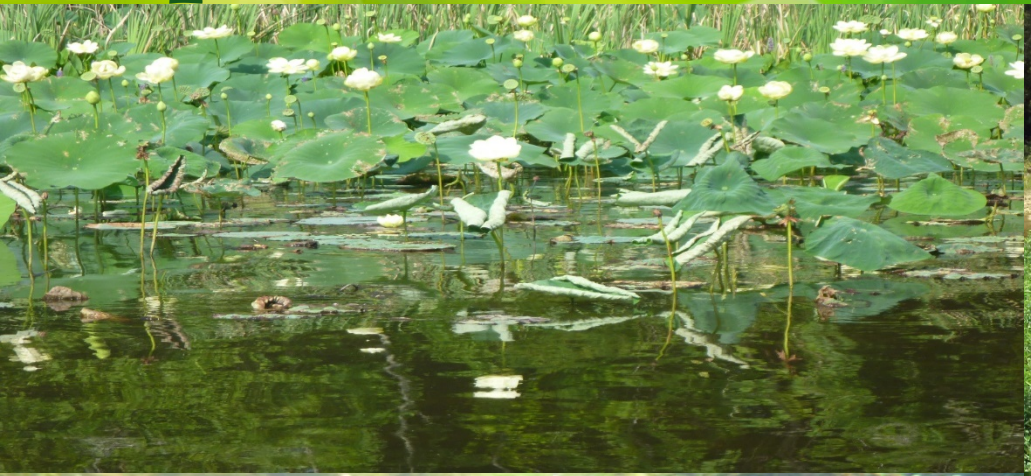
Aquatic Weed Control Program

Brett Hartis, PhD – Aquatic Weed Control Program Manager

DUKE ENERGY®

Aquatic Plants



Why Aquatic Plants?

- Food, shelter, and breeding habitat for fish and wildlife
- Stabilization
- Oxygenation
- Aesthetics

Invasive vs. Native

- Non-indigenous
- Adversely affects habitats
- No natural enemies
- Threaten biological diversity

- Endemic
- Occurs naturally
- Part of ecosystem
- Natural enemies
- “Relative to location”

Common Invasive Plants

- **Hydrilla**

- **Water Hyacinth**

- **Eurasian Watermilfoil**


BIRD SHOALS
TRADING CO.
BIRD SHOALS
AQUATIC NURSERY
Pond Plants & Products
105
CHANNEL
ROCK ROAD


1951-2017

January 22, 2007

1	remove	Anacharis-XLG FORM	1	$2.49	$2.49
2	remove	Egaria najas	1	$1.98	$1.98
3	remove	Cabomba, Green	1	$1.58	$1.58
4	remove	Glossostigma	6	$1.98	$11.88
5	remove	Parrot's Feather	2	$0.98	$1.96
6	remove	Brazilian Pennwort	1	$1.98	$1.98
7	remove	Rotala, Indica	2	$0.98	$1.96
8	remove	Temple Plant	1	$1.98	$1.98
9	remove	Water Velvet or Salvinia	1	$6.99	$6.99
10	remove	Floating Heart	3	$2.98	$8.94
11	remove	Snowflake, Large White (loose)	3	$6.99	$20.97
12	remove	Water Hyacinth	1	$0.00	$0.00
13	remove	Water Lettuce	1	$1.98	$1.98
14	remove	Water Poppy	3	$2.99	$8.97
15	remove	Aquatic Morning Glory	3	$4.59	$13.77
16	remove	Golden Mystery Snail	1	$1.99	$1.99
17	remove	Apple Snail	1	$3.99	$3.99
18	remove	Giant Striped Colombian Ramshorn Snail	1	$1.79	$1.79
19	remove	Mosaic Plant	1	$4.99	$4.99
				Subtotal:	$100.19

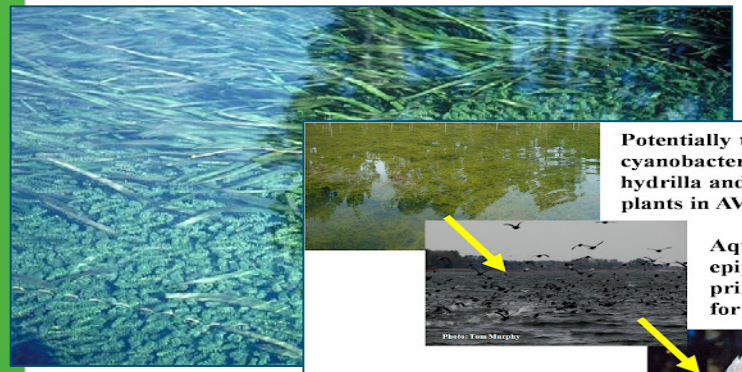
How Do Aquatic Plants Spread?

- Fragmentation
- Water movement, wind
- Animals (wading birds, aquatic mammals)
- Human activities


EXE

What's the Big Deal?

- Outcompetes Native/ Beneficial Species
- Fluctuations in Water Quality
- Alters Habitat and Food Web
- Clogs/ Damages Water Control Structures
- Reduces/ Halts Public Use
- Impact Local Economy



Why so problematic in reservoirs?

