NORTHEAST AQUATIC NUISANCE SPECIES PANEL:
HYDRILLA TREATMENT STRATEGIES/CONSIDERATIONS

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U.S.ARMY

US Army Corps of Engineers®

GOAL

- Eradication – completely or substantively eliminate
- Control – status quo, no expansion
- Management – reduce impacts

OBJECTIVE(S)

- Reduce the risk of spread to new areas
- Protect important habitat
- Reduce specific water use impairments (e.g. water supply)
- Maintain navigation
- Education and outreach

MONITOR

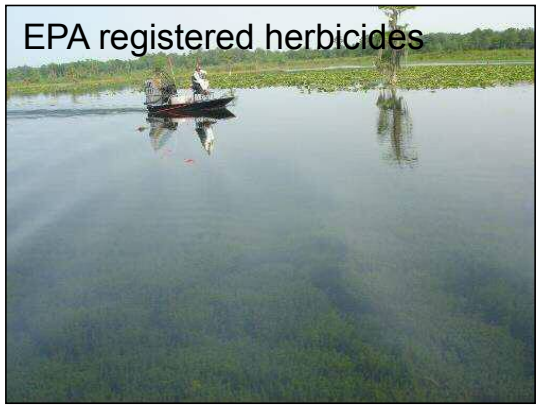
- Frequency
- Extent
- Density
- Growth Characteristics
- Efficacy of treatment

TREATMENT

MANAGEMENT OPTIONS FOR HYDRILLA ARE LIMITED

3

EPA registered herbicides



Grass Carp – SE Reservoirs

Mechanical Harvesting
(hand pulling, diver suction dredge)

Environmental Extremes

Selective Biocontrol

Do Nothing

POTENTIAL MONOECIOUS HYDRILLA BIOCONTROL AGENT

- Surveys have been on going since 2014 in China and South Korea
- New Hydrellia sp. has been identified in China in cooperation with CSIRO and USDA-ARS
  - AQIS and Department of Environment permit in 2018
- About a year from being ready to import the Hydrellia into a US quarantine
  - So far all host specificity has been in our favor with no feeding on any of the non-target hosts
- Additional Hydrellia collections planned for 2019

16 HERBICIDES LABELED FOR AQUATIC USE IN US
9 HERBICIDES LABELED FOR AQUATIC USE IN NY
(225+ LABELED FOR TERRESTRIAL USE)

Copper (1950's)
Endothall (1960)
Glyphosate (1977)
Triclopyr (2002)
Carfentrazone (2004)
Imazamox (2008)
Bispyribac (2011)
Sethoxydim (2017)

