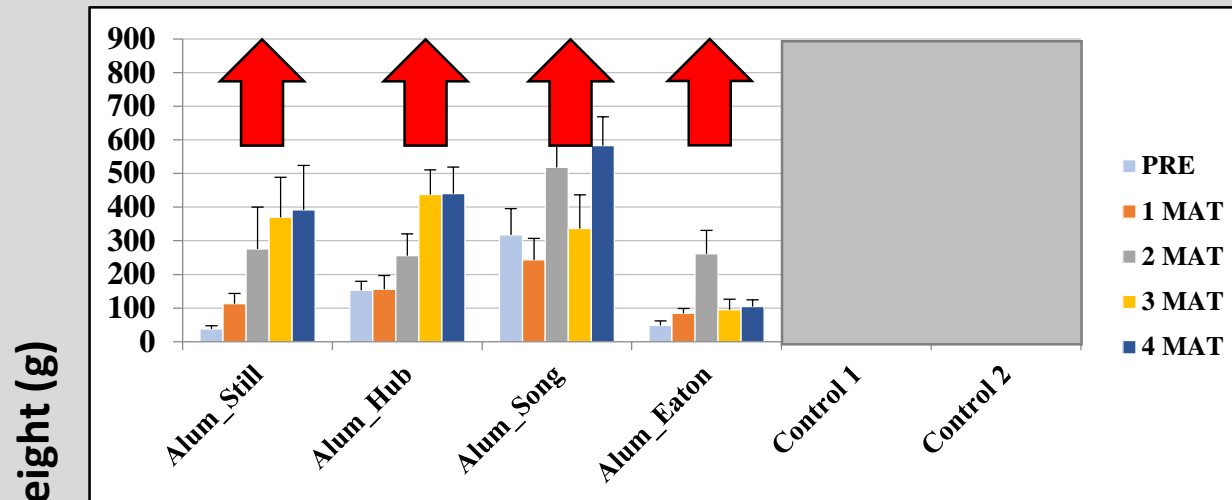
2017



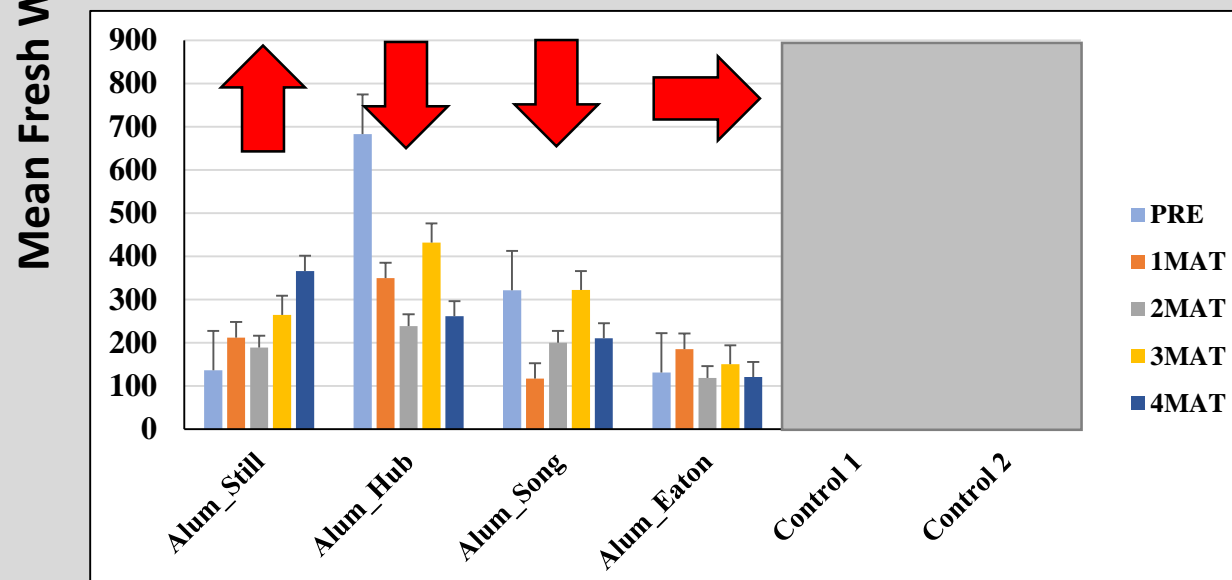
2018

Plots

Alum



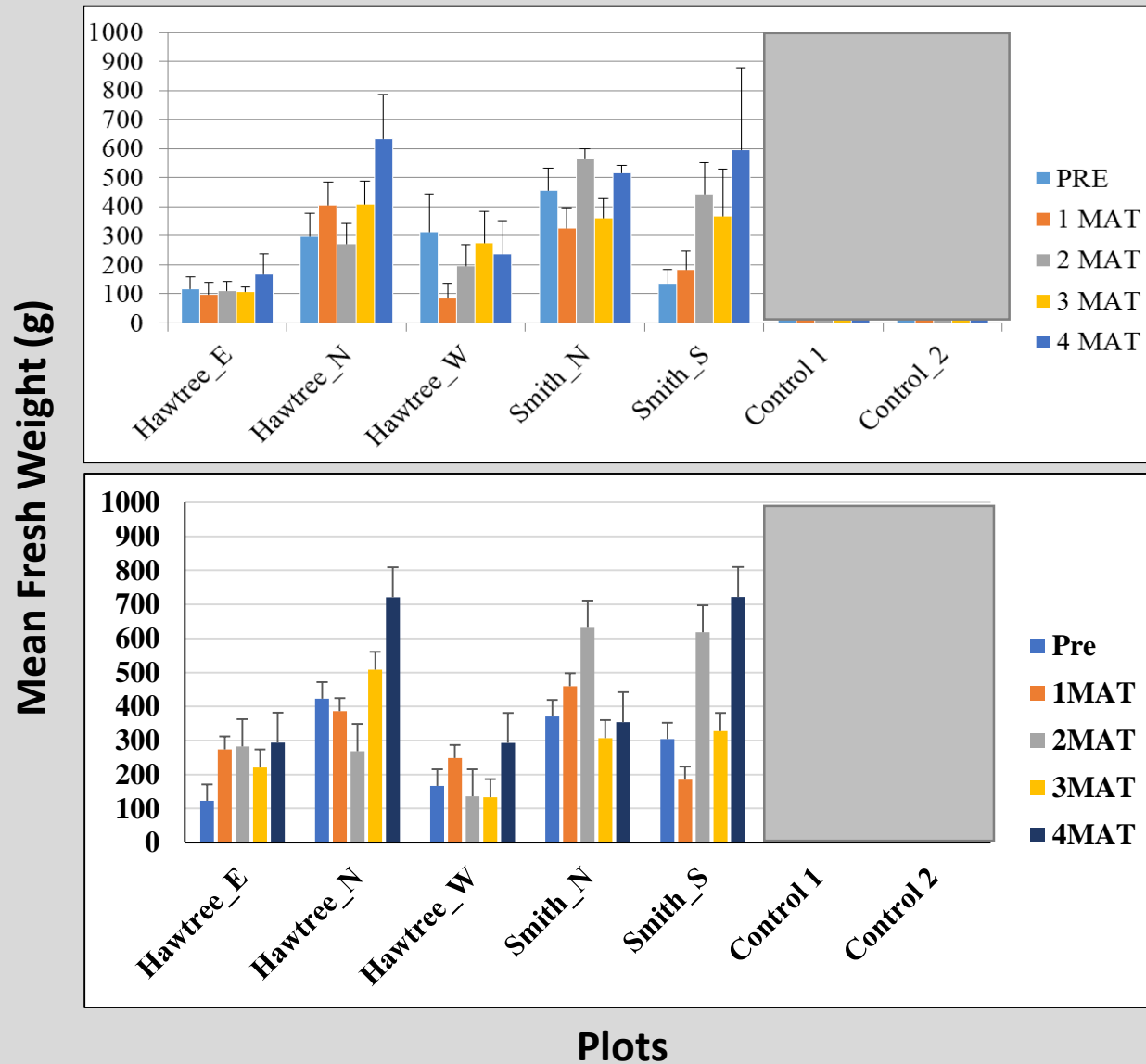
2017



2018

Plots

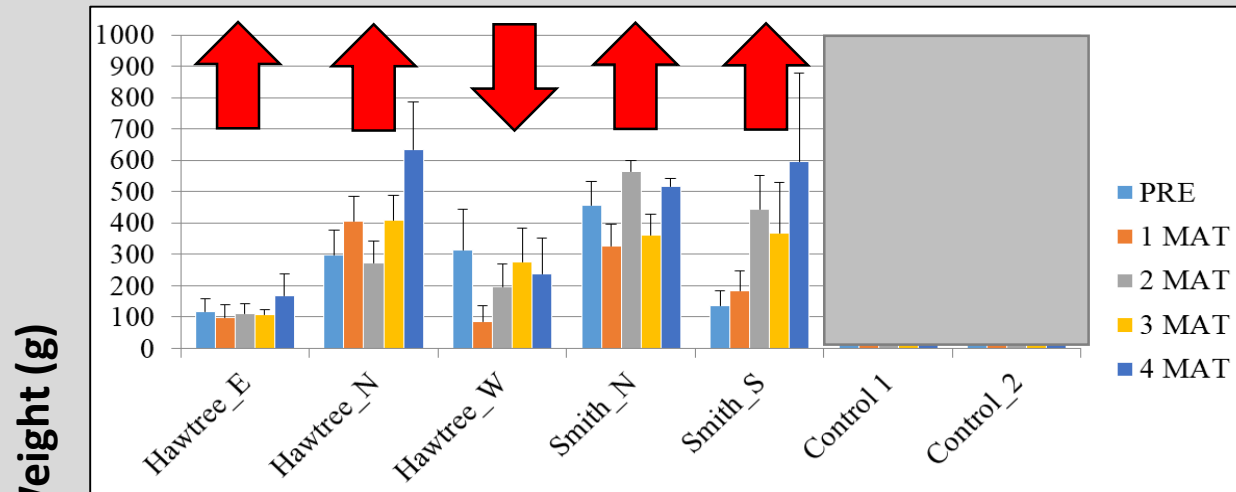