- Clear, Shallow water
- High levels of nutrients
- No Enemies
- Competitive Advantage

Hydrilla (*H. verticillata*)

The "perfect aquatic weed"

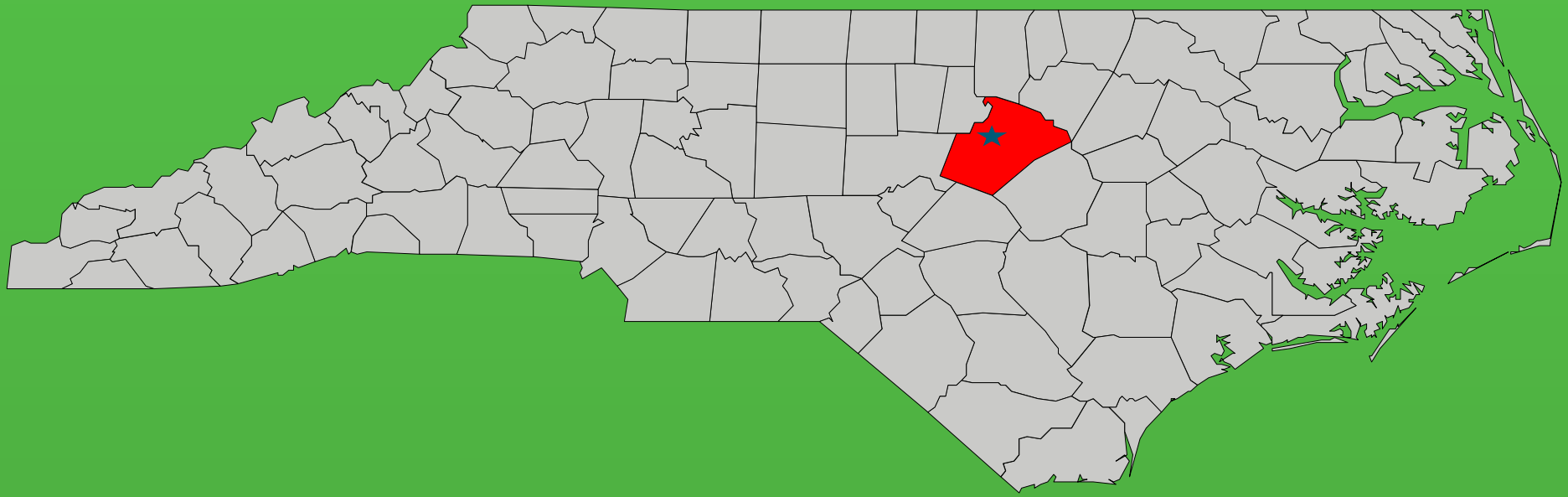
- **#1 Problem Aquatic Weed in U.S.**
- **98% water (very hardy)**
- **Grows in wide range of conditions (salinity, temperature)**
- **Reproduces via Fragmentation, Tubers and Turions**
- **Tubers can remain in sediment for 10+ years**
- **Very shade tolerant (low light affinity)**
- **> *1 (+) inch per stem per day**


1951-2011

St. Stephen Hydro…

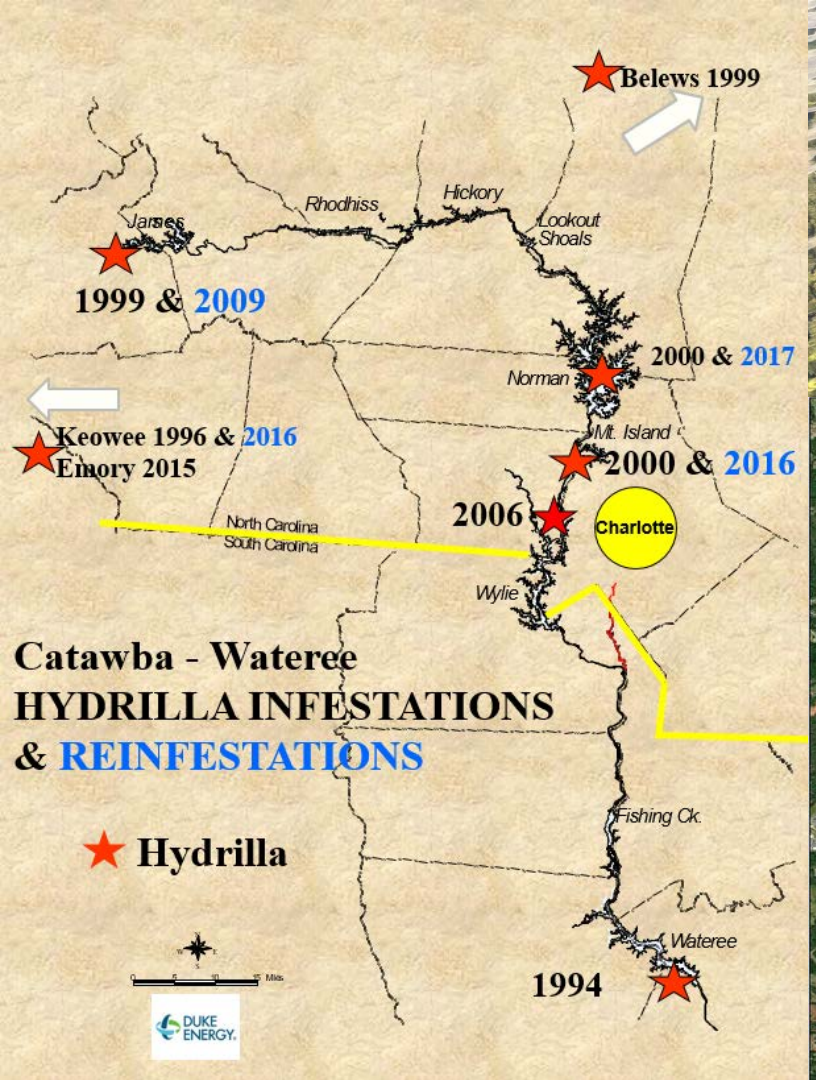
- Hydrilla mats from Lakes Marion/ Moultrie
- 900+ loads hand removed
- Four month outage
- $5 Million in losses/ damage

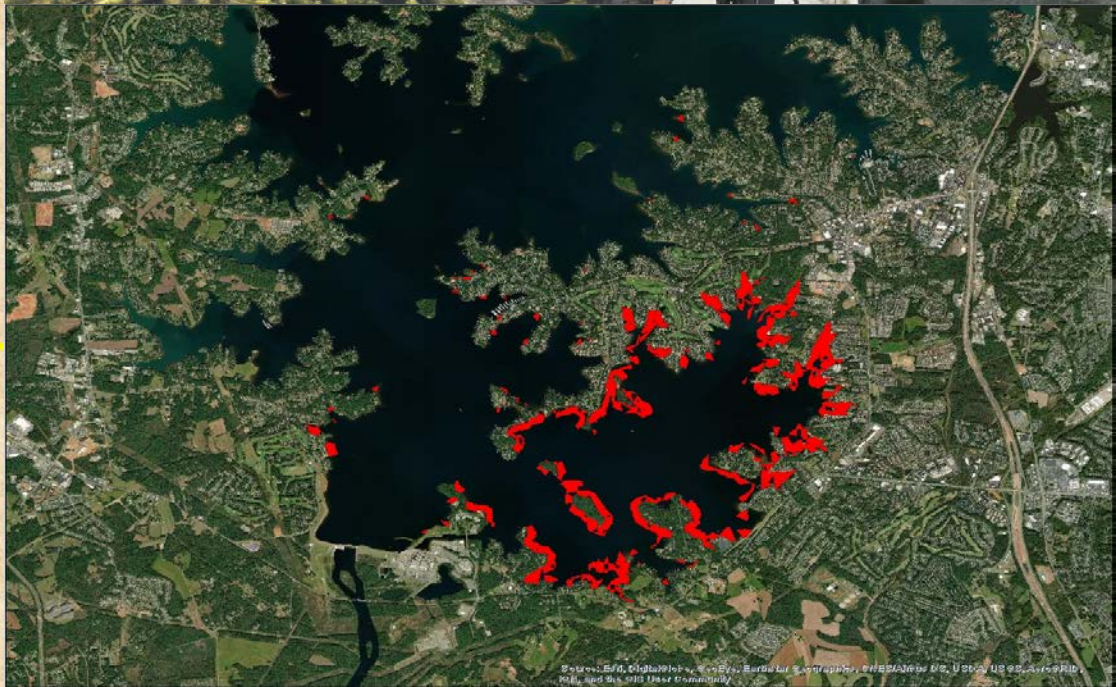
1980




FEDERAL NOXIOUS WEEDS
Danger! This specimen is a Federal Noxious Weed. Safeguard to prevent the dissemination of viable propagules.
ANIMAL AND PLANT HEALTH INSPECTION SERVICE
UNITED STATES DEPARTMENT OF AGRICULTURE
Herbarium of North Carolina State University
PLANTS OF NORTH CAROLINA
County: Wake
HYDRILLA VERTICILLATA (L.f.) Caspary
Pond at Umstead Park
D. J. DeMont
Dec. 9, 1980
HERBARIUM
NCSC
98299
NORTH CAROLINA STATE UNIVERSITY


DUKE POWER MOSQUITO CONTROL (704) 382-0160


Belews 1999
Rhodhiss
Hickory
James
Lookout Shoals
1999 & 2009
2000 & 2017
Norman
Keowee 1996 & 2016
Emory 2015
Mt. Island
2000 & 2016
2006
Charlotte
North Carolina
South Carolina
Wylie
Catawba - Wateree
HYDRILLA INFESTATIONS
& REINFESTATIONS
Fishing Ck.
Hydrilla
Wateree
1994
DUKE ENERGY.



The Unseen Problem: TUBERS

Let’s Clip the Sprouts and…

Watch Them Sprout Again…

Shoot Removed From Tuber

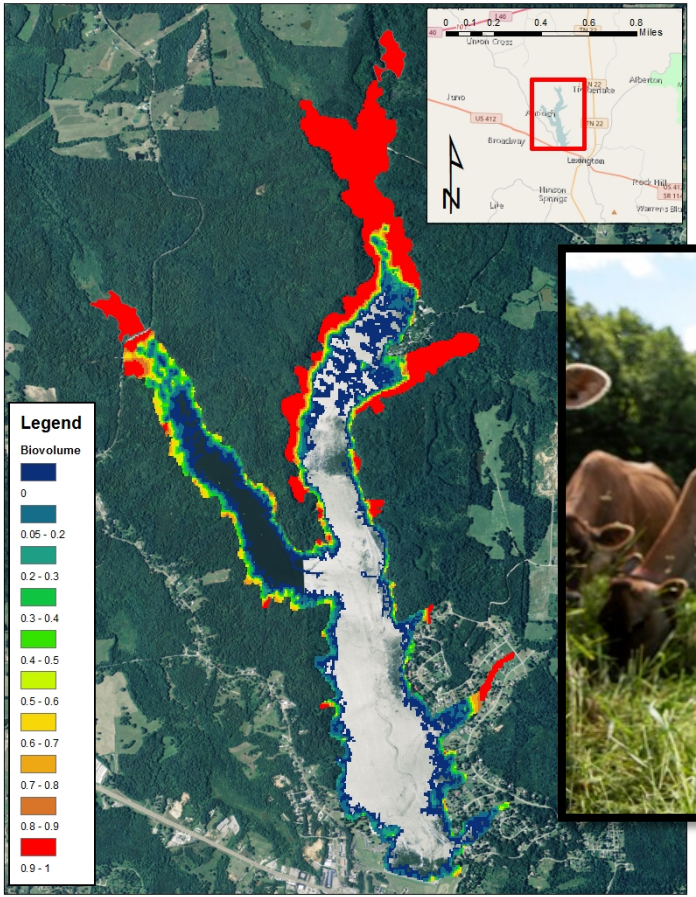
Control Options

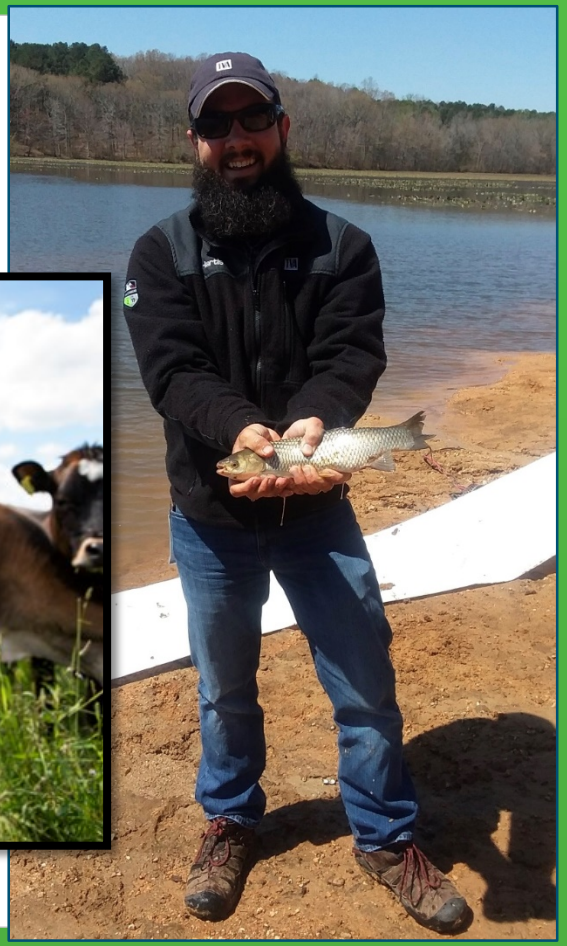
- Prevention
- Cultural
- Mechanical/Physical
- ***<u>Biological</u>***
- Chemical

Biological: Insects, Grass Carp

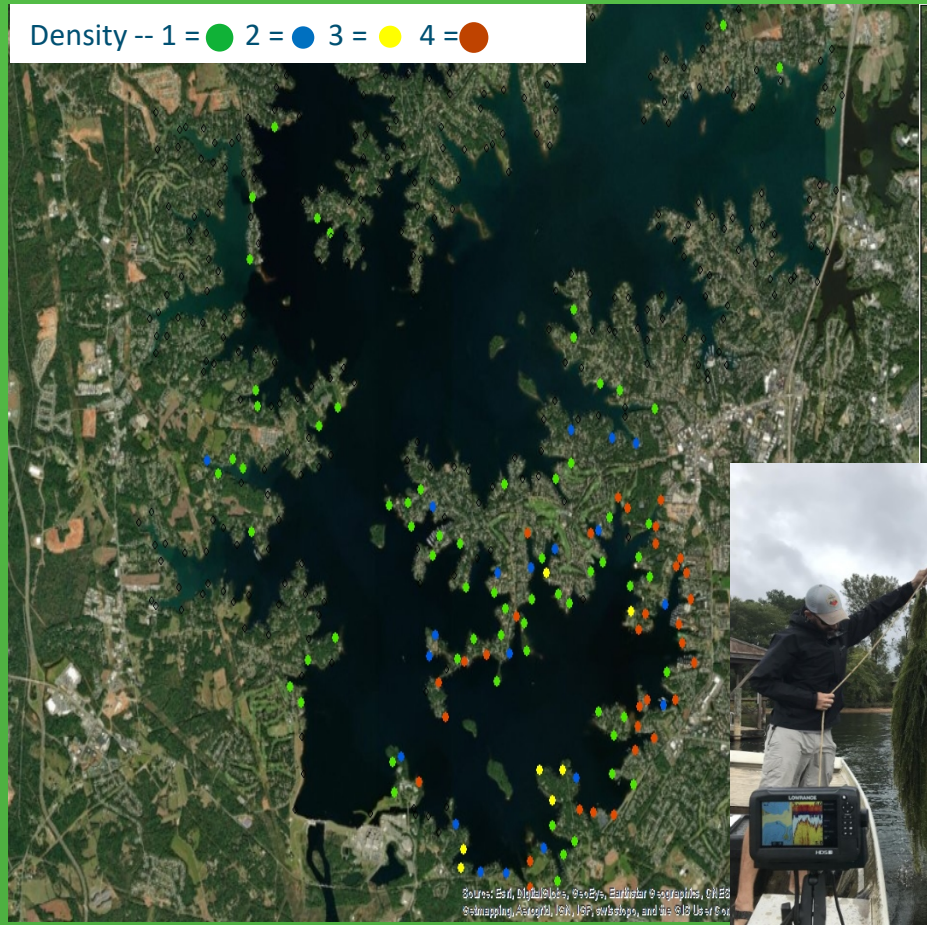
- Relatively non-selective
- Main control method in many reservoirs
  - **Cost-effective over lifetime (up to 25 years)**
  - Other vegetation not “critical”
- Not desired in water with extensive native vegetation
- **<u>Survey dependent!</u>**