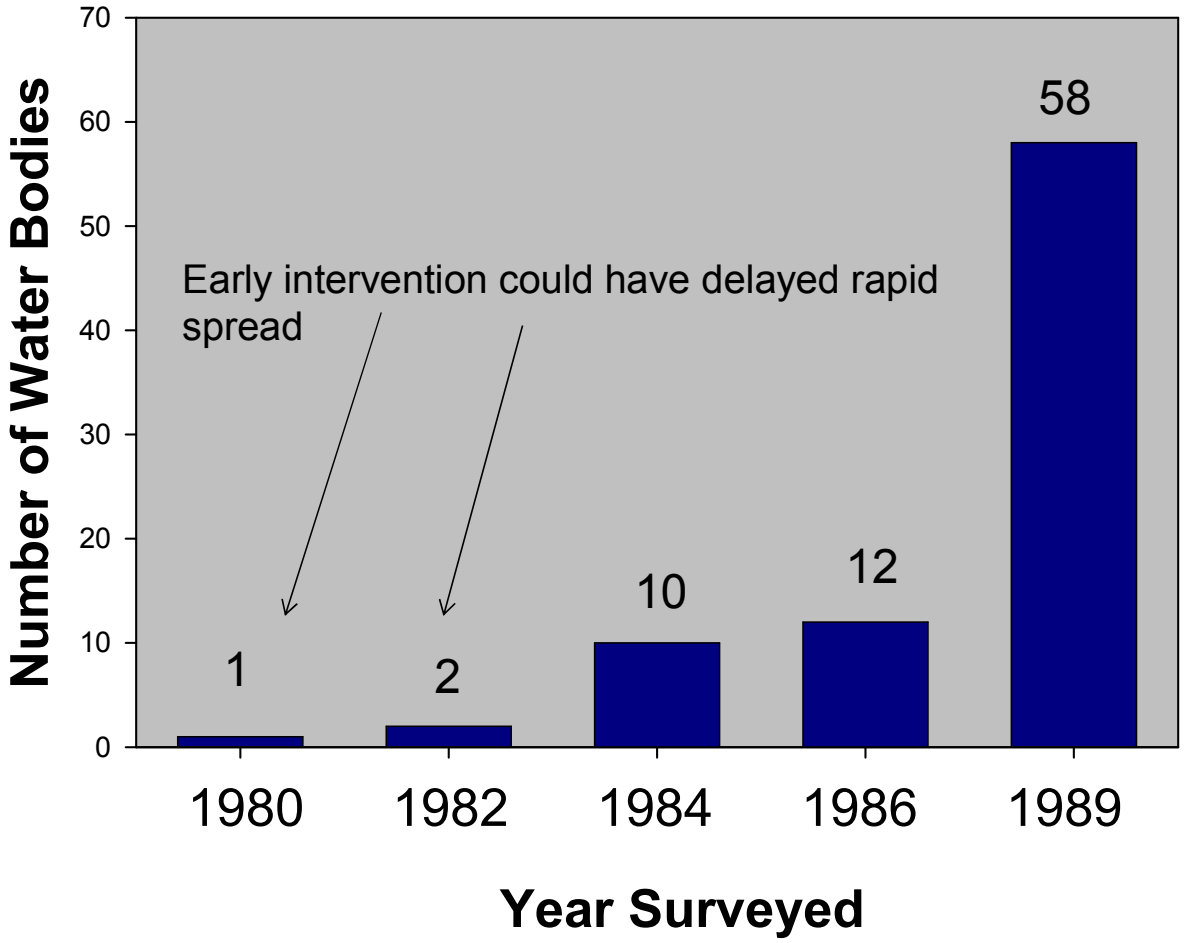
2,4-D (1950, 76)
Diquat (1962)
Fluridone (1986)
Imazapyr (2003)
Penoxsulam (2007)
Flumioxazin (2010)
Topramezone (2014)
Florpyrauxifen-benzyl (2018)

Not registered in NY | Application restrictions | No activity on Hydrilla | Remaining options

