



Department of
Environmental
Conservation

Evaluation of Hydrilla Control Options for Croton River System



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NYS distribution of hydrilla

Orange County/Hudson River basin

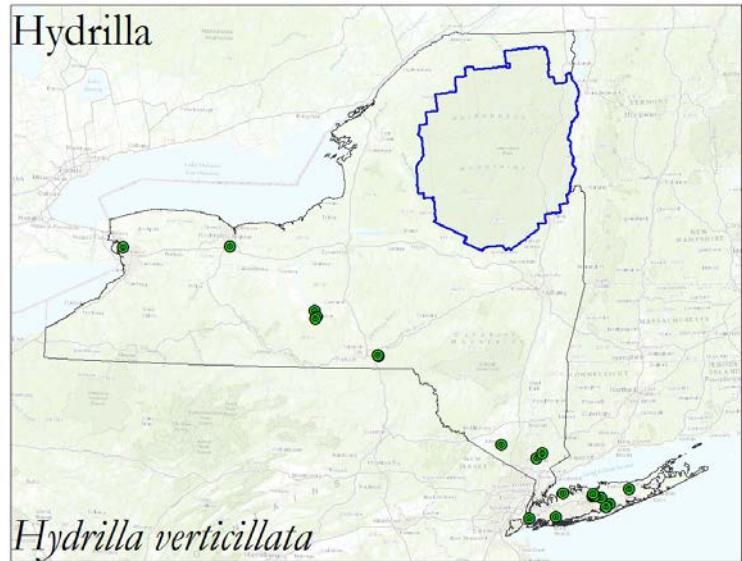
Long Island/Atlantic Ocean-LI Sound / NYC

Cayuga Inlet/Great Lakes basin

Erie Canal/Tonawanda Creek

Broome County

Rochester

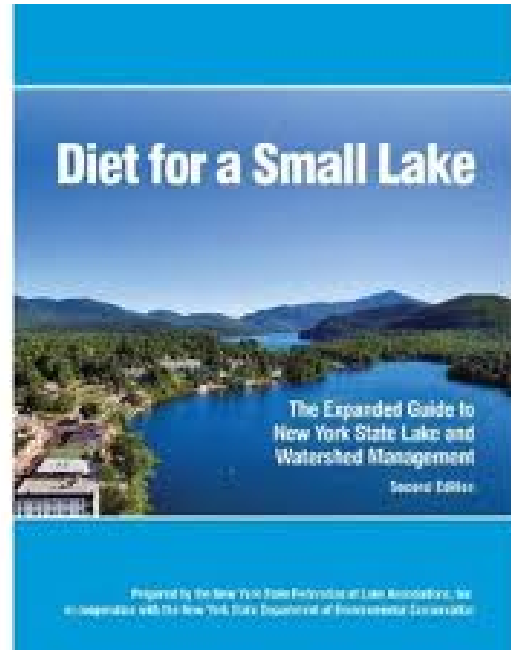


Shopping List of Lake Management Actions

Management actions discussed in detail in [Diet for a Small Lake](#)

Available on NYSDEC website (<http://www.dec.ny.gov/chemical/82123.html>)

Chapter 6 discusses each topic in detail



Specific Issues in the Croton River (System)

Logistics

- No dam or ability to contain grass carp
- Very short retention time influences choice of herbicide options
- Varying densities of plant
- Varying habitats
- Need to protect wild celery
- Potential impact to fisheries resources?

Location location location

- Public water supply at head of infestation
- The Hudson River
- Tidal influence

Other

- Appetite for starting down a long eradication (control) pathway
- Permitting issues
- Management costs
- Monitoring costs



What is the goal?

- *Eradication* - total destruction and removal of the infestation;
- *Control* - active measures to suppress the AIS;
- *Containment* - actions taken to limit the further distribution of the AIS into other waterbodies;
- *Watch* – observation of the AIS, its spread and the occurrence of adverse impacts resulting from the introduction;
- *Mitigation* – actions taken to minimize any adverse impacts caused by the AIS infestation;
- *Restoration* – returning environmental conditions to what existed before the AIS infestation occurred

Summary of NYS Hydrilla Control Actions to Date

Herbicides- contact (endothall) and systemic (fluridone)

- Komeen (copper): Creamery Pond- 2008
- Endothall: Cayuga Inlet system- 2011-2015, Erie Canal- 2014-2015
- Fluridone: Creamery Pond- 2008, Cayuga Inlet system- 2012-2015

Grass carp

- Creamery Pond- 2010, 2015
- Frost Mill Pond- 2009

Hand harvesting

- Cayuga Inlet- 2011
- Cayuga Lake- 2013, 2014-15?