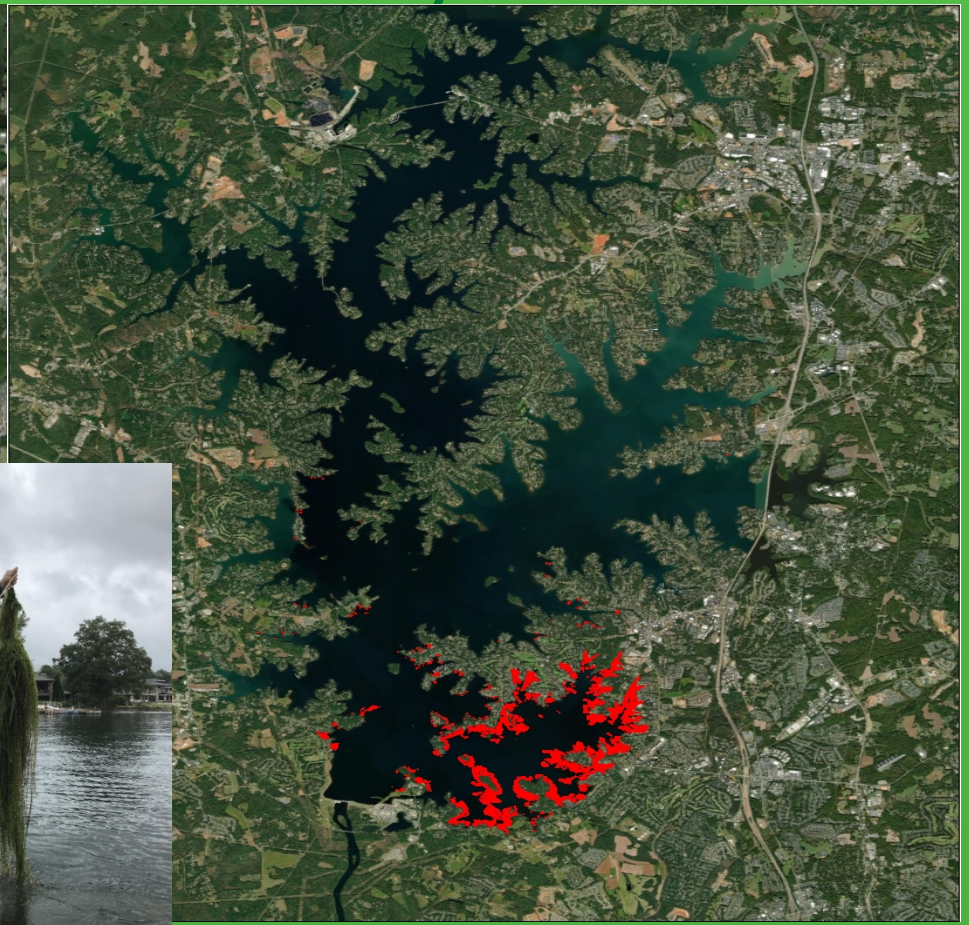
Biological:


Legend
Biovolume
0
0.05 - 0.2
0.2 - 0.3
0.3 - 0.4
0.4 - 0.5
0.5 - 0.6
0.6 - 0.7
0.7 - 0.8
0.8 - 0.9
0.9 - 1
0 0.1 0.2 0.4 0.6 0.8
Miles
Union Cross
Alberton
Isaac
Broadway
Lexington
Hinson Springs
Life
Rock Hill
Warrens Sta



2018 Norman Survey





Norman Stocking

Activity Summary

- **~ *510 Acres in fall 2017**
  - 10,200 fish (20 fish/va) stocked spring 2018

- **~ **640 Acres in fall 2018**
  - 70 % survival from 2018 = 6,500 fish
  - 12,500 fish to be stocked in 2019
  - ~ 19,000 fish (*30 fish/va*) in 2019

*visual/ point sample
**hydroacoustic/ point sample

2018 Mountain Island Survey

Activity Summary

~ 510 Acres in fall 2017

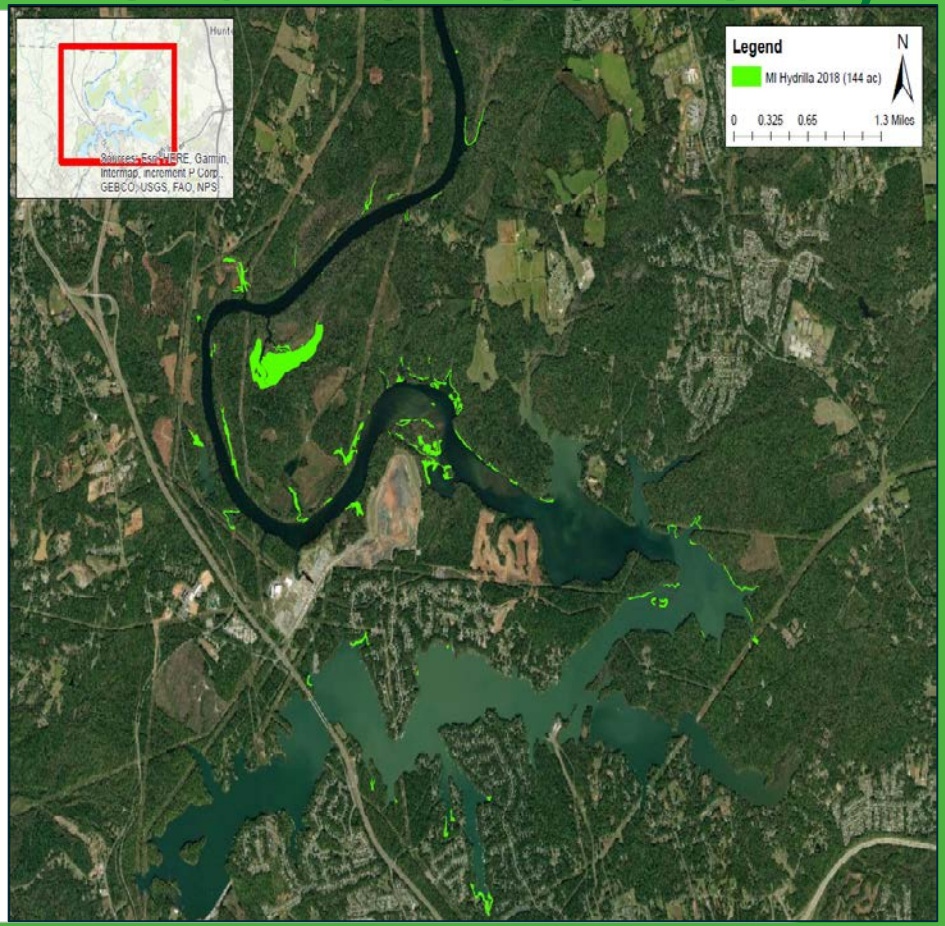
610 fish (2017) + 730 fish (2018)

