



**Department of
Environmental
Conservation**

2016 Croton River Hydrilla Control Project

**Croton Hydrilla Public Information Meeting
June 28, 2016**

Background

- Overview of hydrilla biology
- What makes hydrilla a superweed
- Overview of infestation growth in Croton River
- Updates on actions taken in Croton River



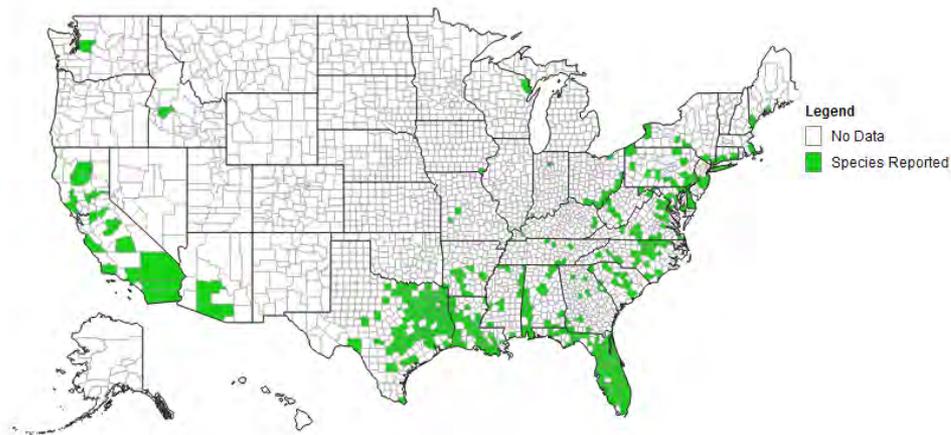
A “Most Wanted” Species



- Federal Noxious Weed List
- Noxious weed and/or banned in at least 17 states
- Prohibited under NYCRR Part 575

Hydrilla in the U.S.

hydrilla (*Hydrilla verticillata*)



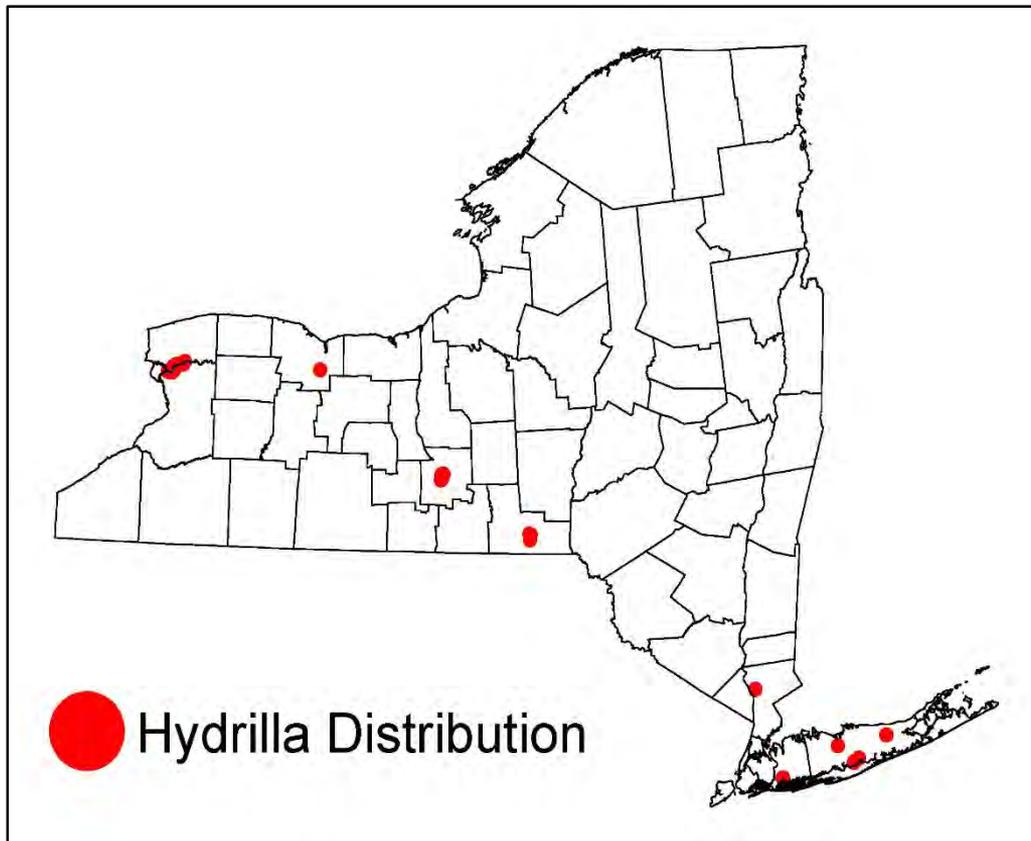
UF-Gainesville

Map generated on Jun 22, 2016

EDD MapS
Early Detection & Distribution Mapping System



NEW YORK
STATE OF
OPPORTUNITY
**Department of
Environmental
Conservation**



Broome, Erie, Kings, Monroe,
Nassau, Niagara, Orange,
Suffolk, Tompkins, and
Westchester Counties.

