HYDRILLA INFESTATION OF THE CROTON WATERSHED

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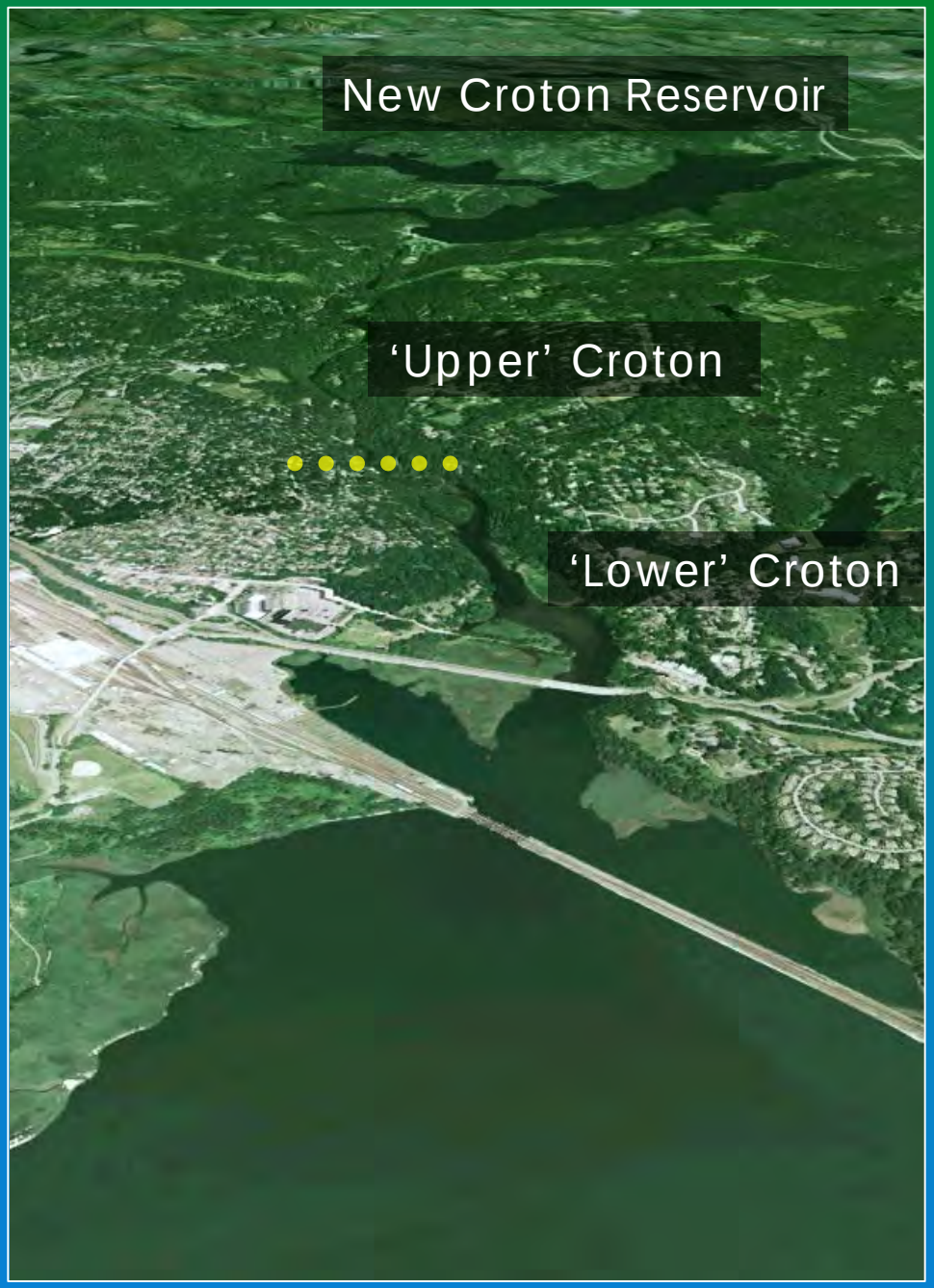
SePRO

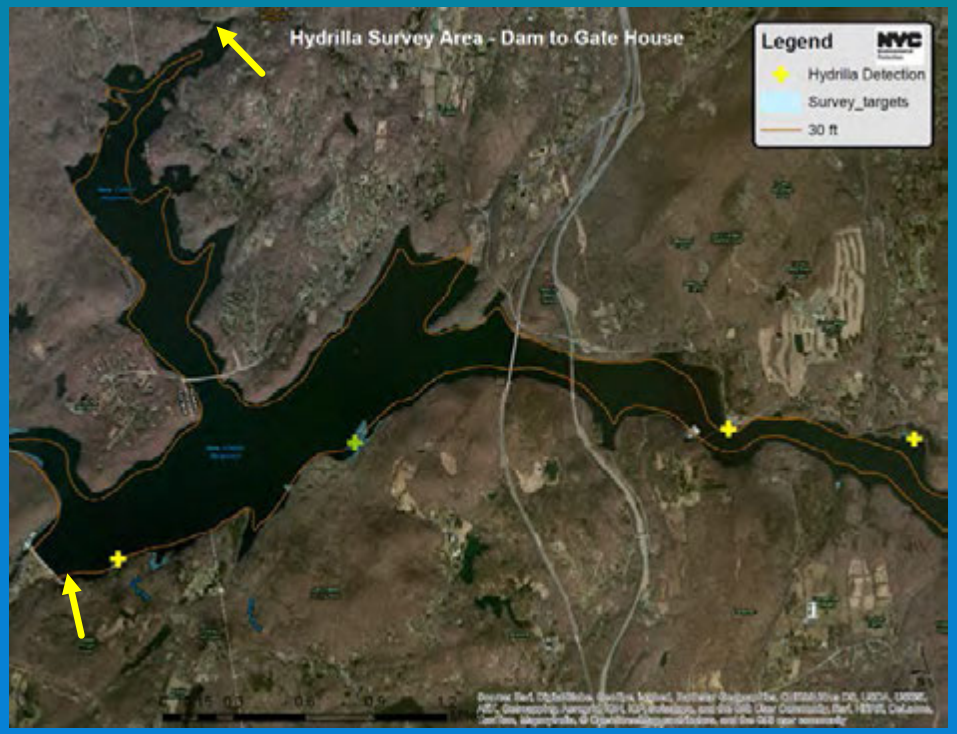


Hydrilla infests three distinct aquatic environments in the Croton watershed.

- New Croton Reservoir
- 'Upper' Croton River (no tidal influence)
- 'Lower' Croton River (tidal influence)

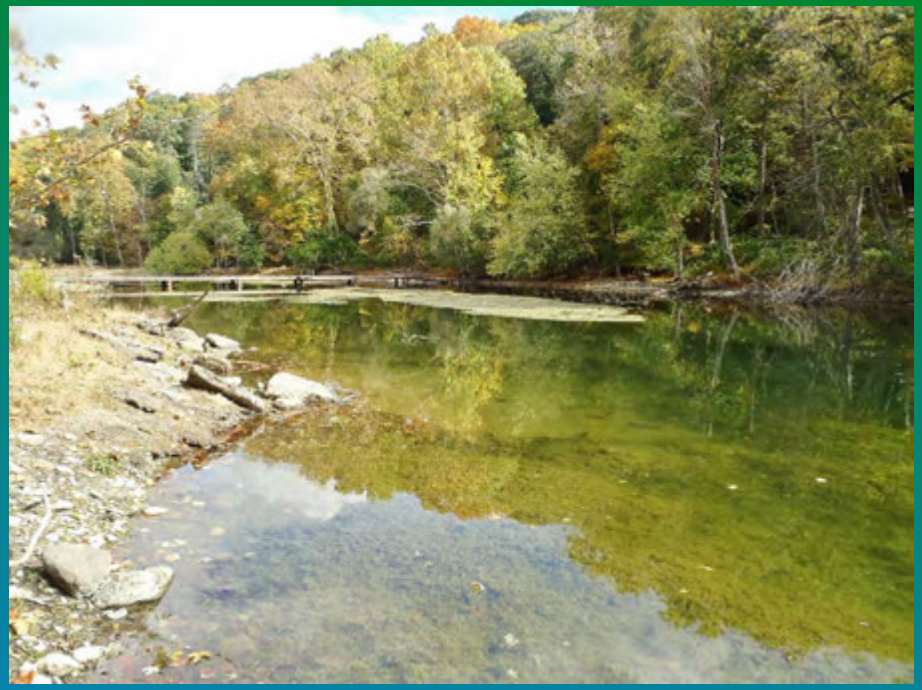
There is currently no evidence of established hydrilla in upper Croton Bay.