based on unknown acreage

~ 144 Acres in fall 2018

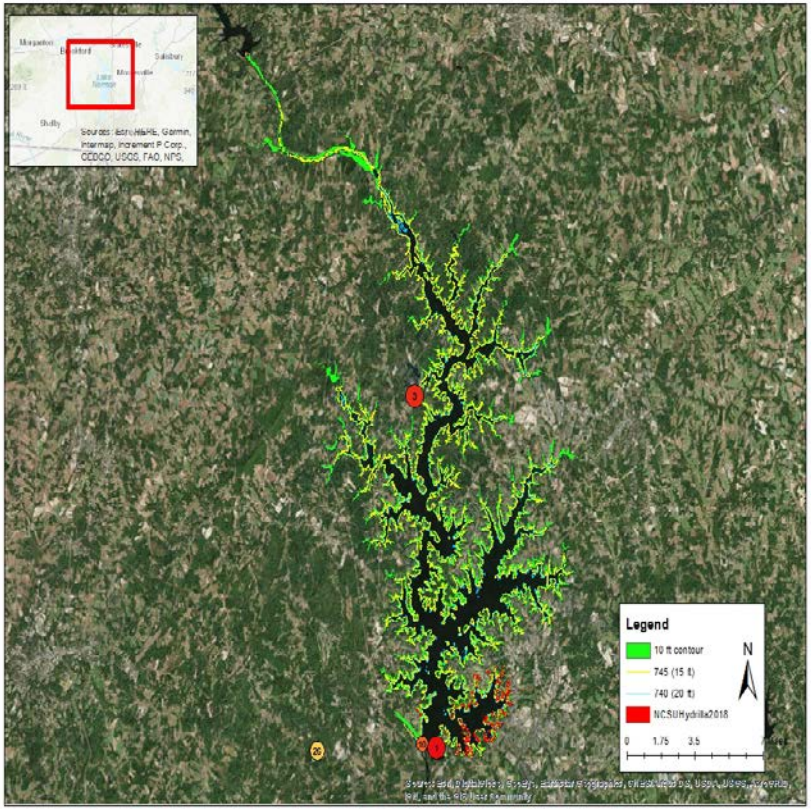
1,500 fish to be stocked in 2019

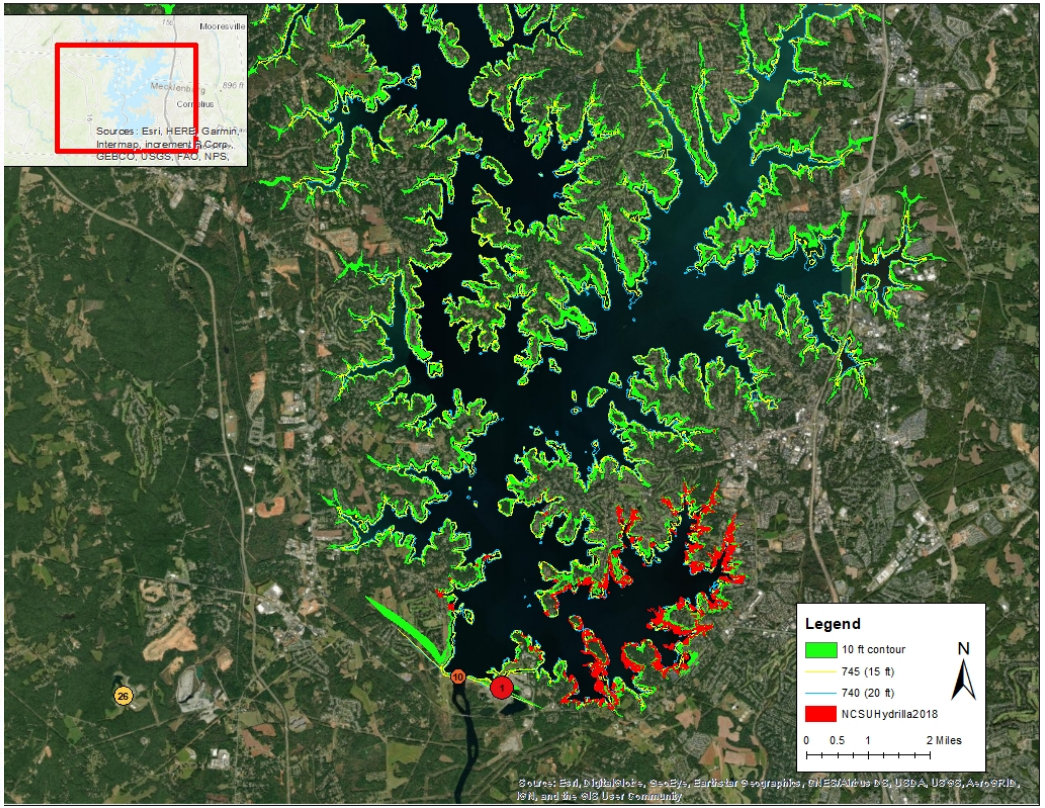
+ Quantitative survey



Potential Hydrilla Habitat

Potential Acreage = 8,000 ac





2008 Wylie Survey

Summary

Hydrilla discovered in 2006

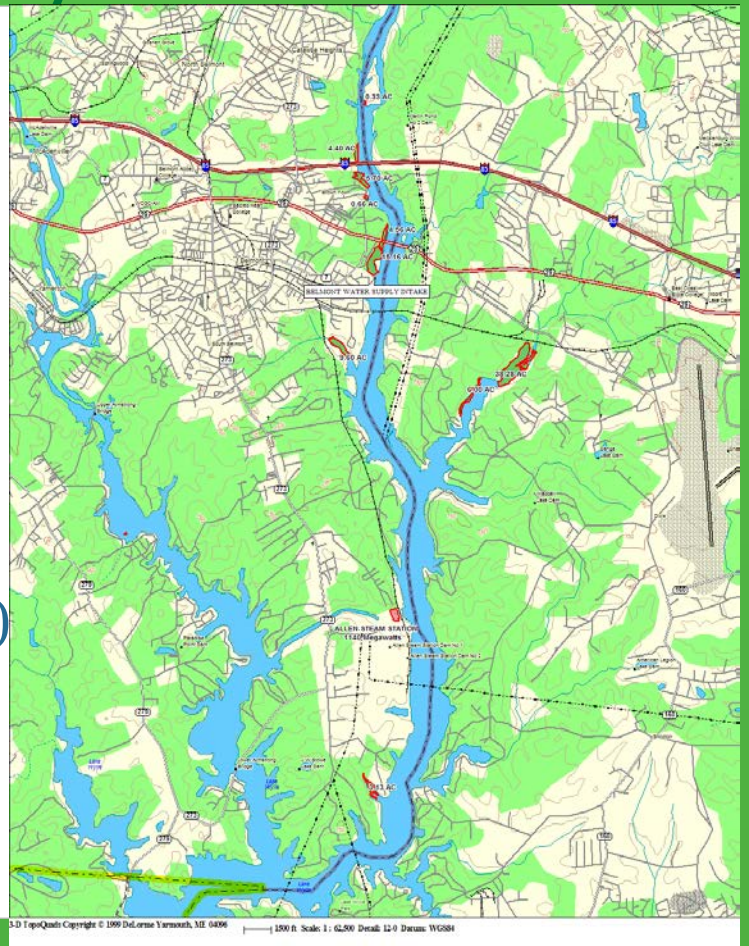
500 fish stocked in 2008

3,586 fish stocked (2009-2017)

No Hydrilla observed since late 2000s

Exceeded life expectancy of tuber bank (18)

Intensively monitoring in future



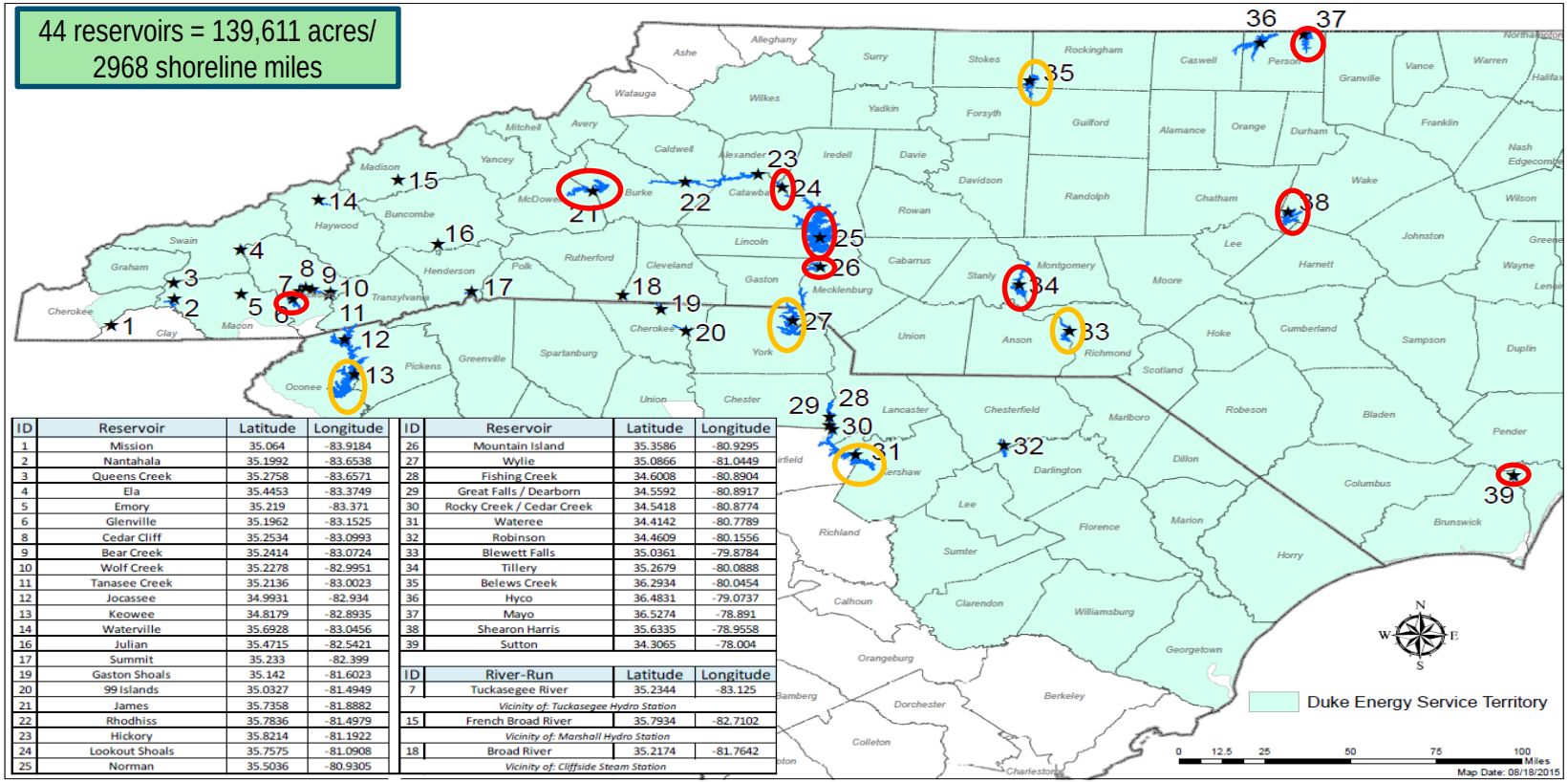
Future Direction (Duke Energy)

- Partner to address current infestations (10+ year commit.)
- Addressing “eyes on the water” issue with tiered approach
- Integrated, adaptive approach to management
- Annual detection surveys following eradication (system-wide)
  - Prioritized surveys
  - Leverage partnerships (Duke, NCDEQ, local) for high probability sites
  - Utilize volunteers to fill gaps
  - Refocus on “one-click” education and outreach

Prioritized Detection Surveys/ Volunteer Monitoring

Duke Energy Reservoirs & Water Bodies

44 reservoirs = 139,611 acres/
2968 shoreline miles

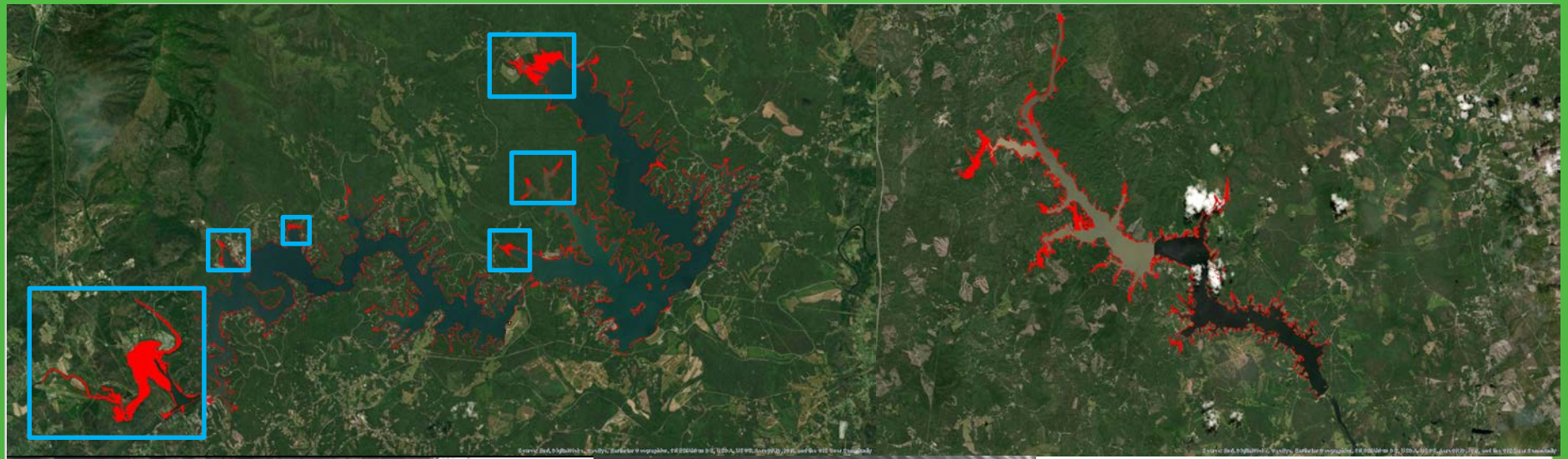


ID	Reservoir	Latitude	Longitude
1	Mission	35.064	-83.9184
2	Nantahala	35.1992	-83.6538
3	Queens Creek	35.2758	-83.6571
4	Ela	35.4453	-83.3749
5	Emory	35.219	-83.371
6	Glenville	35.1962	-83.1525
8	Cedar Cliff	35.2534	-83.0993
9	Bear Creek	35.2414	-83.0724
10	Wolf Creek	35.2278	-82.9951
11	Tanasee Creek	35.2136	-83.0023
12	Jocassee	34.9931	-82.934
13	Keowee	34.8179	-82.8935
14	Waterville	35.6928	-83.0456
16	Julian	35.4715	-82.5421
17	Summit	35.233	-82.399
19	Gaston Shoals	35.142	-81.6023
20	99 Islands	35.0327	-81.4949
21	James	35.7358	-81.8882
22	Rhodhiss	35.7836	-81.4979
23	Hickory	35.8214	-81.1922
24	Lookout Shoals	35.7575	-81.0908
25	Norman	35.5036	-80.9305

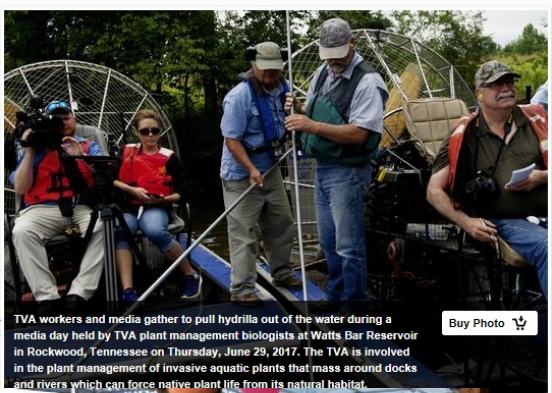
ID	Reservoir	Latitude	Longitude
26	Mountain Island	35.3586	-80.9295
27	Wylie	35.0866	-81.0449
28	Fishing Creek	34.6008	-80.8904
29	Great Falls / Dearborn	34.5592	-80.8917
30	Rocky Creek / Cedar Creek	34.5418	-80.8774
31	Wateree	34.4142	-80.7789
32	Robinson	34.4609	-80.1556
33	Blewett Falls	35.0361	-79.8784
34	Tillery	35.2679	-80.0888
35	Belews Creek	36.2934	-80.0454
36	Hyco	36.4831	-79.0737
37	Mayo	36.5274	-78.891
38	Shearon Harris	35.6335	-78.9558
39	Sutton	34.3065	-78.004

ID	River-Run	Latitude	Longitude
7	Tuckasegee River	35.2344	-83.125
	Vicinity of: Tuckasegee Hydro Station		
15	French Broad River	35.7934	-82.7102
	Vicinity of: Marshall Hydro Station		
18	Broad River	35.2174	-81.7642
	Vicinity of: Cliffside Steam Station		

Prioritized Detection Surveys/ Volunteer Monitoring



Education and Outreach



Questions?

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