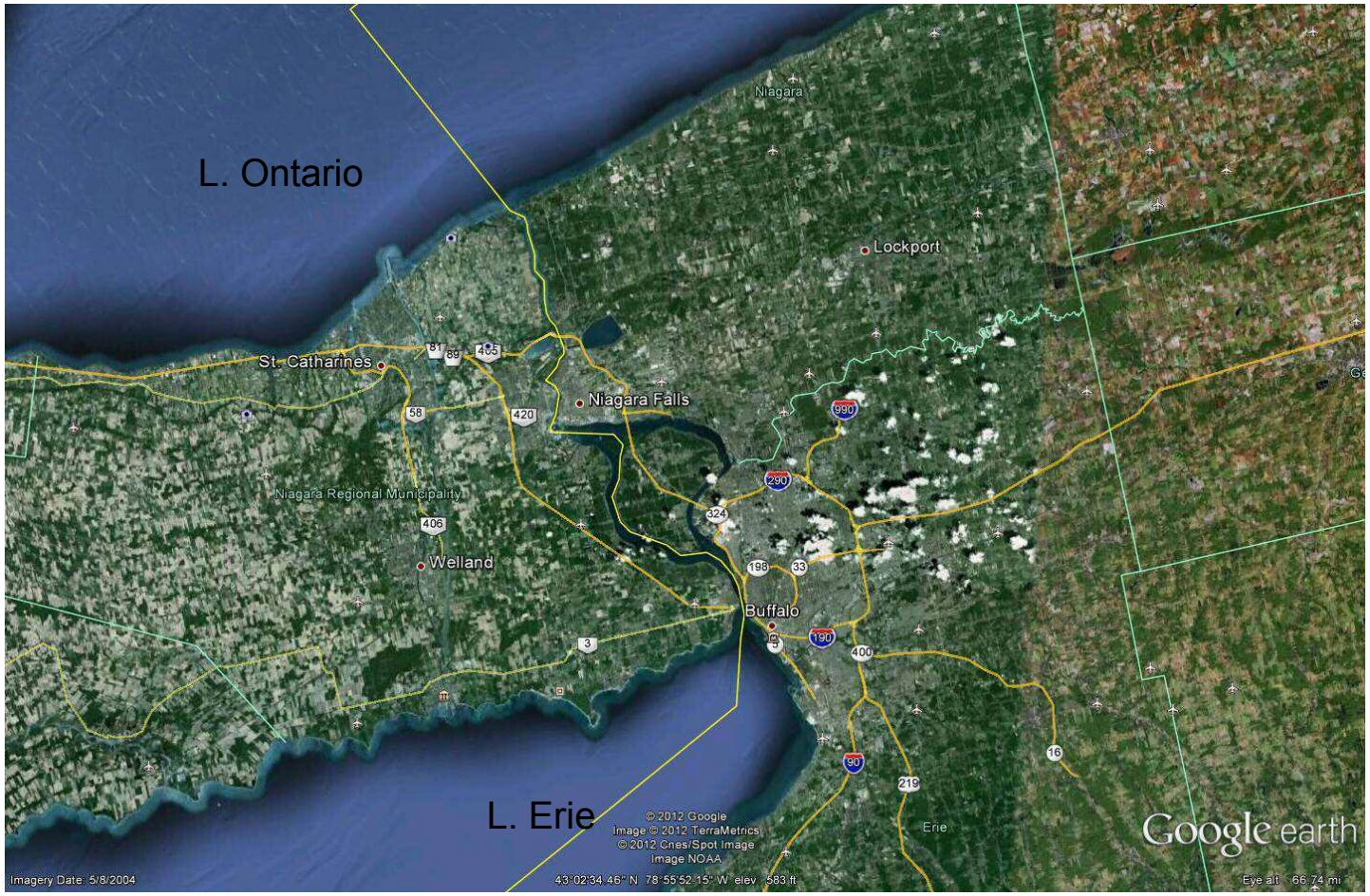
HERBICIDE OPTIONS

Herbicide	Typical Application Rates	General Exposure Requirements	Use Pattern	Pros	Cons
Copper	0.5 to 1 ppm	Hours to 1 day	Small Spot Applications	Short contact time. No restrictions with potable water.	Binds rapidily to SAVs, algae and organics.
Endothall	1 to 3 ppm	Hours to days	Small to large spot applications	Short contact time. Does not bind to organics in turbid water.	600 ft potable water setback. MCL below 0.1 ppm for public consumption.
Fluridone	5 to 20 ppb	45 to 90 days	Spot and whole lake applications	Effective on monoecious hydrilla at very low rates. No restrictions with potable water.	Extended exposure required. Can bind to organics.
Flumioxazin	50 to 200 ppb	Hours to 1 day	Small to large spot applications	Short contact time. No restrictions with potable water. Does not bind to organics.	High pH significantly reduces half life - exposure - efficacy. Flumi alone may require 2 applications for seasonal control.