UPI / BIO



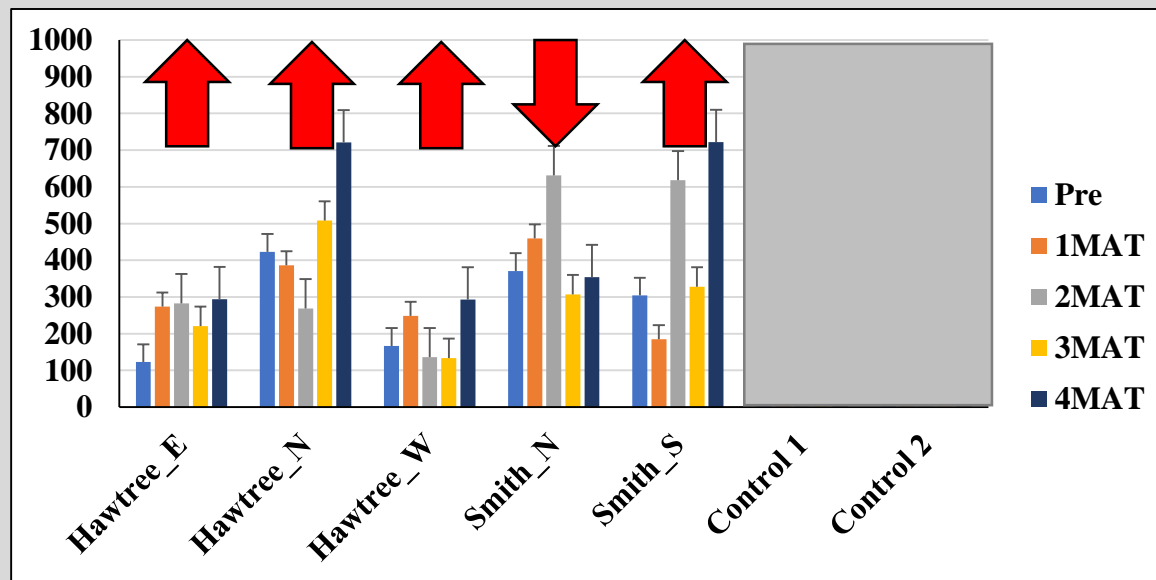
2017

2018

UPI / BIO



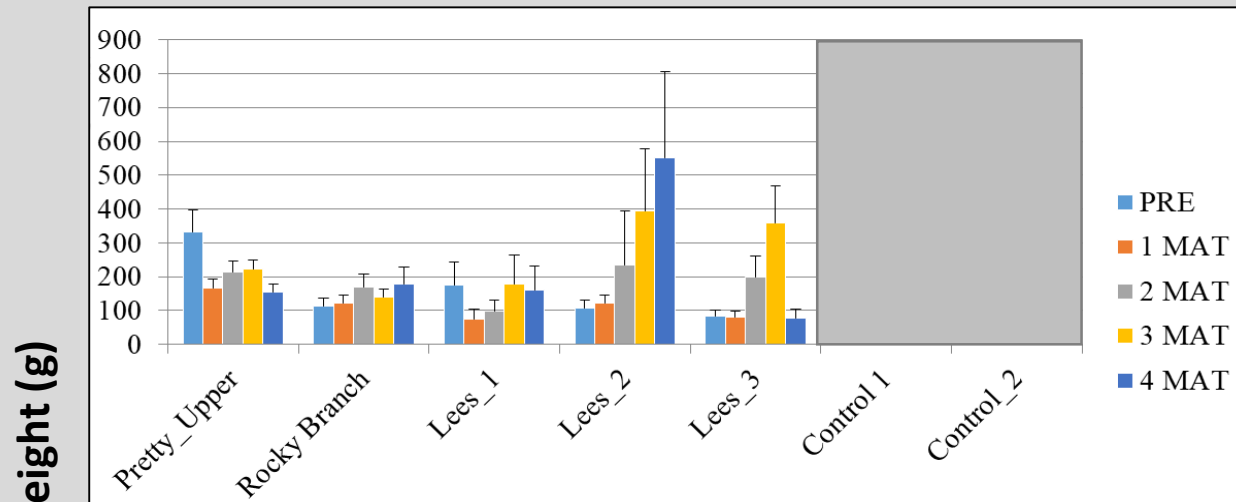
2017



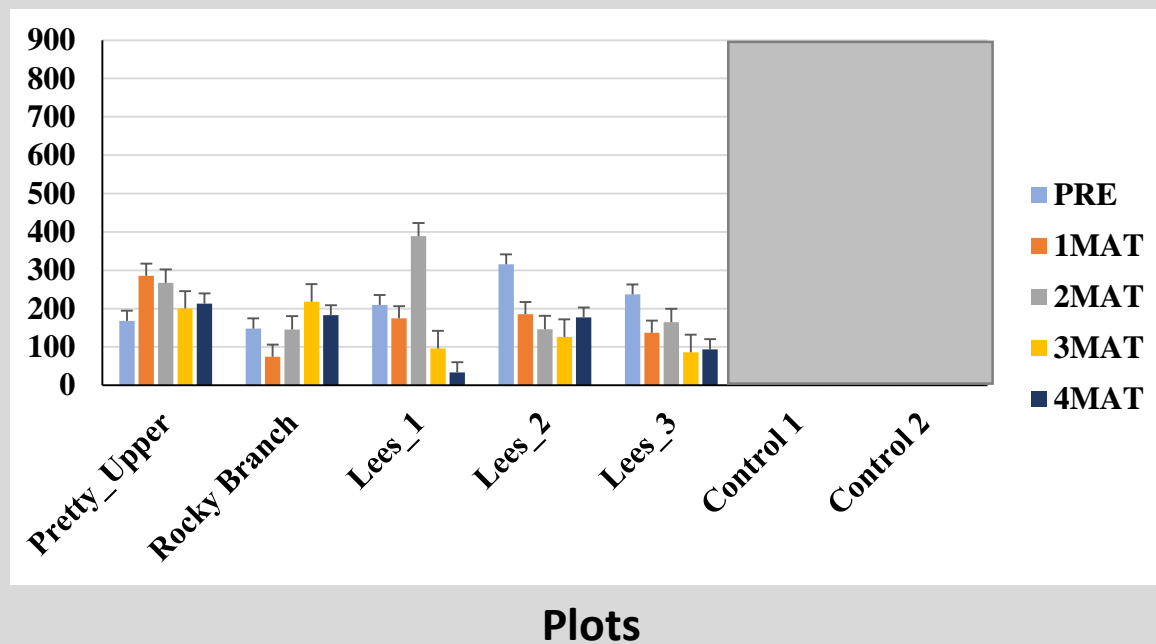
2018

Plots

Lonza

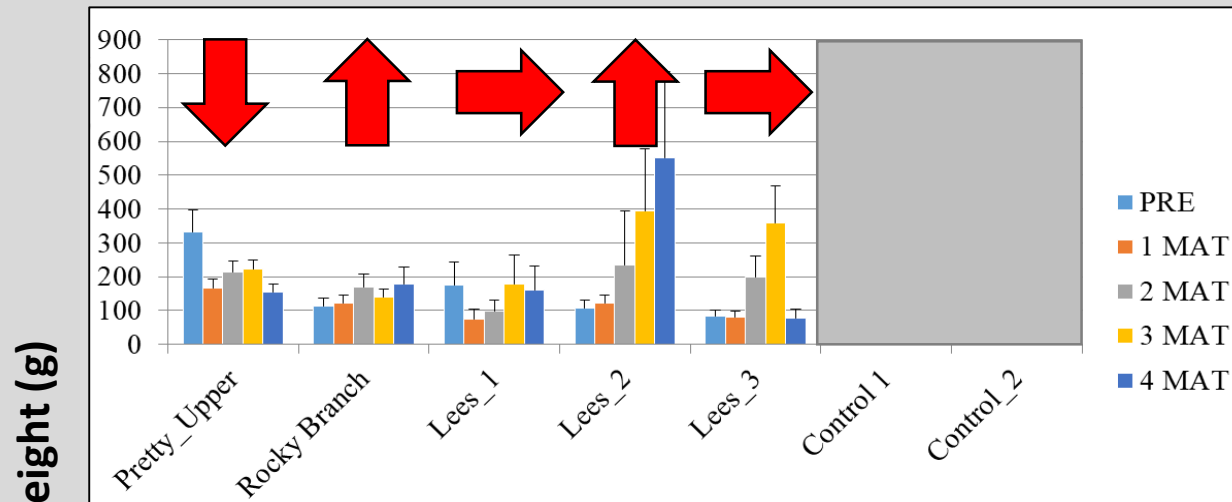


2017

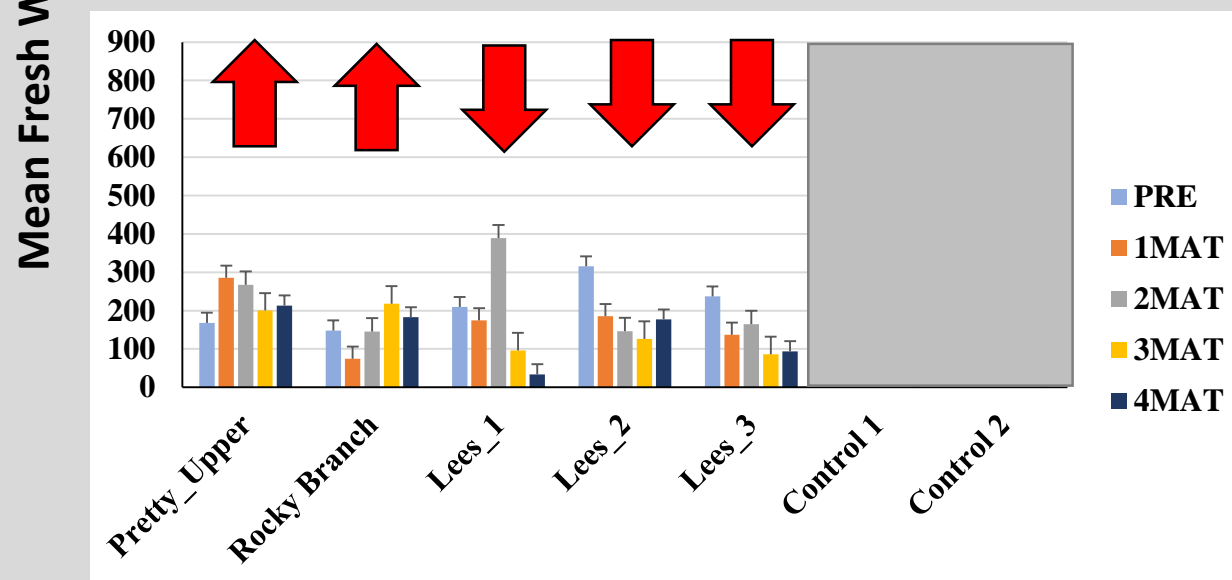


2018

Lonza



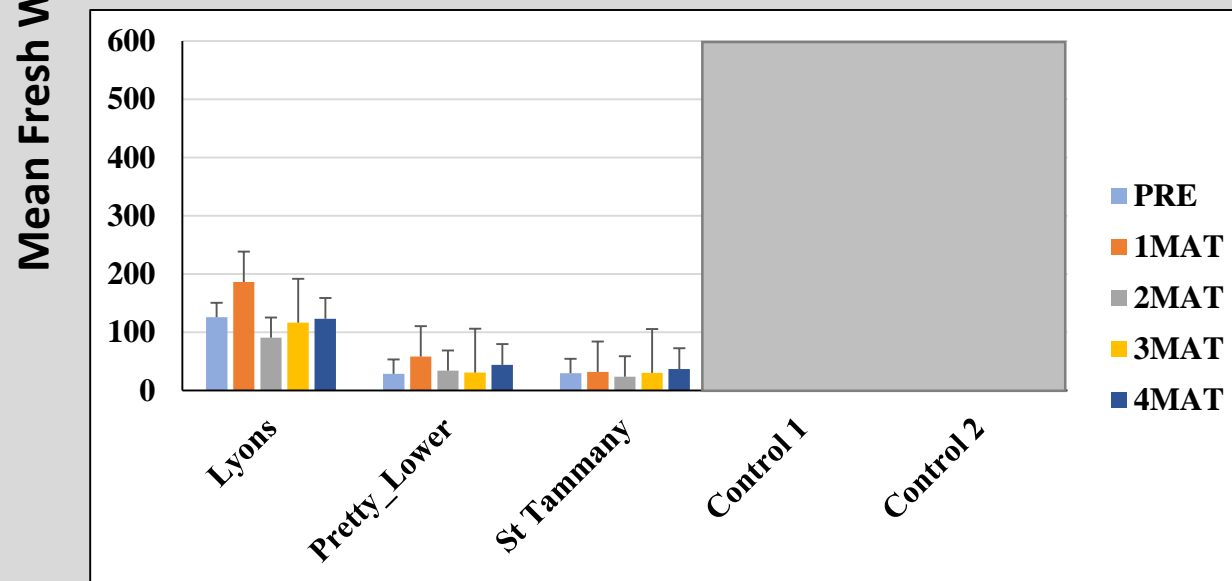
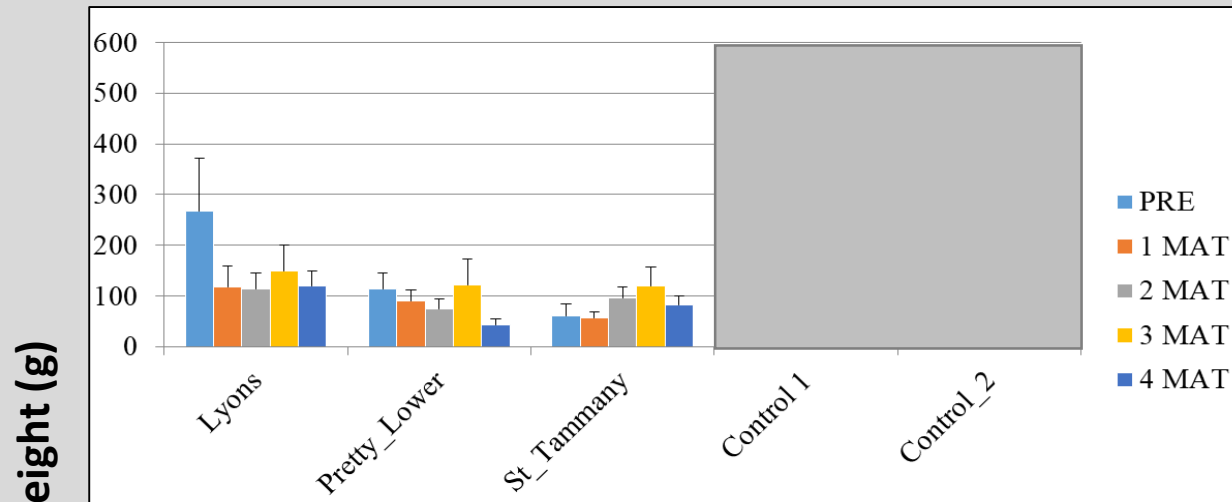
2017



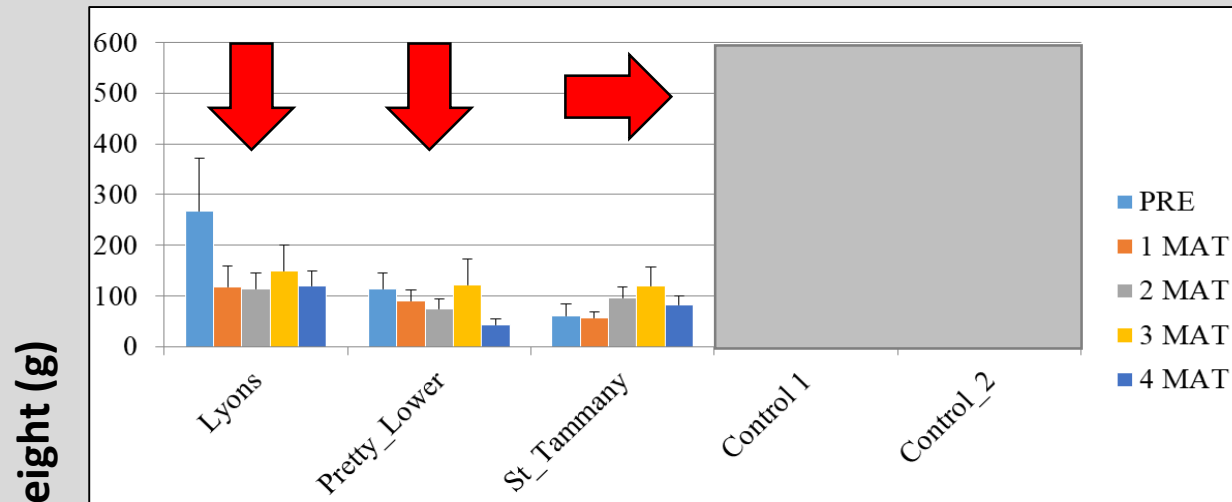
2018

Plots

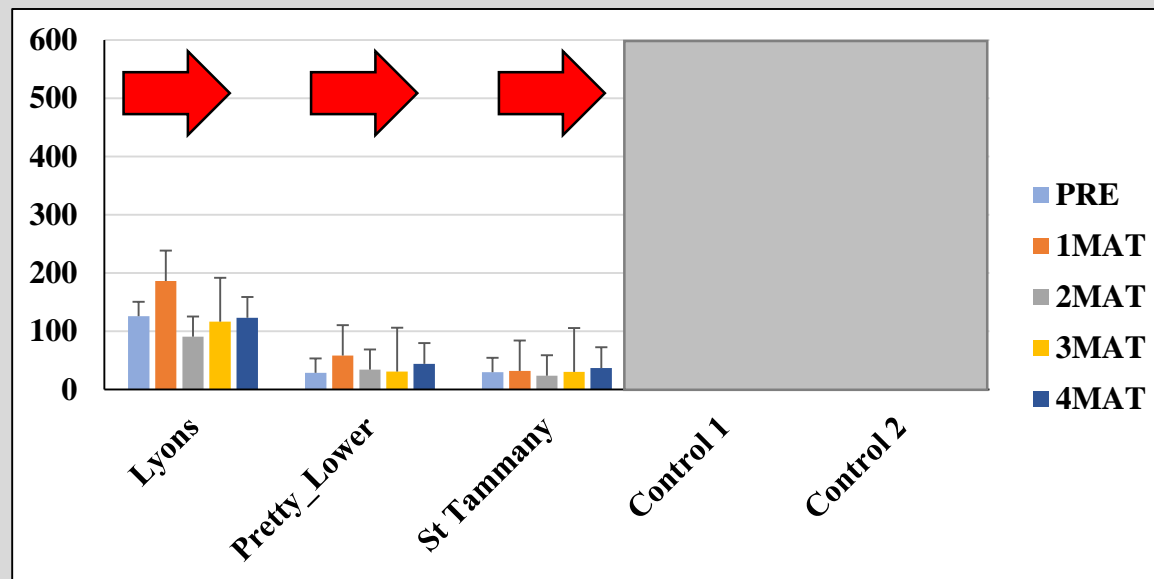
SePRO



SePRO



2017



2018

Plots

Lyngbya Treatments

2017 / 2018 Pilot Study

- No Treatment was Clearly Most Effective



Lyngbya Treatments (moving forward)

- **Treatment Application**
 - No Change
 - Products / Method
- **Treatment Timeline**
 - Begin Treatments Earlier
- **Biomass Sampling**
 - Expand on Collection Methods
- **Large Scale Treatment (25+ acres)**
 - Wait?