Benthic barriers

- Cayuga Lake- 2013
- New Croton Reservoir- 2015



Do Nothing Option

Principle- Let Nature or Apathy Work

Pros- (No)\$, May Take Advantage of Normal Cyclical Patterns

Cons- Problem May Become More Difficult to Manage

Permits- None

Costs- Pay Later

Viability for Hydrilla- potential great risk of explosive growth- not preferred option

Verdict for Croton- not a good choice if goal is to protect Hudson and prevent spread



Hand / Suction Harvesting

Principle- Pluck (nudge) 'em out, one at a time (and bag 'em)

Pros- Can be cheap, target individual plants or plant species, combine with suction harvesting, good IPM technique

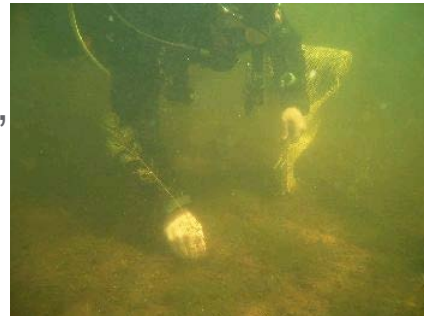
Cons- Labor intensive, difficult and costly > 1000 ft² or deep water, spread fragments

Permits- Only if large scale (ECL Article 15, Article 24)- suction permits akin to dredging

Costs- Labor only to \$100-500/ac (suction = \$5-10k/ac)

Viability for Hydrilla- may be good technique for small plots if tuber removed

Verdict for Croton- potential as follow up but not primary strategy due to size of infestation and difficulty in extracting tuber



Benthic Barriers

Principle- Smother 'em

Pros- Focus on use impacted areas, can move to different areas, variable time options

Cons- Difficult in deep water, limited to small areas, potential ecological impacts, not species specific

Permits- Some DEC regions- only If large scale (ECL Article 15, Article 24), USACE if navigable water

Costs- \$100/ac + Labor to \$10-30k/ac

Viability for Hydrilla- all plants can be controlled if barrier placed as plants emerge

Verdict for Croton- not viable due to size of infestation, habitat and flow



Aquatic Herbicides

Principle- Chemically wipe out weeds by contact or impact to growth pattern

Pros- Short to long term control, some selectivity, local or lakewide control, usually effective

Cons- Non-target impacts, controversial, some limits on use, time delays, plan /monitoring required

Permits- DEC ECL Article 15/Part 327, Article 17/SPDES General Permit, Article 24)

Costs- \$300-1500/ac

Viability for Hydrilla- Several herbicides effective at impacting hydrilla

Verdict for Croton- likely most viable option



Grass Carp

Principle- Stock weed eating fish

Pros- Perceived “natural”, less expensive, long-term control, mostly invisible control

Cons- Non-native fish, non-target control, risk of algal blooms/ plant eradication / escape, habitat alteration, hard to remove, EIS required

Permits- DEC Stocking Permit (ECL Article 11)

Costs- \$50-300/ac

Implications for Hydrilla- preferred plant; good for containment or management

Verdict for Croton- not viable in River or Bay- can't contain (possible for Reservoir)



Other options and why they're not....

Cutting or Harvesting

- Creates fragments for new plant growth
- Does not remove tubers or interrupt germination cycle

Shading (chemical colorants)

- Non-selective, non-localized
- Little evidence of control

Herbivorous insects

- None cultivated for hydrilla control
- Delayed response- no immediate action

Drawdown

- Tuber appears to be resistant to freezing and desiccation
- Likely significant impact to benthos

Dredging

- Limited at best to localized areas
- May be too coarse to prevent tuber spread
- Croton infestations too widespread to consider



IPM = Integrated Plant Management

Principle- Combining two or more management techniques

Pros- ^ likelihood of long-term control, 1-2 punch, favorably viewed as more comprehensive, can combine local and large scale management

Cons- Must make sure techniques are compatible, side effects could multiply

Permits- Varied

Costs- Varied

Verdict for Croton- could combine hand-harvesting with herbicides



Figure 6. Par Pond after drawdown



NYS Peer Review Process

Initiated in 2012 to guide NYS decisions in Cayuga Inlet

External peer reviewers represent USACE, University of Florida, North Carolina State, and Mississippi State/USDA

Reviewers evaluate management options and provide recommendations to NYS/local task forces

Process expanded to include Erie Canal / Tonawanda Creek in 2014 and Croton system in 2015



2015 Peer Reviewer Recommendations

New Croton Reservoir- spot treatment of Nautique or other copper herbicides

Croton River- injection treatments of fluridone or endothall (most likely from base of dam downstream)

Croton Bay- no option recommended