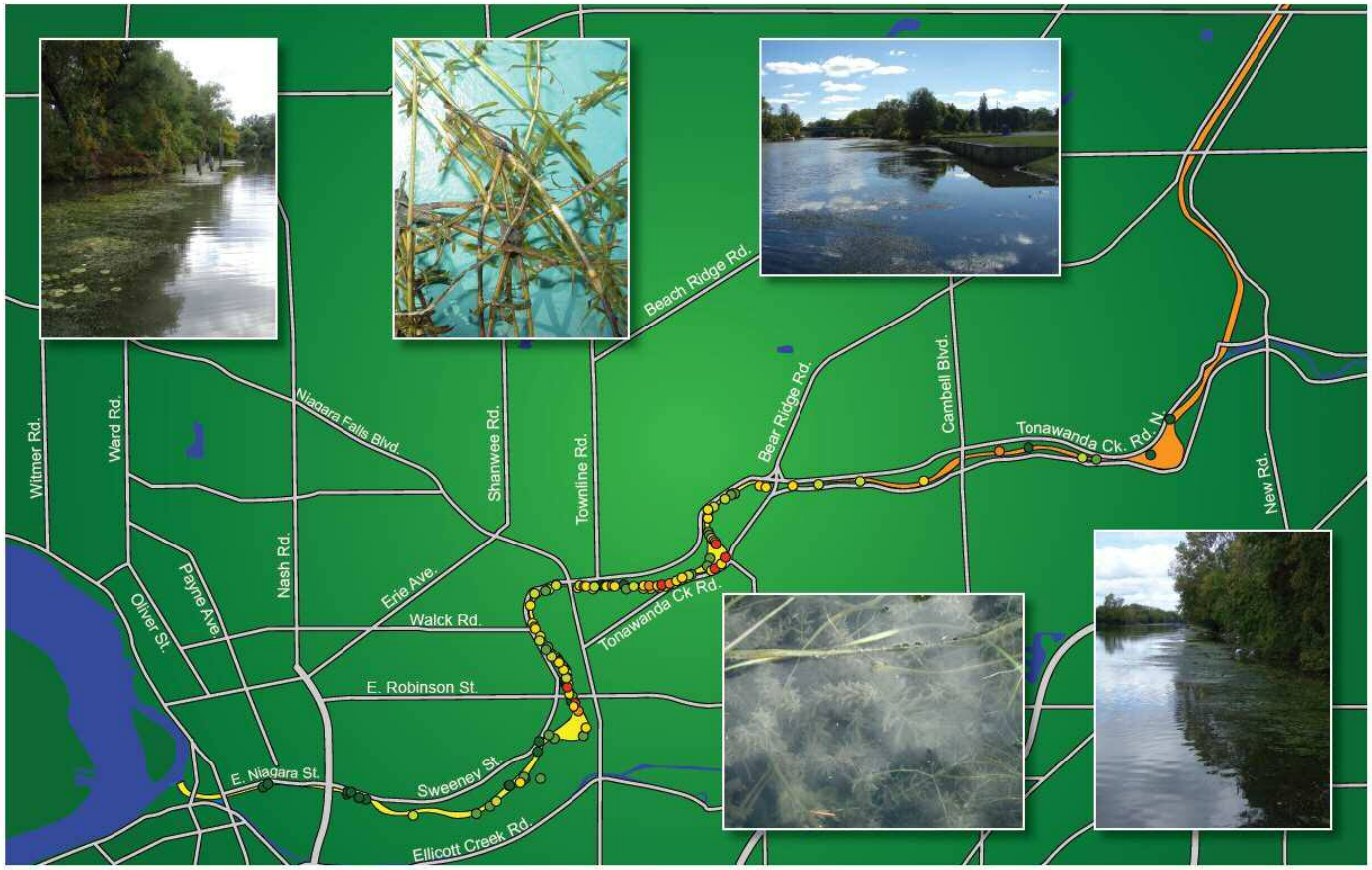
Water Bodies in Wake County, NC with Hydrilla



Hydrilla in Erie Canal – Direct Access to Great Lakes, Canada, Midwest, NY



TONAWANDA CREEK/ERIE CANAL
HYDRILLA CONTROL DEMONSTRATION PROJECT



Surface Area* in Sq. ft.

- Unknown
- 1-50
- 51-150
- 151-1000
- 1001-5000
- >5000

Primary Treatment Area
Secondary Treatment Area

*Surface areas are estimates based on visual observations

Hydrilla Locations Fall 2012
from U.S. Fish and Wildlife Service

0 0.5 1 2 3 4 Miles

US Army Corps of Engineers.
Buffalo District
BUILDING STRONG.

DEMONSTRATION PROJECT
ERIE CANAL HYDRILLA INFESTATION

What are we “demonstrating”

1. A single, well-timed herbicide application can target hydrilla at a weak point in it’s life cycle
   - Work with Canal Cooperation to create optimal conditions
2. Treat after tubers have sprouted but prior to formation of new tubers
   - Reduce hydrilla biomass > 99%
   - Objective in year 1 = reduce tubers > 85%
3. