# Membership List

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

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 undesignated 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 undesignated 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

![Bar Chart](image)
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

<table>
<thead>
<tr>
<th>Emergent</th>
<th>Submergent</th>
<th>Floating Leaf</th>
<th>Algae</th>
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<tr>
<td>American Lotus</td>
<td>Brittle Naiad</td>
<td>Floating Leaf</td>
<td>Chara / Nitella</td>
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<tr>
<td>Arrow Plants</td>
<td>Cabomba</td>
<td>Pondweed</td>
<td>Compsopogon</td>
</tr>
<tr>
<td>Cattail</td>
<td>Eel Grass</td>
<td></td>
<td>Lyngbya</td>
</tr>
<tr>
<td>Coontail</td>
<td>Egeria</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rush</td>
<td>Hydrilla</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water Willow</td>
<td>Native Naiad</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Watermilfoil</td>
<td></td>
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</table>
Fall Volunteer Survey

Aquatic Plant Abundance 2018

Percent of Rake Tosses

American Lotus | Arrow Plants | Brittle Naiad | Cabomba | Cattail | Chara / Nitella | Compsopogon | Coontail | Eel Grass | Egeria | Floating Leaf | Hydrilla | Lyngbya | Native Naiad | Pondweed | Rush | Water Willow
--- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | ---
2 | 6 | 1 | 0 | 6 | 7 | 4 | 0 | 0 | 0 | 3 | 6 | 15 | 1 | 1 | 2 | 56
Aquatic Plant Abundance

- Hydrilla
- Lyngbya
- Water Willow
- Chara / Nitella
- Other Emergent
- Other Submergent
- Floating Leaf

Legend:
- Blue: 2014
- Orange: 2015
- Dark Blue: 2016
- Yellow: 2017
- Green: 2018
Hydrilla Survey

2012

64% Rake Toss
Hydrilla Survey

2012 64%
2013 48%
2014 21%
2015 29%
2016 6%
2017 13%
Hydrilla Survey

2018

6% Rake Toss
Fall Sonar Survey

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

• Acreage 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

<table>
<thead>
<tr>
<th>YEAR</th>
<th>ACRE</th>
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<tr>
<td>2012</td>
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<tr>
<td>2013</td>
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<td>2014</td>
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<td>2017</td>
<td>374</td>
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<td>386</td>
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Tuber Survey

<table>
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<td>Timberline Shores</td>
<td>3.08</td>
<td>0.62</td>
<td>0</td>
<td>0.82</td>
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<tr>
<td>Cold Springs Branch</td>
<td>34.95</td>
<td>16.03</td>
<td>0</td>
<td>1.23</td>
</tr>
<tr>
<td>Lakeview</td>
<td>124.37</td>
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<tr>
<td>Lizards Creek</td>
<td>N/A</td>
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<td>0</td>
<td>49.34</td>
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<tr>
<td>Big Stone House</td>
<td>31.25</td>
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<tr>
<td>Pretty Creek</td>
<td>38.72</td>
<td>3.29</td>
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<td>Poe Creek</td>
<td>125.40</td>
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<td>0</td>
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<tr>
<td>Woodland Hurst</td>
<td>135.67</td>
<td>18.91</td>
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<td>8.22</td>
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<td>Hamlin</td>
<td>446.08</td>
<td>75.24</td>
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# Tuber Survey

## Tuber Density (m²)

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<td>292.73</td>
<td>53.12</td>
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<tr>
<td>Lyons Creek</td>
<td>293.96</td>
<td>22.82</td>
<td>21.58</td>
<td>29.33</td>
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<tr>
<td>Poplar Creek</td>
<td>89.63</td>
<td>15.95</td>
<td>19.12</td>
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</tr>
<tr>
<td>Hawtree</td>
<td>38.03</td>
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<td>59.41</td>
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<td>Cotton Creek</td>
<td>217.90</td>
<td>165.82</td>
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<td>2018</td>
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</table>
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

2018

AQUATIC PLANT MANAGEMENT
Hydrilla Sonar Survey

2018
## Hydrilla Survey

### Tuber Density (m²)

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</table>
2019 Hydrilla Treatments

• Treatments Recommendations

  • Sonar (June – August)
    • Lizard Creek (___ acres)
    • Cages (___ acres)
      • Adaptative 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

2012
Lyngbya Survey

2018

15% Rake Toss
Lyngbya Survey

2012: 8%
2013: 5%
2014: 6%
2015: 8%
2016: 11%
2017: 16%
Lyngbya Treatments (2017 / 2018)

- 3 Different Product Companies
- 2 Control Sites
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)

![Graph showing mean fresh weight (g) for Hawtree_E, Hawtree_N, Hawtree_W, Smith_N, Smith_S, Control 1, Control 2 in 2017 and 2018. The graph compares the treatments with 1 MAT, 2 MAT, 3 MAT, and 4 MAT.](image)
Lyngbya Treatments (2017 / 2018)

- **Mean Fresh Weight (g)**

**2017**

**2018**
Alum

Mean Fresh Weight (g)

<table>
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<tr>
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<th>2017</th>
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<td>600</td>
</tr>
<tr>
<td>Alum_Eaton</td>
<td>700</td>
<td>800</td>
</tr>
<tr>
<td>Control 1</td>
<td>900</td>
<td>1000</td>
</tr>
<tr>
<td>Control 2</td>
<td>1100</td>
<td>1200</td>
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</tbody>
</table>

Plots

2017

2018

AQUATIC PLANT MANAGEMENT
AQUATIC PLANT MANAGEMENT

UPI / BIO

Mean Fresh Weight (g)

Plots

2017

2018
Lonza

Mean Fresh Weight (g)

2017

2018

Plots

AQUATIC PLANT MANAGEMENT
AQUATIC PLANT MANAGEMENT

SePRO

Mean Fresh Weight (g)

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?

AquaticPlants@ncsu.edu