Summary and TAG Recommendations

Hydrilla

- 1) Treat No More than ____ acres**
 - Lizard Creek (____ acres)**
 - Cages (____ acres)**
 - Reserved for Unexpected Explosions (____ acres)**
 - Keep an Eye on Hawtree**
- 2) Stock Appropriate Number of Grass Carp**

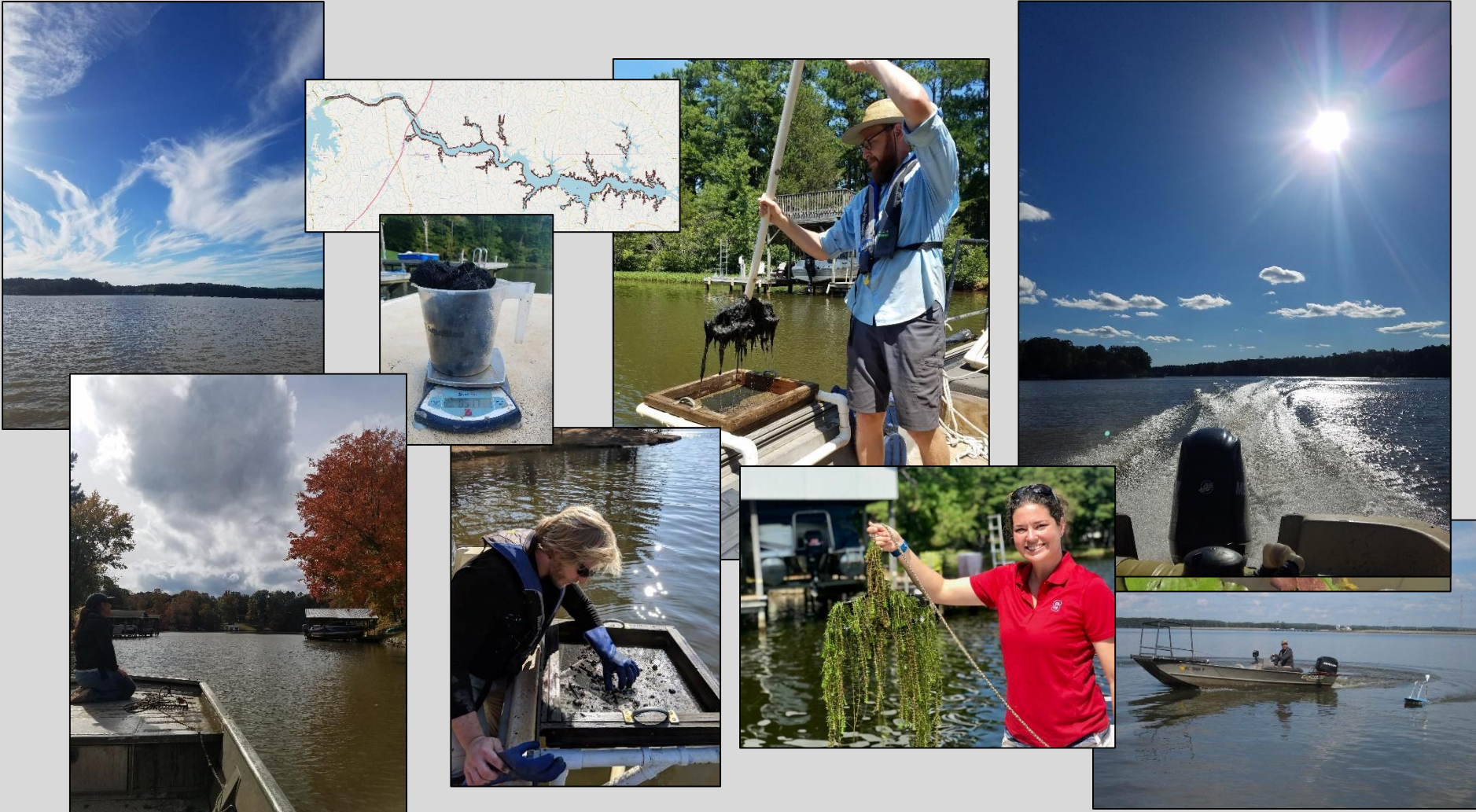
Lyngbya

- 1) Continue Experimental Treatments**
- 2) Improve on Survey Techniques**
- 3) Large Scale Treatment (Wait?)**

Vegetation Project

- 1) Continue Funding for 2019**

Questions?



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