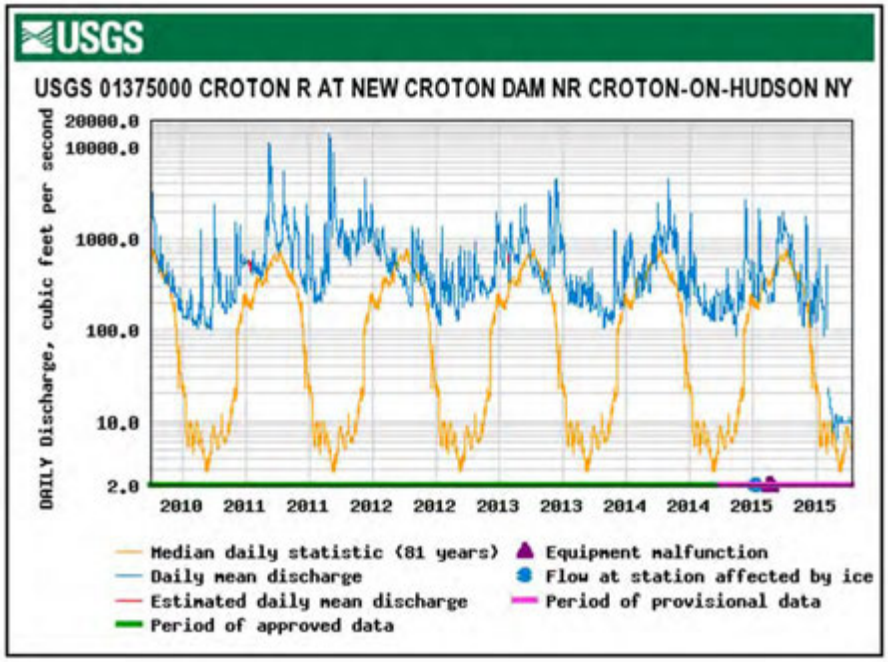
Each environment will require different approaches to possible management.



New Croton Reservoir

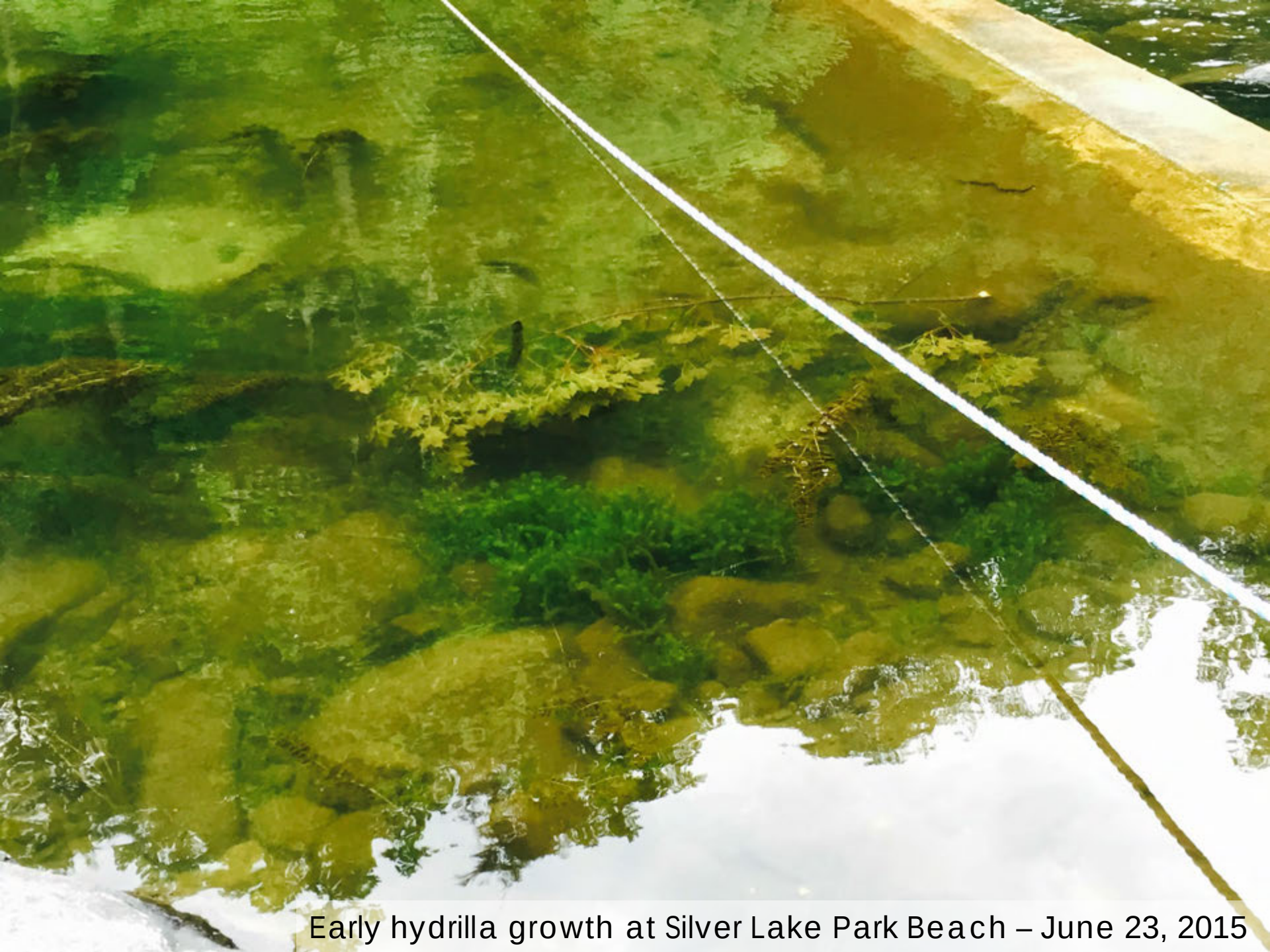
- Isolated, scattered patches
- Complete distribution remains somewhat uncertain
- While system is deep and has some discharge, water exchange rate is not high.
- Spot management with herbicides can be successful if reconciled with system's potable use by NYC.
- Barriers, physical removal/dredging, triploid grass carp are alternatives.





‘Upper’ Croton River

- Heavily infested in many areas but distribution and density are still increasing.
- Hydrology is controlled by discharge from the New Croton Dam.
- Discharge patterns changed this summer versus recent past where NYC use was suspended. Required flows…
  - 75 MGD April 1 to June 30
    (116 CFS or 230 acre-feet per day)
  - 5.5 MGD for rest of the year
    (8.5 CFS or 16.9 acre-feet per day)



Early hydrilla growth at Silver Lake Park Beach – June 23, 2015

Below walking bridge at Black Rock…dense hydrilla throughout and topped areas – 10/14/2015

4 feet of dense hydrilla growth with isolated milfoil – 10/14/2015

Dr. Richardson looking downstream at hydrilla/EWM mix at Black Rock Park – 10/30/2014

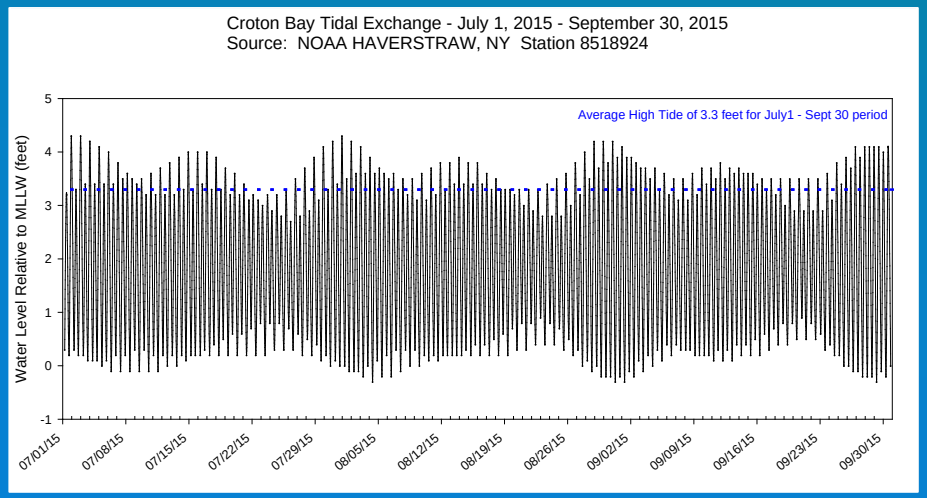
Same area is now almost entirely hydrilla – 10/14/2015