Hydrilla verticillata

Two biotypes found in U.S.

Dioecious – Native to India

Monoecious - Native to Korea



Important Species Characteristics

- Highly adaptable to different soil types and depths, low light and low nutrient conditions
- Establishment deterred by wave action, exposure, and hard substrate
- Does not do well with regular exposure to > 3 ppt salinity



Important Species Characteristics



- Grows in water depths of > 30 feet (depending on clarity)
- Water clarity > 1.3 feet
- Hydrosoil temperatures for tuber sprouting 52°F - 59°F
- Hydrilla maintains vegetation at colder temperatures (40°F)

Important Species Characteristics

- Turions (produced in early summer)
- Tubers (after July 4th) – carbohydrate storage
- Vegetative spread by fragments



Croton River Hydrilla: Actions to Date

- 2013 NY Botanical Garden Rare Plant Survey
- 2014 Allied Biological Croton River plant survey
 - Hydrilla at 55% of survey locations, including in the Croton Bay
- 2015 plant survey around Black Rock Park
 - Hydrilla density had doubled



Croton River Hydrilla: Actions to Date

- 2015 Allied Biological Hudson River aquatic plant survey
- SePRO flow dynamics study 2015
- Public information meeting December 1, 2015



Chris Doyle, SOLitude Lake Management



Croton River Hydrilla: Actions to Date

- DEC Invasive Species Unit directed by Executive to take on project March 2016
- June 2016 contract for plant monitoring and herbicide treatment
- Plan for Hydrilla Hunter monitoring 2016 season



Urgency for Response

- Threat of spread to Hudson River and its tributaries
- Threat to NYC water supply
- Risk to Submerged Aquatic Vegetation (SAVs):
Vallisneria americana
(water celery)



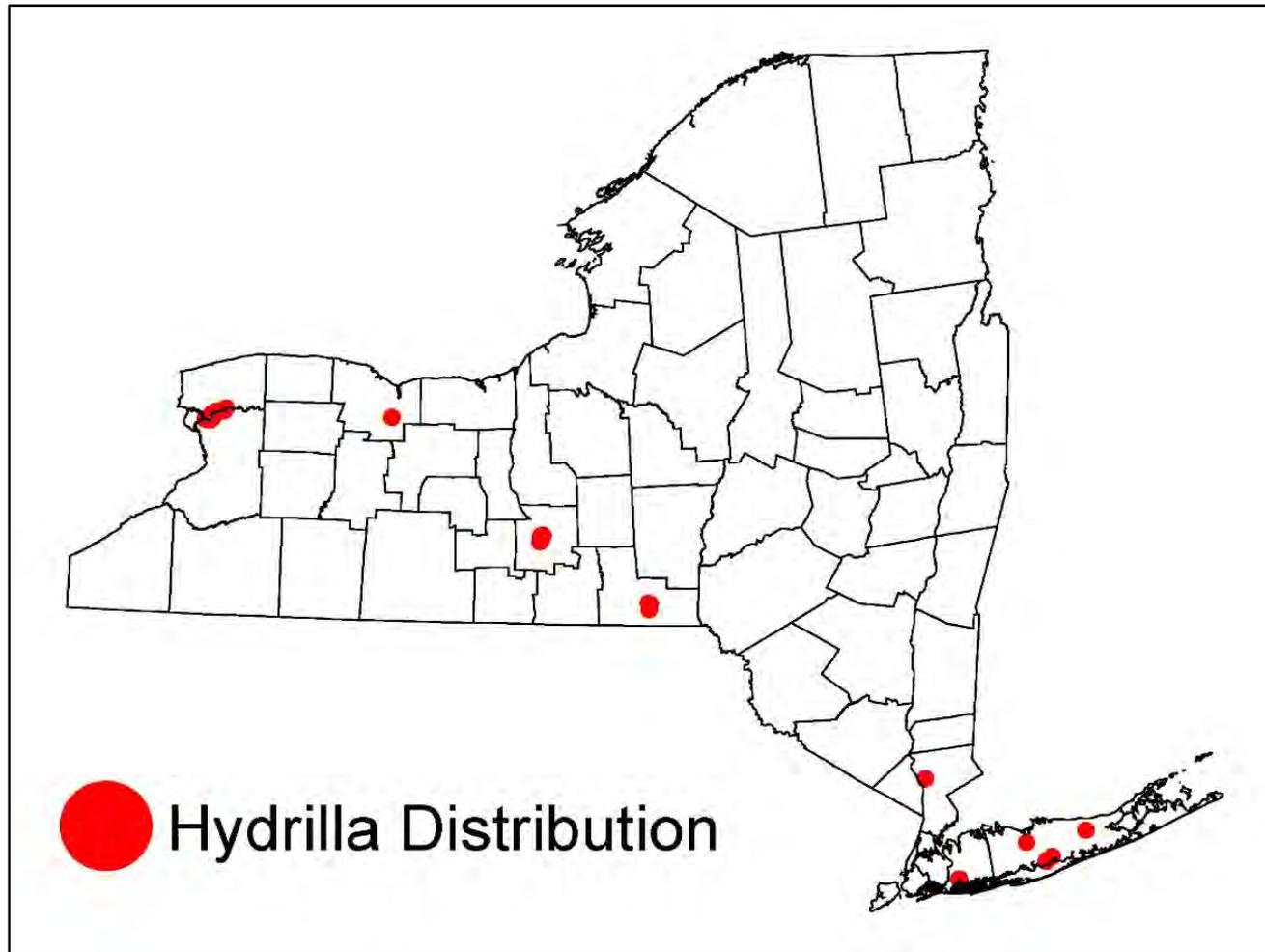
Urgency for Response



- Risk to waterfowl and raptors: toxic cyanobacteria (*Aetokthonos hydrillicola*)
- Threat to waters in NYS and adjacent states: biodiversity
- Impacts to recreational water use

Hydrilla management in other NY locations





Hydrilla Projects in other NY Locations

Lake Ronkonkoma, Suffolk County (2009)

- 240 ac lake with public boat launch
- Explosive growth from year 2-3
- No management, hydrilla comprises 90% of the plant community

Small pond in Tinker Creek Nature Park
Henrietta, Monroe County

- Grass carp 2015
- Benthic mats 2016



Hydrilla Projects in other NY Locations

Tonawanda Creek/ Erie Canal: endothall
USACE ERDC, NYS Canal Corp, DEC, USFWS,
E&E, Aquatic Control Tech

- Hydrilla present in ~15 miles, from Niagara River to Lockport (359 ac)
- 400-800 CFS flow rates in canal
- 1.5 ppm for 48 hrs in reduced flow
- Extensive water monitoring and plant surveys
- 90% tuber bank reduction, 99% hydrilla biomass



Hydrilla Projects in other NY Locations

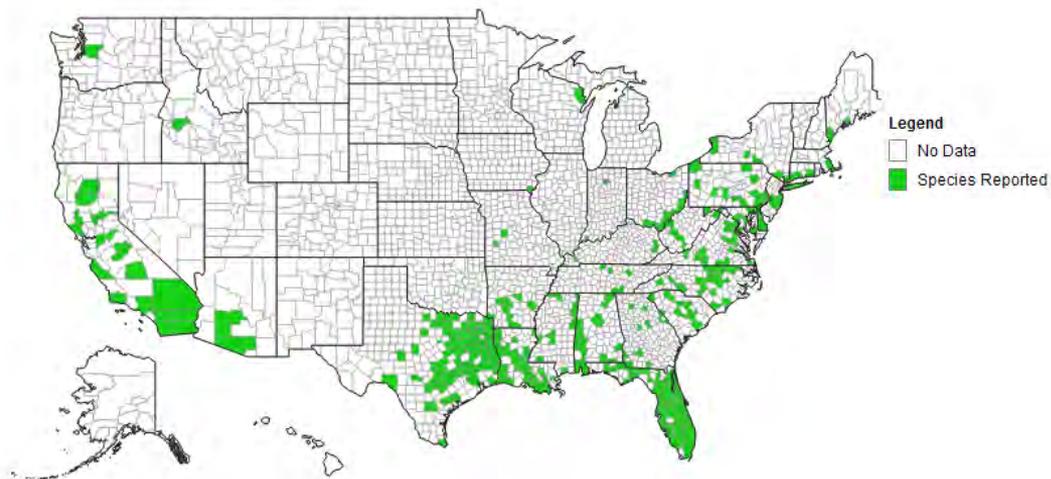
Cayuga Inlet/ Fall Creek: combo treatment

- Tompkins County SWCD, CCE, CLWN, Hydrilla Task Force, DEC, Racine-Johnson, Allied Biological, volunteers
- 166 acres, with connection to other Finger Lakes and Great Lakes
- Endothall 1-2 days, 3.0 ppm
- Fluridone 14 weeks metered application, liquid/ granular, 3-5 ppb
- Extensive water and aquatic plant surveys
- Very successful after 5 years of treatment and extensive monitoring
- 2015, no hydrilla was found in the inlet



Negative Impacts and Costs in Other States

hydrilla (*Hydrilla verticillata*)



Map generated on Jun 22, 2016

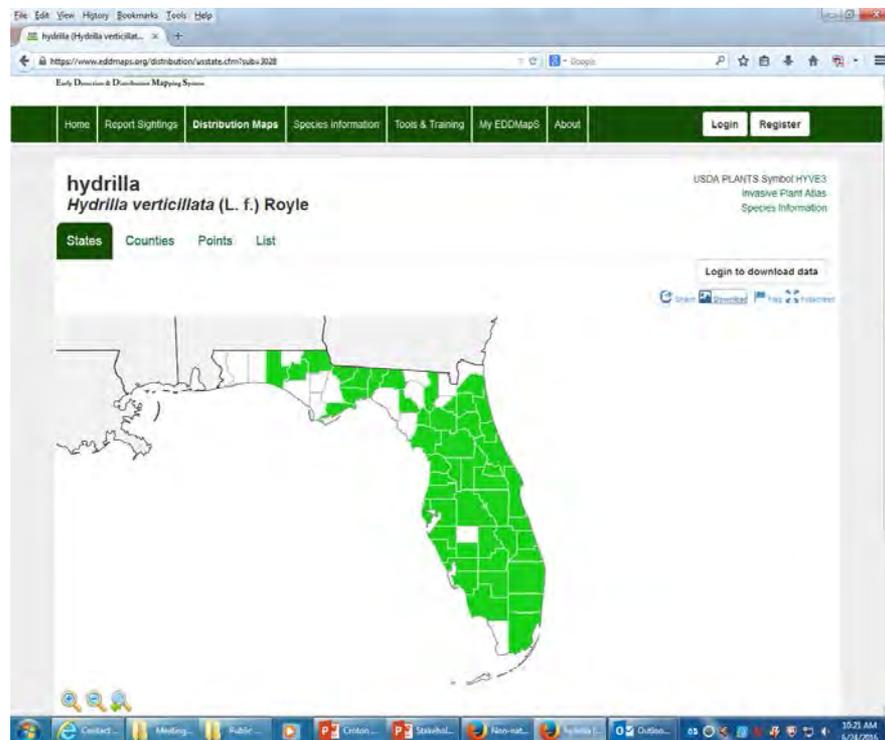
EDDMapS
Early Detection & Distribution Mapping System



Department of
Environmental
Conservation

Florida

- Initial response delayed (first introduction in late 1950's)
- Hydrilla has infested more than 140,000 acres of lakes, rivers, streams, drainage and irrigation canals
- Annual expenditures for management only exceed \$20 million
- Impacts on flood control, endangered species, fishing, hunting, real estate





Department of
Environmental
Conservation

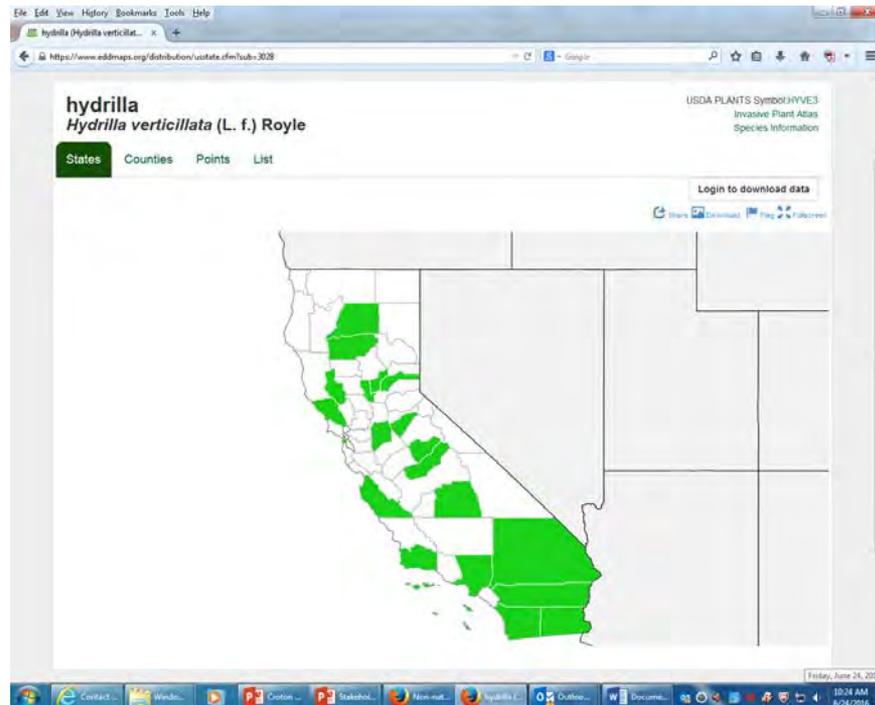
Indiana



- Lake Manitou infestation discovered in 2006 during routine aquatic plant survey
- DNR surveys lakes within 60 mile radius
- Restricted access to boat launches for 2 years
- \$7 million+ used for fluridone (systemic herbicide) treatment

California

- Largest current eradication effort in Clear Lake (since 1994)
- CA Department of Food and Agriculture claims eradication in 9 counties
- Yearly surveys of high risk areas
- Economic loss due to decreases in tourism



Additional States (annual expenditures)

Maryland \$0.5 M

North Carolina > \$0.5M

South Carolina > \$ 2.5M

Texas ? (since late 1970's)



Bryan Goldsby



Department of
Environmental
Conservation

Non-target Issues from Control



nature.mdc.mo.gov

- Physical controls may non-selective and impact all plants present (harvesting and benthic mats)
- Herbicides may impact more than just the target aquatic plant species



Department of
Environmental
Conservation

Non-target Issues from Control

- Impacts on native animals (dependent upon herbicide chosen)
- Resources used for control are unavailable for other projects



Unforeseen consequences of allowing Hydrilla to establish



Advocacy groups may form if hydrilla becomes established

- Especially if it creates novel habitat
- Fishing interests, waterfowlers, anti-management groups

Can result in a charged political environment

- Expectation the plant will behave
- Management decisions not optimal in this environment (not based on data)

Often results in “all or none” mgmt. scenarios

- Grass carp or do nothing



Hydrilla perceived as providing ecosystem services but

- Challenges come when hydrilla growth gets out of control
- Negative impacts from excessive hydrilla or large-scale management
- Severe impairment of nutrient cycling

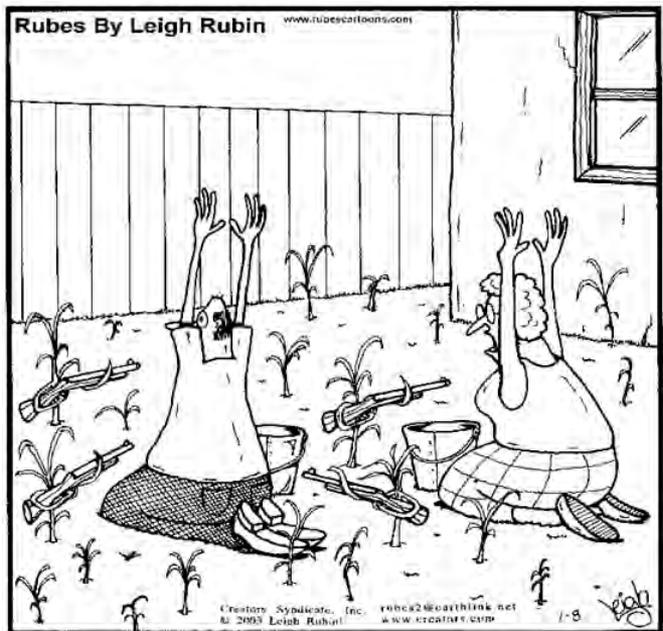


And more ...

- Blue green algae producing AVM
- Reduction in biodiversity
- Blocked intakes for hydroelectric plants



Range of responses



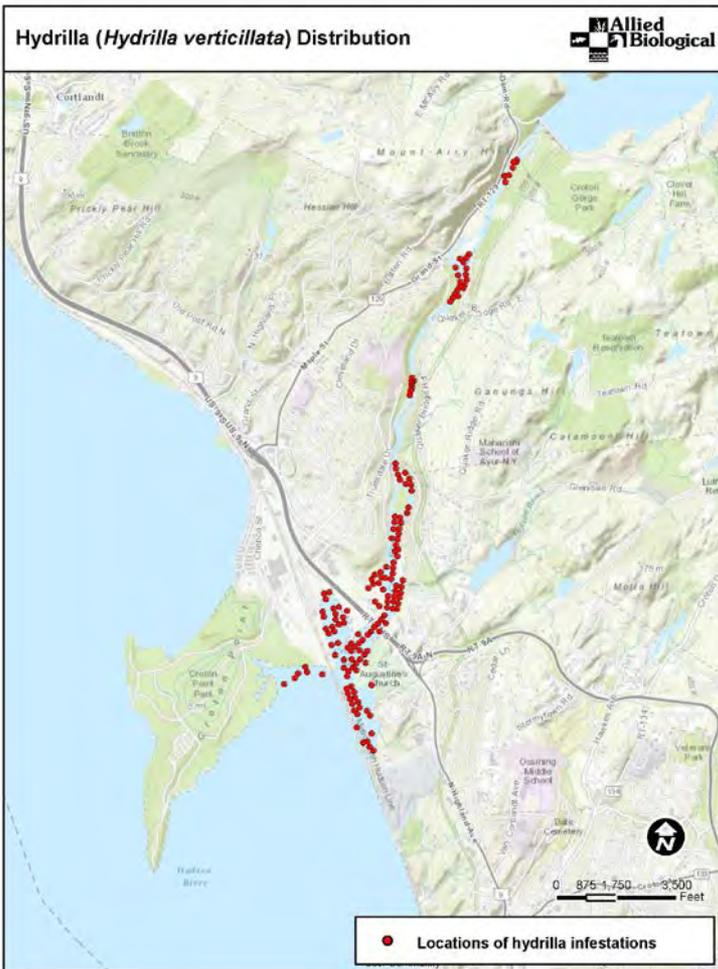
"We never should have waited this long ...
Now the weeds have *completely*
taken over."

- Eradication
- Control
- Containment
- No management efforts

Control and Management in the Croton River



Department of
Environmental
Conservation



Potential Treatments

- Evaluations based on non-target species impacts, cost, effectiveness in controlling hydrilla, water use restrictions
- Consultation with agency staff, national experts, literature
- **Physical:** hand pulling, benthic barriers
- **Biological:** triploid grass carp, site not suitable



Potential Treatments

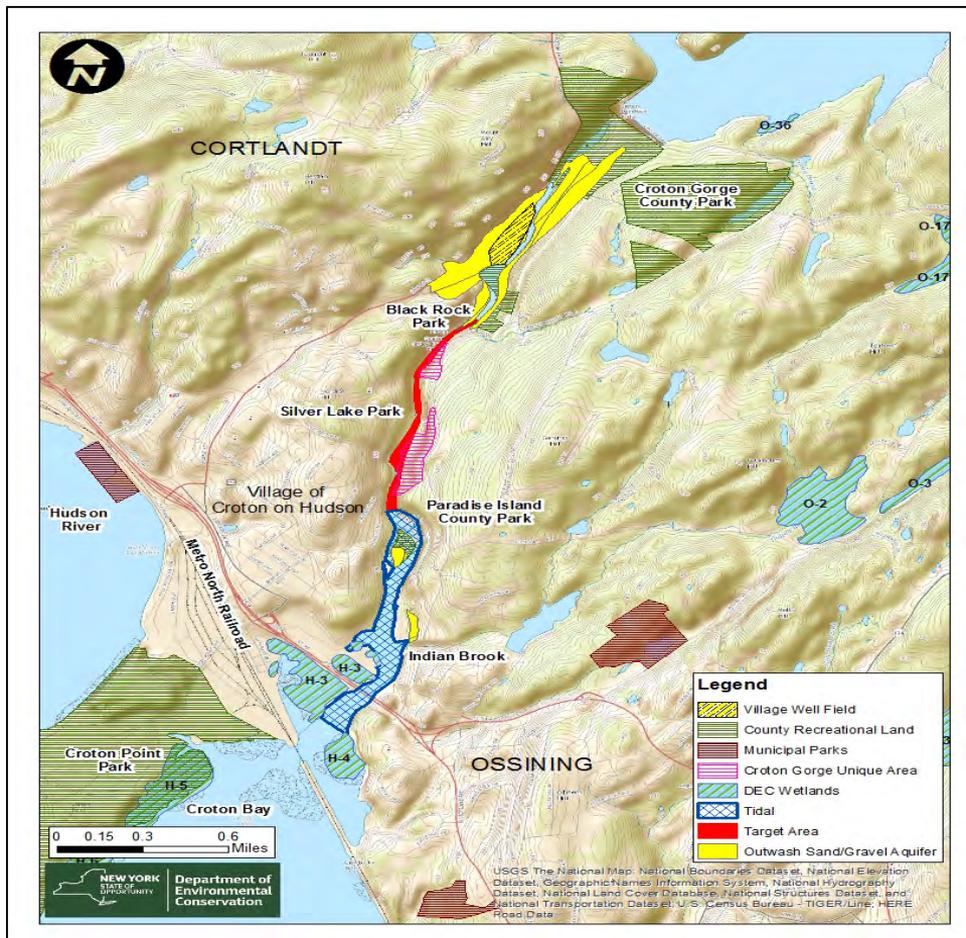
- **Chemical:** proven effective in a variety of aquatic environments
- Labeled for control of hydrilla:
 - Chelated copper products (Nautique/ Cutrine)
 - Flumioxazin (Clipper)
 - Fluridone (Sonar Genesis)
 - Endothall (Aquathol K)



Project Constraints and Limitations

- Village of Croton on Hudson drinking water
- High quality native plant beds, varying susceptibility to herbicides
- Rare, threatened and endangered plants
- Fish and other aquatic fauna
- Water use restrictions
- Article 24 regulated wetlands
- Herbicide restriction for use in brackish (salt) waters
- River system, challenging habitat





Department of
Environmental
Conservation

Proposed 2016 Treatment and Rationale

- 2016 effort important for developing a long term control project
- Herbicide treatment summer 2016 by injection method, no more than 100 gal of herbicide will be used
- Timing is critical to disrupt turion and tuber development
- 1.5-2.0ppm for 24-36 hours, dosage based on water flow
- Target area: Black Rock Dam to Deer Island (15.5 acres, 1.2 mi)
- Effective treatment area may extend beyond target area but will be diluted as the river widens



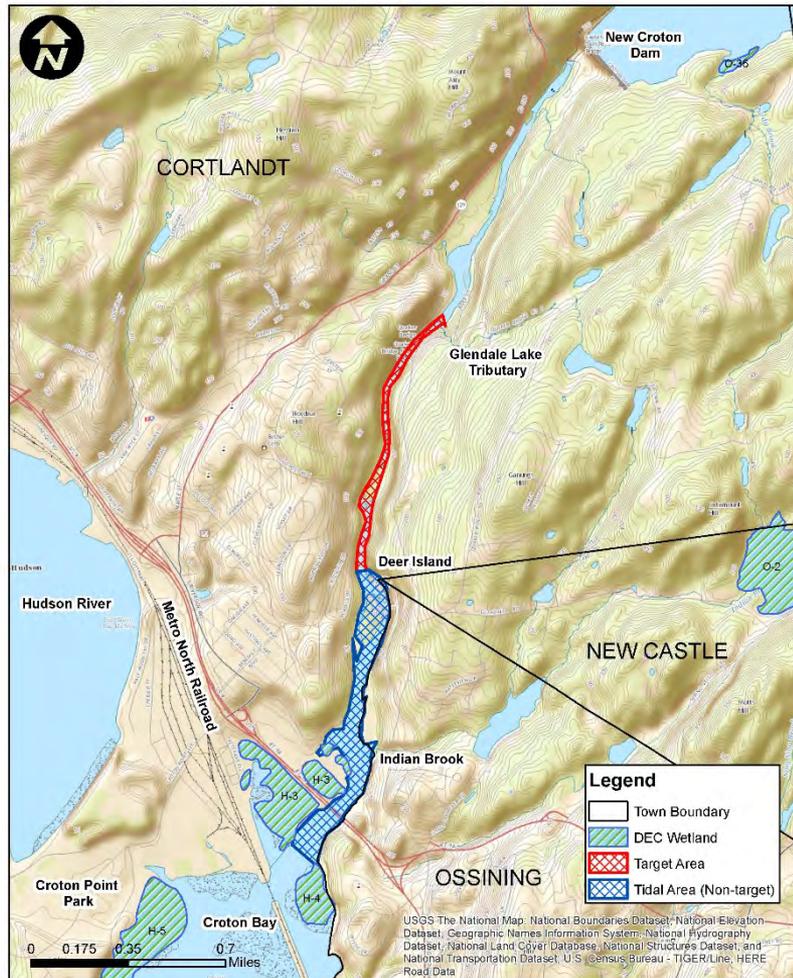


FIGURE 1 LOCATION MAP

Croton River Hydrilla Control Project 2016
Article 24 Freshwater Wetlands Permit
Towns of Cortlandt and Ossining
Westchester County, New York

Endothall (trade name Aquathol K)

- Used for the past 50 years, well studied and very effective
- Contact herbicide, interferes with plant respiration and protein synthesis
- Degrades quickly in the environment, <10 days
- Cellular breakdown in 2-5 days, plants appear brown and wilted
- Plants will fall out of water column in 3-4 weeks
- US EPA approved application rates of 0.5 - 5.0ppm
- Applied by a licensed and certified applicator



Endothall and Non-target Species

- EPA and NYS: strict application guidelines (Article 15)
- Decades of toxicity studies: no impact to waterfowl and wildlife, aquatic organisms, fish and turtles, pets
- Proposed concentrations far below EPA thresholds
- As a precaution, 1 day water use restriction after treatment
- Does not concentrate in animal tissue, rapidly excreted



Endothall and Non-target Aquatic Plants

- Contact herbicide that effects green, growing foliage
- Majority of native plants reproduce by seed and seed production will be well underway by mid-summer
- Endothall does not effect seeds or roots, as such propagules will germinate in 2017
- Emergent wetland plants will not be impacted



Proposed Monitoring

- Recent preliminary observations
- Pre- treatment aquatic plant survey, next few weeks
- Post-treatment aquatic plant survey of the entire Croton River in mid-October 2016
- Water sampling to monitor concentrations of endothall
- Tuber sampling in specified locations



Permits and Pesticide Use

- SEQR 1981 Programmatic Environmental Impact Statement for Aquatic Vegetation Control
- 2014 Amended Findings Statement
- Article 15 Part 327 Permit for Use of Chemicals for the Control of Aquatic Vegetation
- Article 24 Freshwater Wetlands Permit
- NYSDEC Region 3 Permit Administration staff
- Village of Croton on Hudson wetland regulations



Anticipated Results

- 90-95% knock down of Hydrilla vegetation biomass in the target area
- Disruption of tuber and turion development
- No negative impact on emergent plants, fish or wildlife
- No long-term negative impact on native aquatic plants
- Data on movement of herbicide and influence of tide

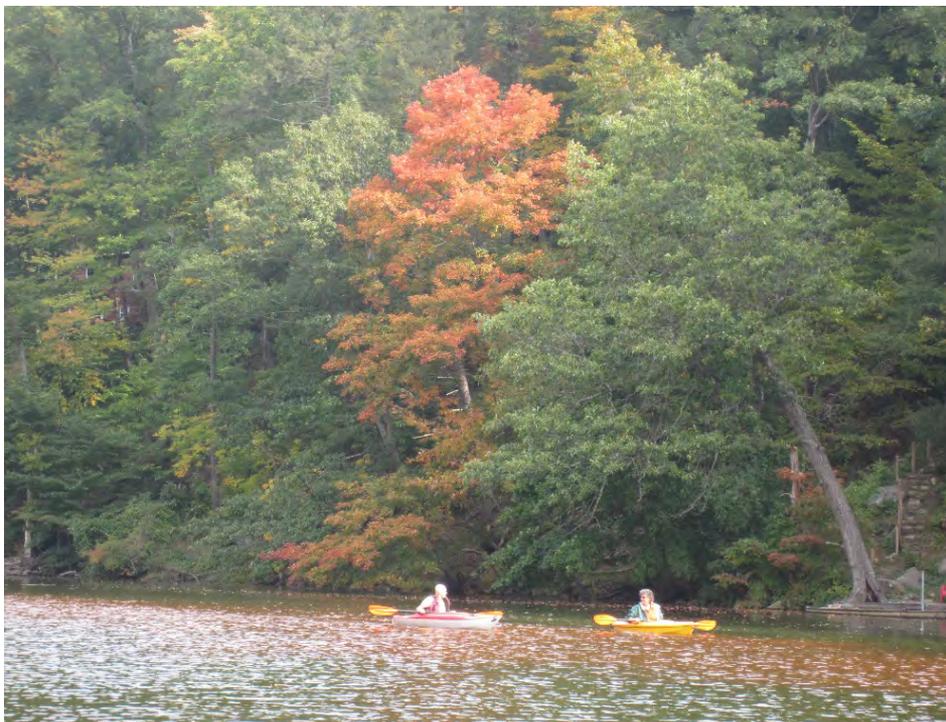


Need for Action

- 2016 growing season represents a crucial point in time
- Control of infestation is still attainable
- Prevent spread into neighboring waterbodies
- Results from this year's work will allow for the development of a sophisticated and effective 5 year management plan
- Document herbicide efficacy in controlling hydrilla in specific areas of the river
- Continue outreach and education



What Residents and Croton River Recreationists can do



Department of
Environmental
Conservation

Potential sources of Hydrilla infestations



“It doesn’t seem to be covered in our invasive species management plan.”

- Transport on watercraft and/or equipment
- Accidental planting of hydrilla tubers/Aquatic gardens
- Aquaria dumping
- Waterfowl transport

How You Can Help

- Clean, drain, and dry your watercraft and equipment
- Be a proactive aquatic gardener
- Make smart choices about your aquarium and its inhabitants
- Become a volunteer Hydrilla Hunter
- Spread the word!



Acknowledgments

- Mike Netherland, USACE
- Mark Heilman, SePRO
- James Balyszak, Cayuga Task Force
- Earl and Be DePass
- Samantha Epstein, Clearwater
- Karalyn Lamb, Saw Mill River Audubon
- Village of Croton on Hudson





Thank you!



**Department of
Environmental
Conservation**