Looking upstream at Black Rock Park – 10/30/2014

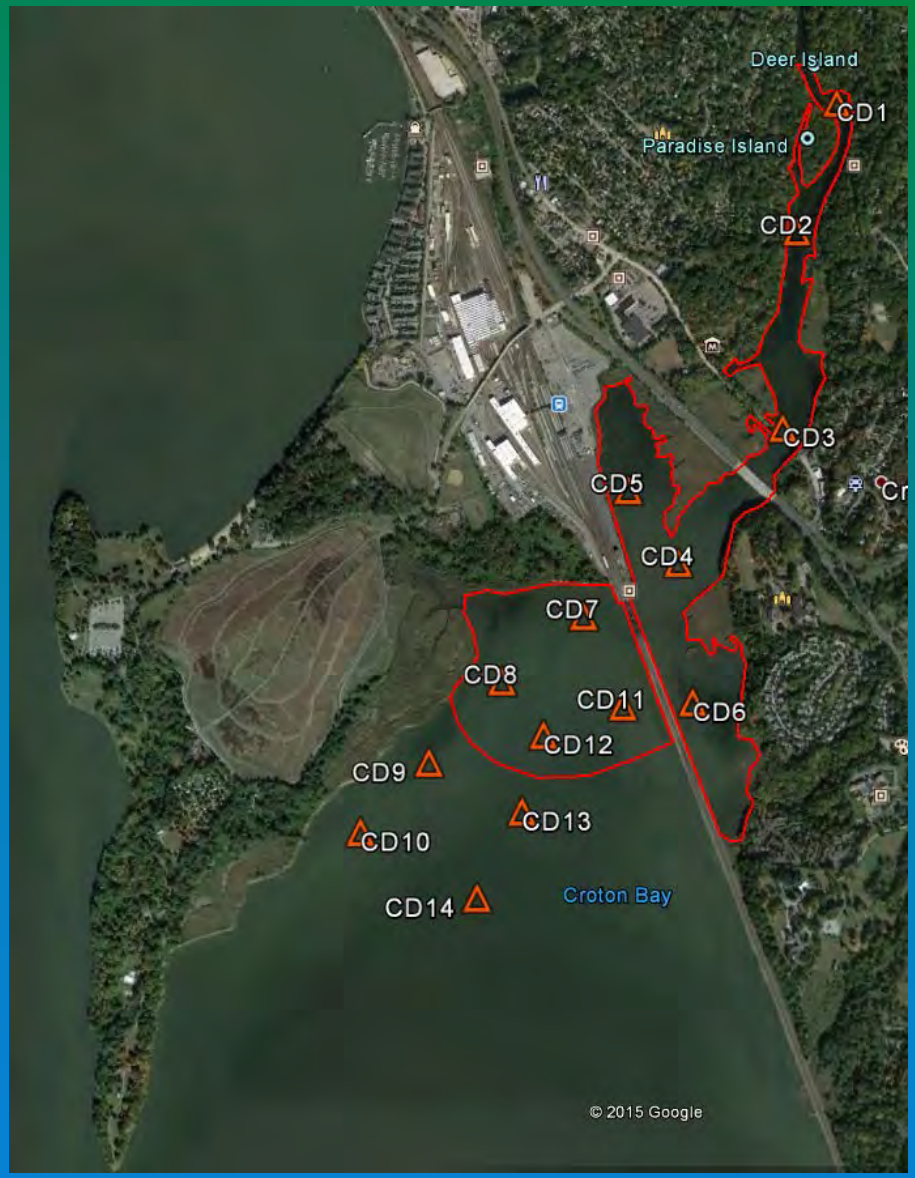
Hydrilla at surface looking upstream
at Black Rock – 10/14/2015

Below walking bridge at Black Rock
dense hydrilla persists today – 12/1/2015
Water temperature estimated in
mid-upper 40s

‘Lower’ Croton River



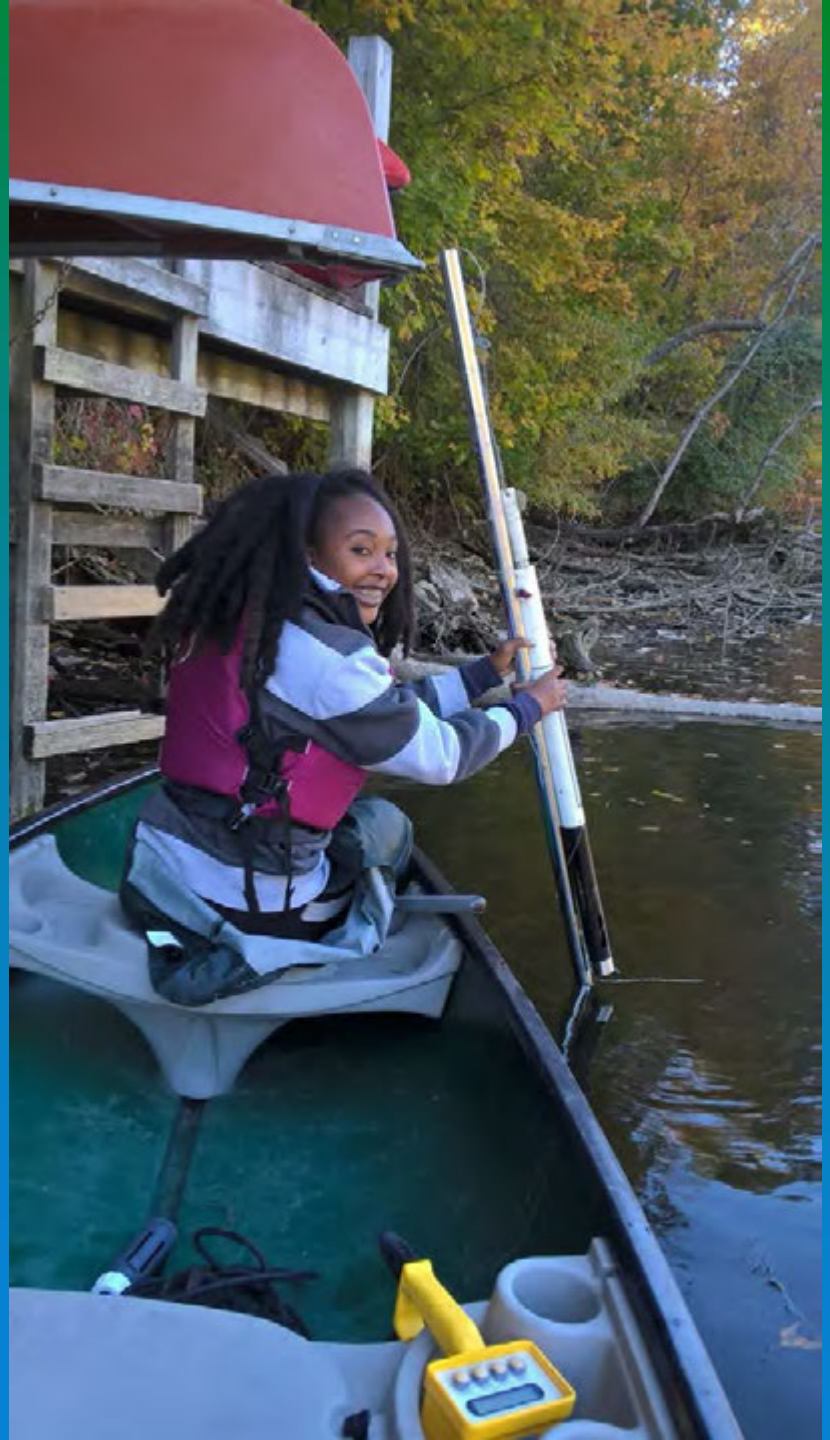
- Strong tidal influence with 3+ foot swings twice daily
- With future reservoir release schedule, June hydrology will be influenced strongly by flow from upstream and tides.
- In July or later in summer, tidal effects will dominate water exchange.
- As a complex factor in considerations of hydrilla management, tidal influence was studied in a mid October tracer dye study.



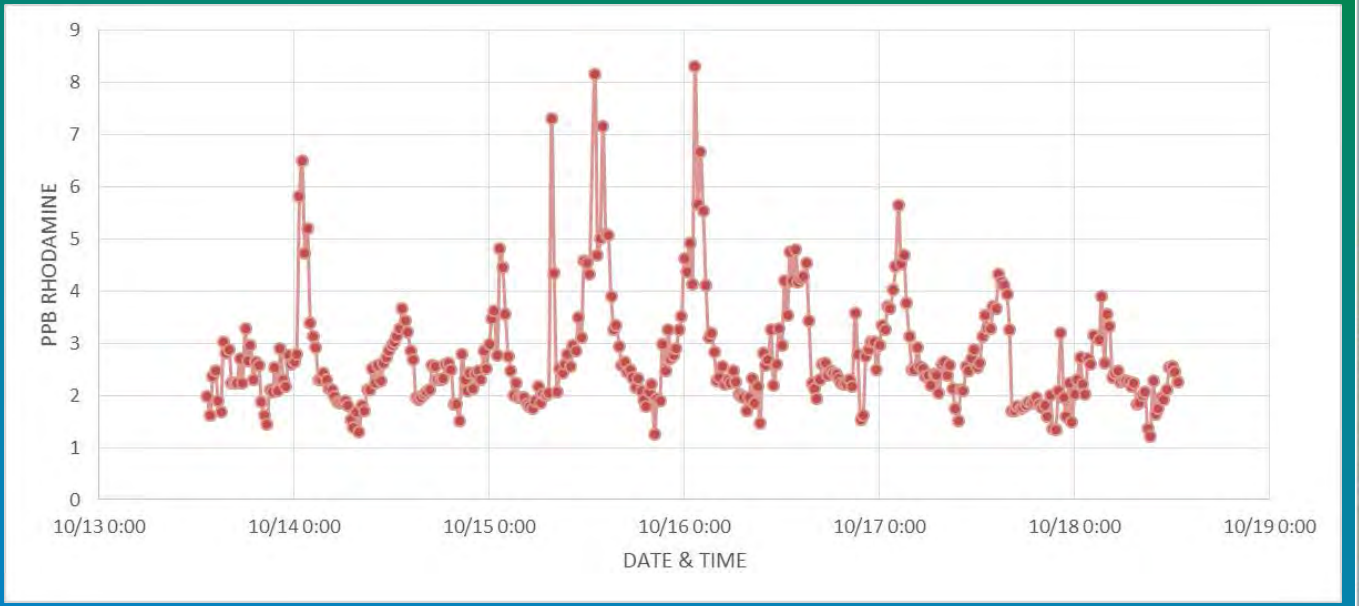
Croton River/Bay Dye Study

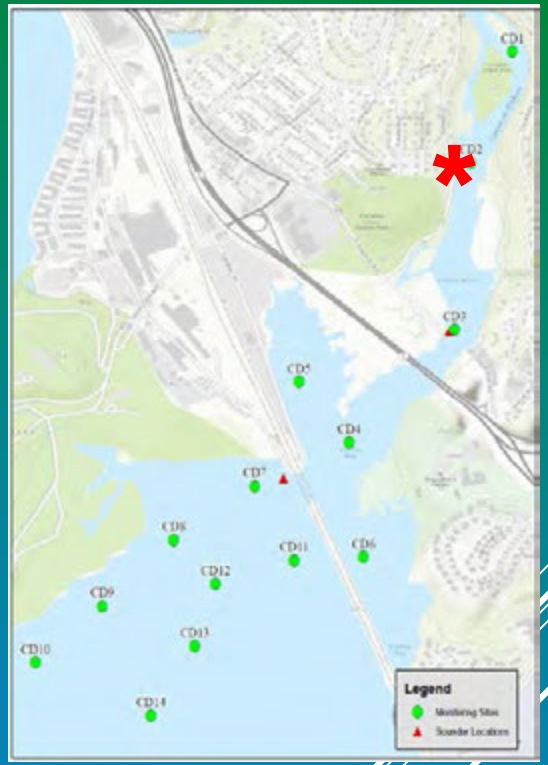
- Cooperative study supported by NYSDEC.
- Application of rhodamine dye on 10/13 by Allied Biological and monitored through 10/23.
- Dye monitoring equipment provided by US Army Corps (Dr. Netherland) with on-site support from NC State University
- Volunteer support critical!

THANK YOU !
Be Abam-Depass and
Earl DePass

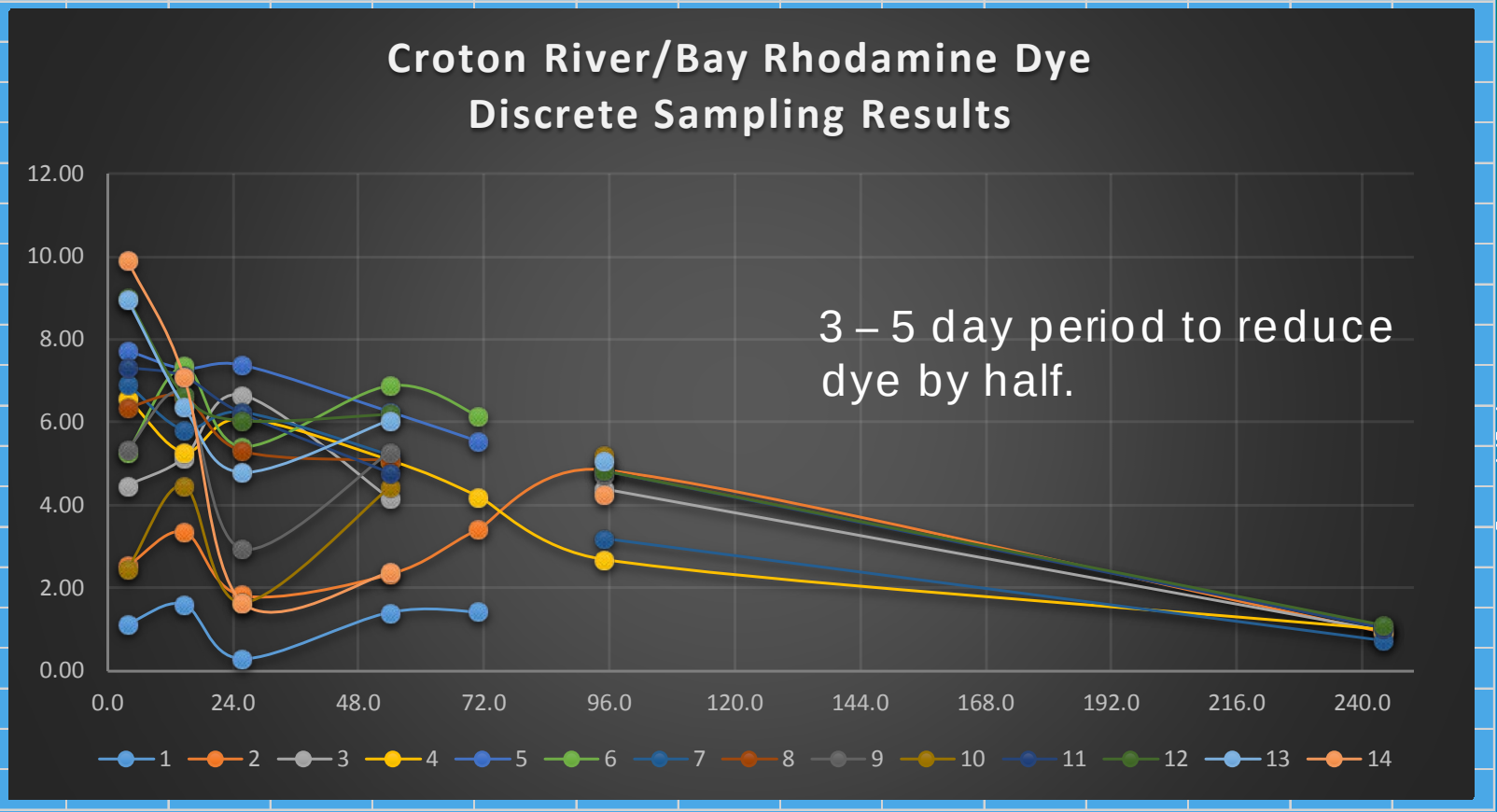


Tidal behavior of dye in upper part of study area. October 13 – 18, 2015





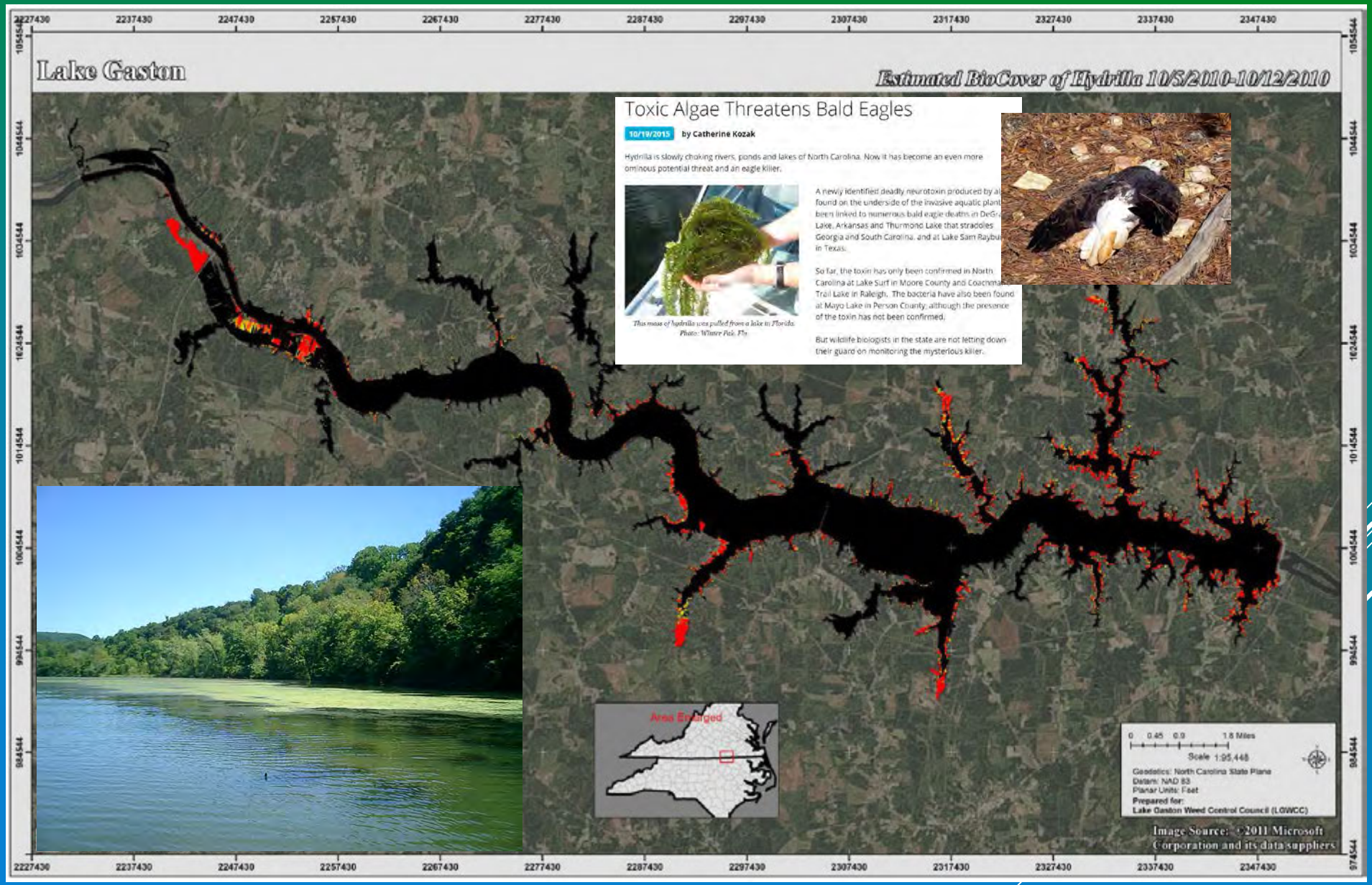
	Discrete Sampling Station ID													
AVG HAT	1	2	3	4	5	6	7	8	9	10	11	12	13	14
3.7	1.15	2.54	4.48	6.60	7.74	5.27	6.93	6.35	5.36	2.45	7.33	9.02	8.96	9.91
14.5	1.61	3.35	5.14	5.29	7.30	7.35	5.83	6.60	6.65	4.46	7.11	6.66	6.39	7.10
25.6	0.31	1.83	6.65	6.10	7.39	5.41	6.25	5.30	2.96	1.64	6.22	6.05	4.80	1.65
54	1.42	2.34	4.15	5.09	6.25	6.89	5.21	5.08	5.29	4.43	4.78	6.21	6.06	2.37
71	1.43	3.43		4.21	5.53	6.16								
95		4.84	4.39	2.69			3.19	4.83	4.75	5.21	4.83	4.84	5.08	4.26
244		0.95	0.98	1			0.72	1.08			1.04	1.12		



Chris Doyle

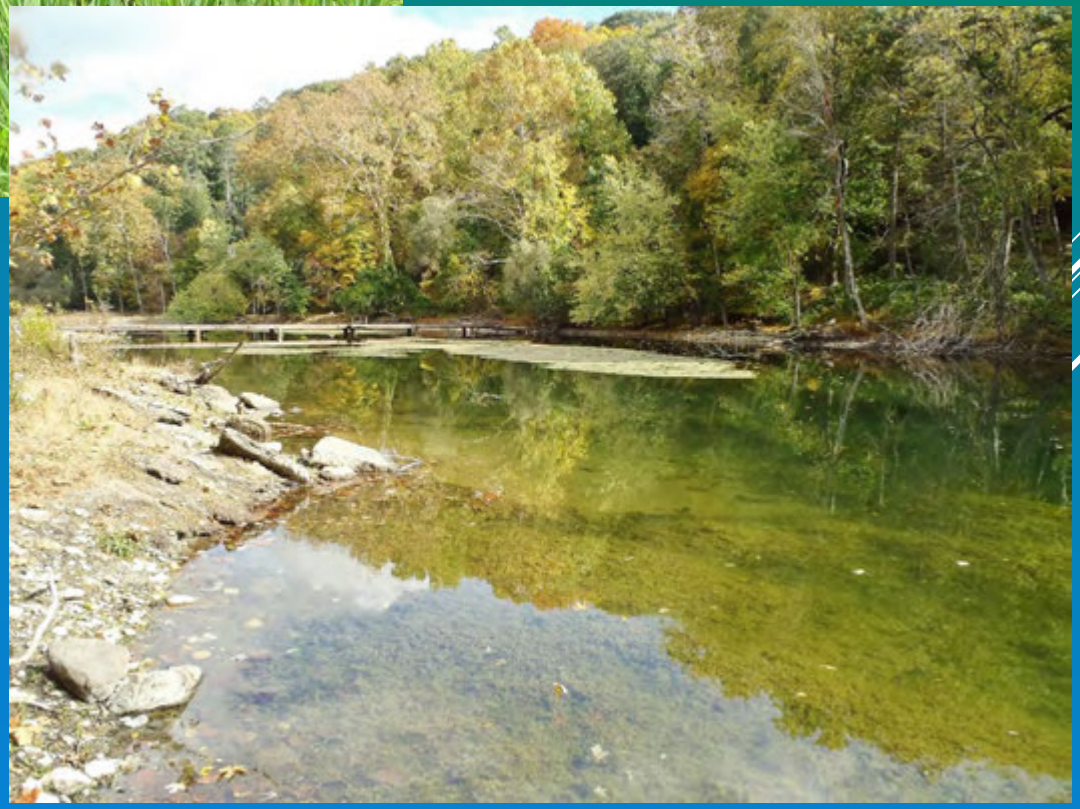
Hydrilla Survey Results for Croton River: 2014 - 2015

Possible Future Outlook for New Croton Reservoir

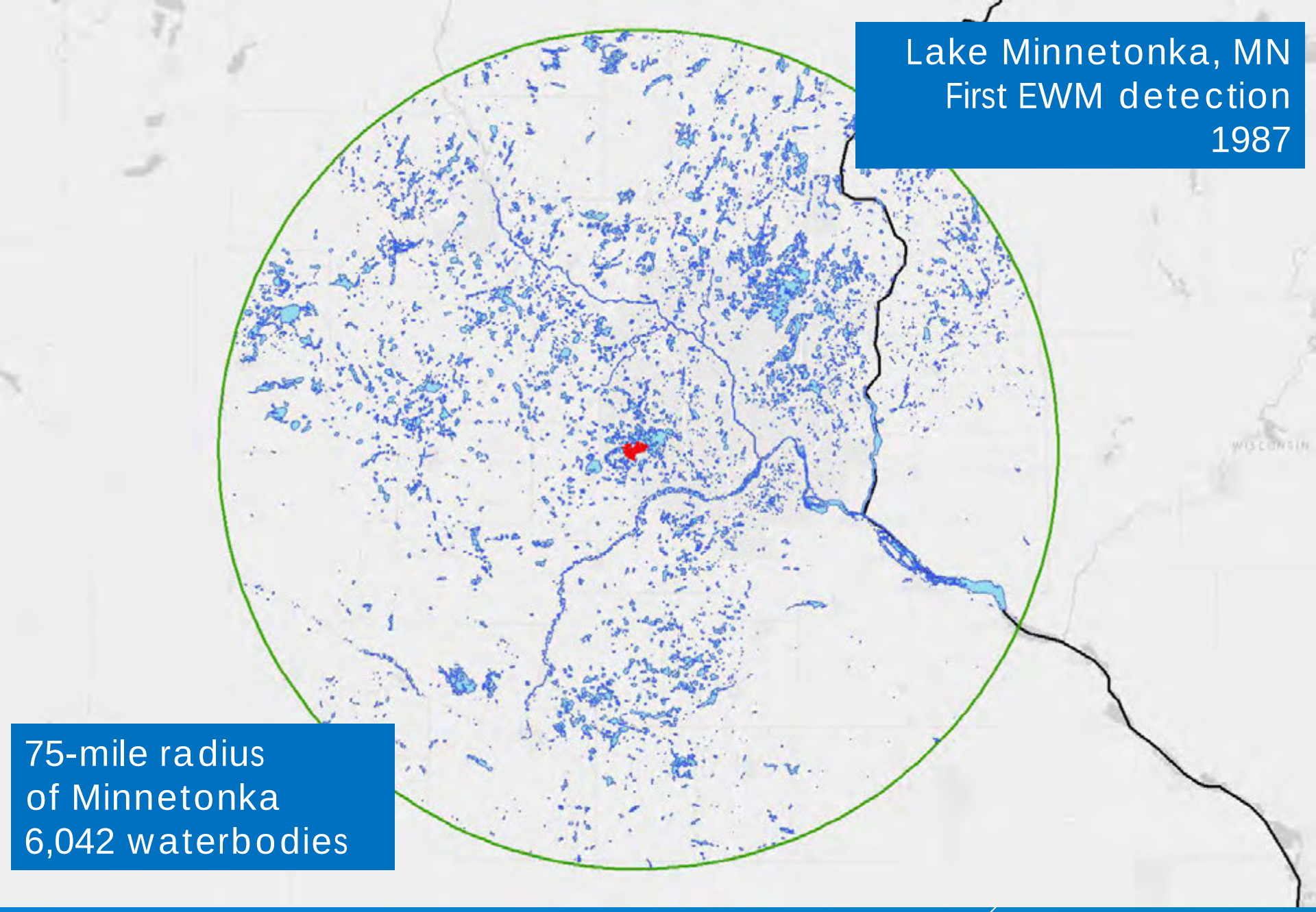


Lake Gaston NC Prior to Triploid Grass Carp Impact (plus SE reservoir AVM)

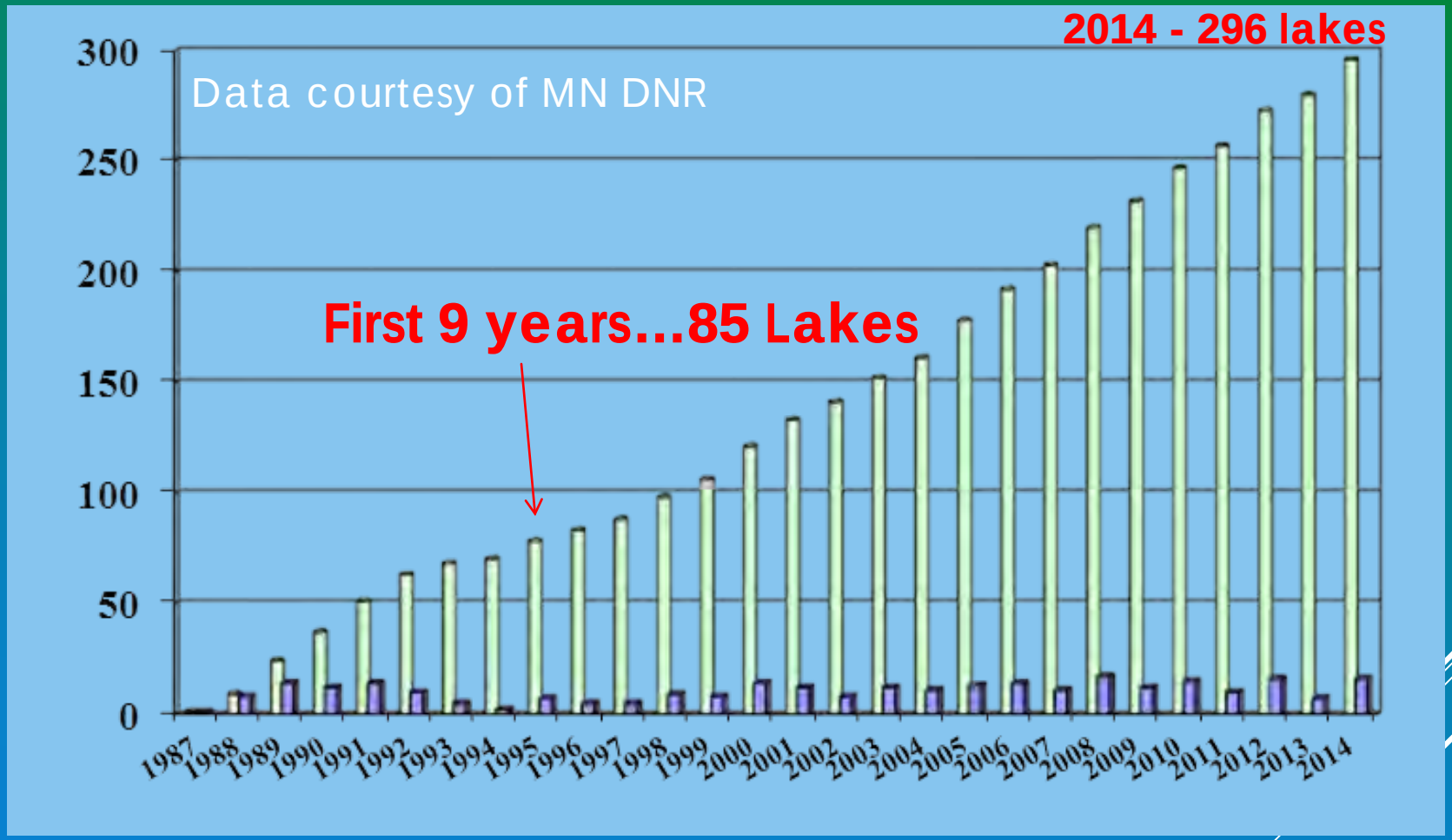
Unmanaged Hydrilla
Eno River NC
August 2011



Croton River
October 2015

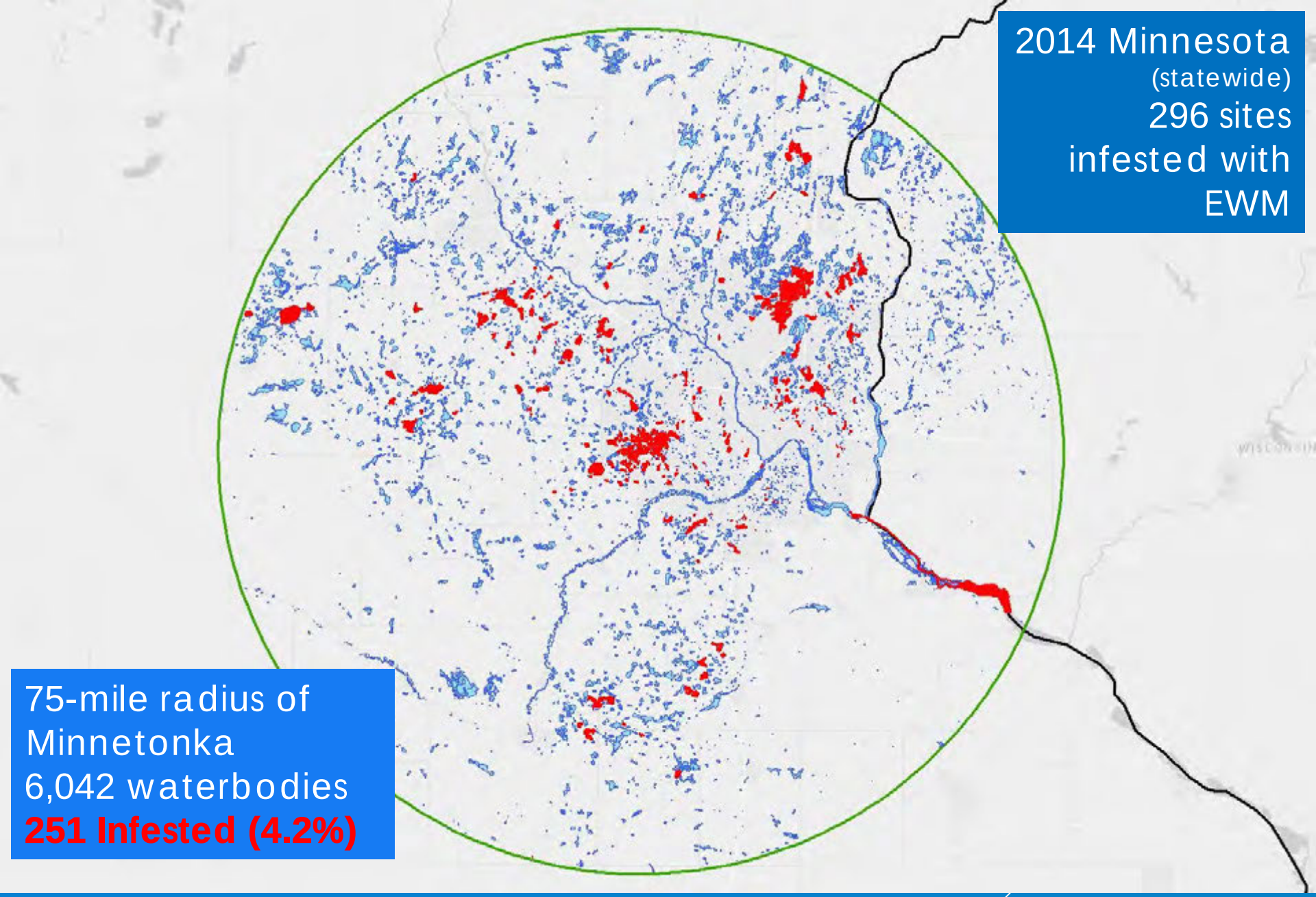

Lake Minnetonka, MN
First EWM detection
1987
75-mile radius
of Minnetonka
6,042 waterbodies

History of Eurasian Watermilfoil Discovery in Minnesota since 1987 Detection in Lake Minnetonka



Cumulative Number of Infested Sites

Number of new infested sites in a given year


2014 Minnesota
(statewide)
296 sites
infested with
EWM
75-mile radius of
Minnetonka
6,042 waterbodies
251 Infested (4.2%)

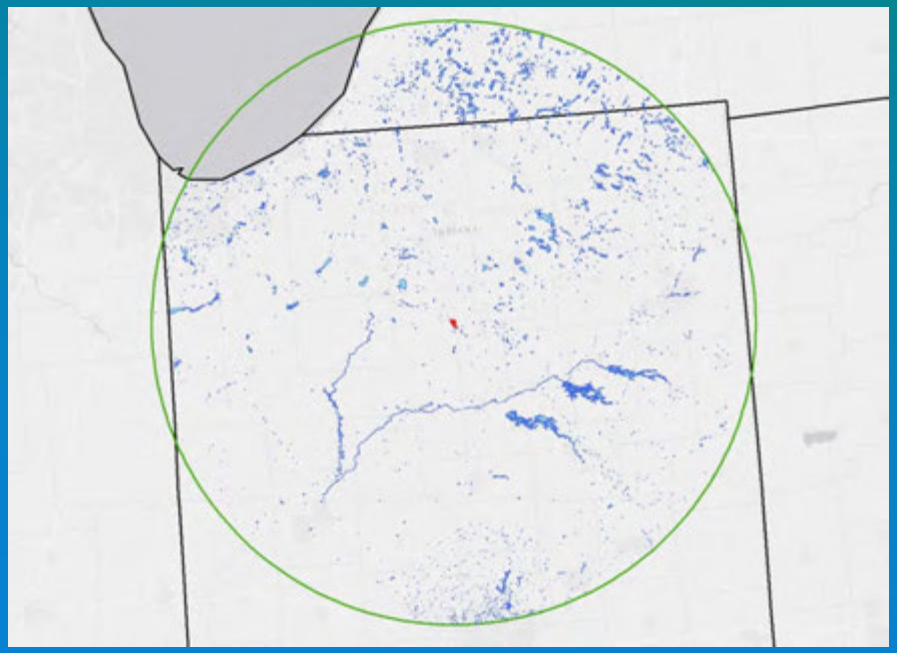
Indiana Hydrilla with Formal Eradication Program

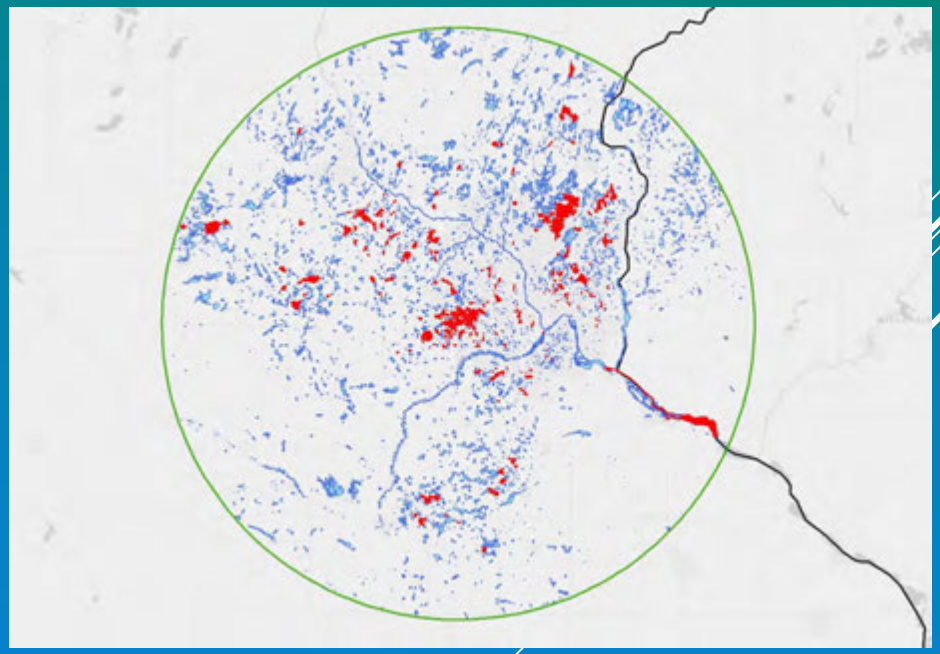
9 years (2006 – 2015)
0 new infested lakes

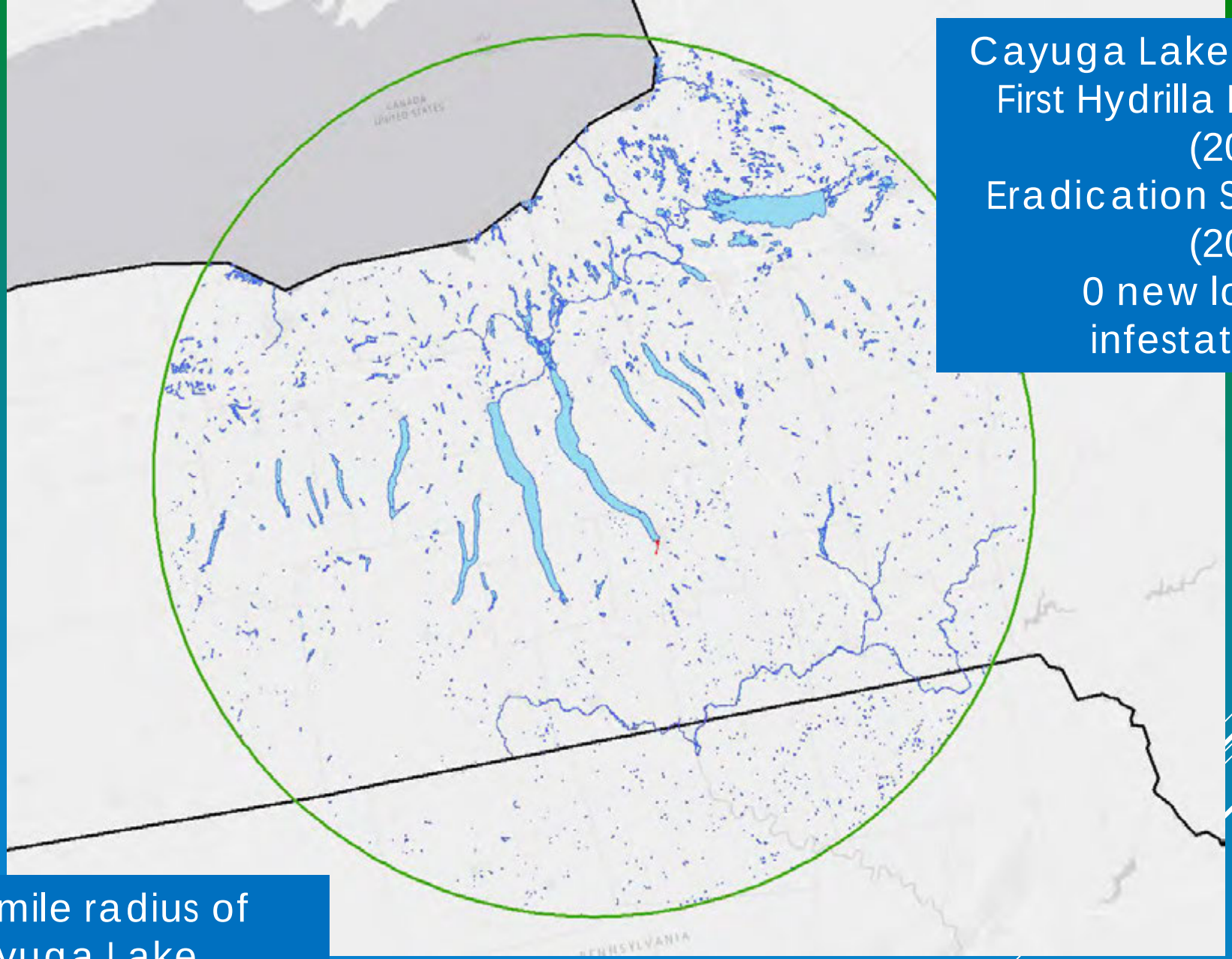
Minnesota EWM History without Formal Eradication

9 years (1987 – 1996)
85 lakes

27 years (1987 – 2014)
296 infested lakes (11/yr)



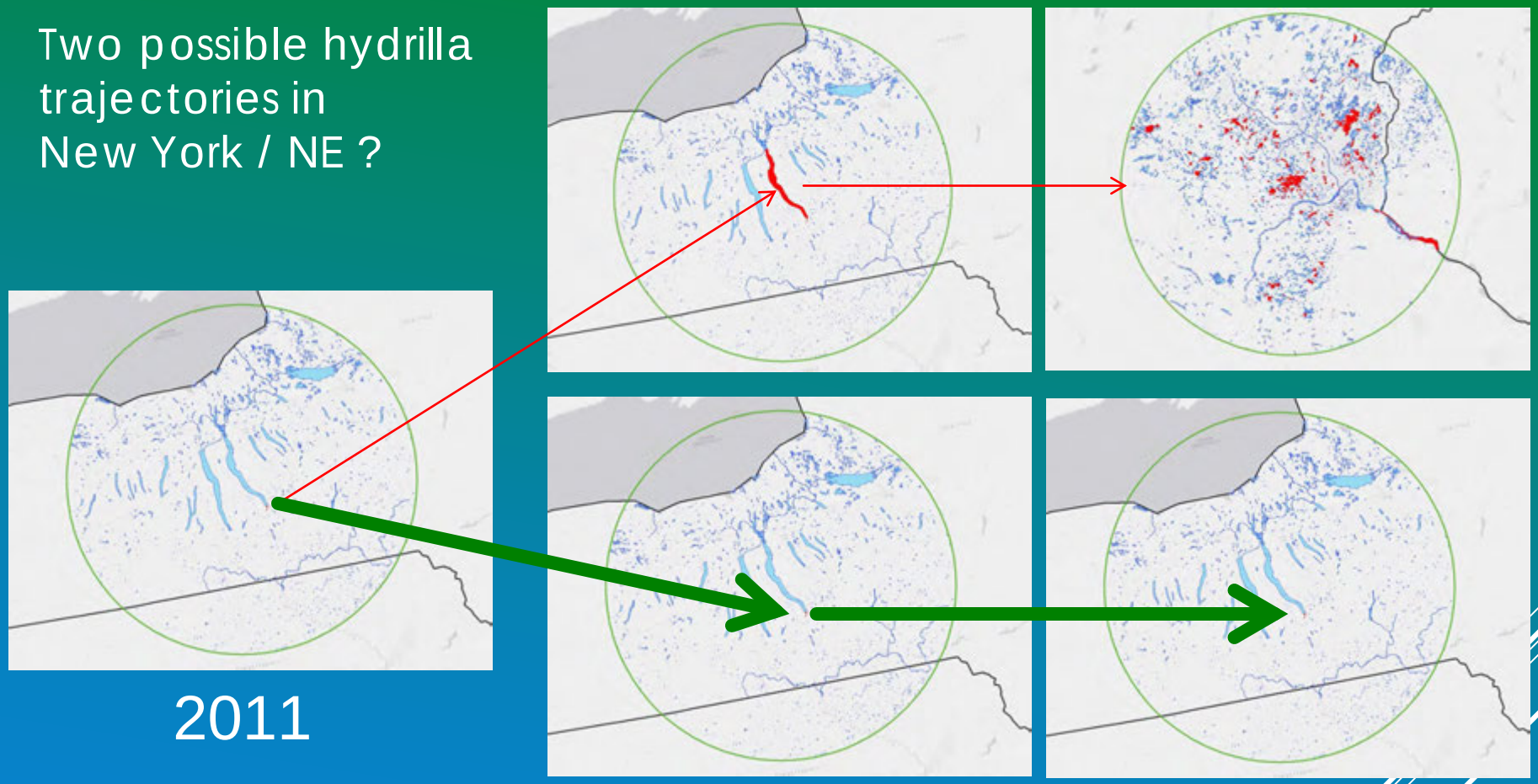




Cayuga Lake, NY
First Hydrilla Find (2011)
Eradication Start (2012)
0 new local infestations

75-mile radius of Cayuga Lake
2,339 waterbodies

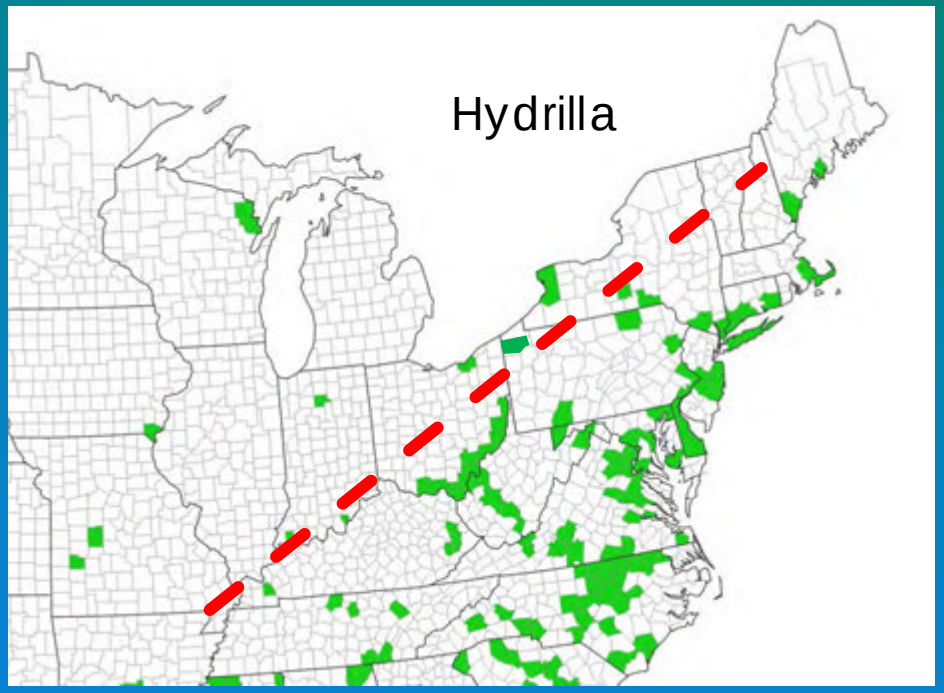
Two possible hydrilla trajectories in New York / NE ?



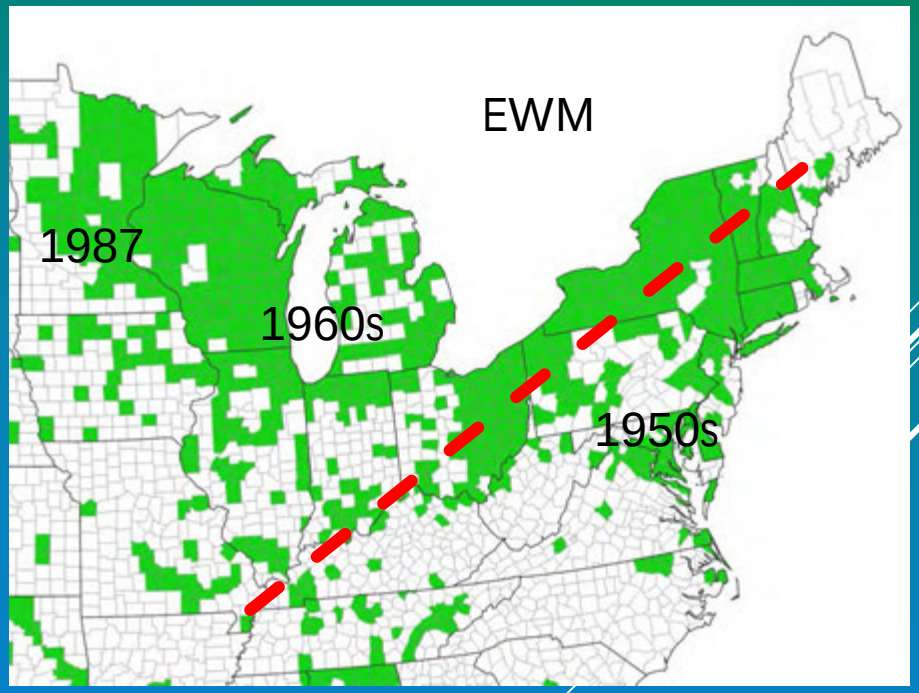
Challenge:
Croton infestation presents risk of local and regional hydrilla spread without strong management intervention

FUTURE TRAJECTORY OF REGIONAL/ NATIONAL HYDRILLA EXPANSION?

Hydrilla 2015
35 years since introduction
First NE introductions in late 1990s



Eurasian Watermilfoil 2015
135 years since introduction
but faster expansion since 1950s



Costs of Management

Grass Carp – very inexpensive but major ecological shifts can occur (NO)
Barriers – good for known spots but expensive (low $k per acre)
Harvesting – extremely difficult for monoecious hydrilla – not recommended

Herbicide Examples:

Lake Manitou IN Eradication

- 800 acre…lakewide management
- $300 - $400 per acre/year including all support services

Lake Waccamaw NC Eradication

- 960 acres in 9,000 acre lake
- $485 per acre/year including all services

Lake Gaston NC Management (not Eradication)

- Higher exchange treatments
- $600 - $900/acre including all services

Deep Creek Lake MD

- Eradication of small, scattered, deeper-water infestations across 100+ acres in 4,000 acre reservoir
- $600 - $2000/acre including all services

Controlling / Removing Hydrilla from the Croton watershed is technically feasible but would be challenging.

- Hydrilla tuber eradication can take 6 – 10 years.

Different management methods will have different cost and ecological considerations.

The negative long-term impacts of hydrilla in the watershed and risk to local/regional waters support taking strong action.

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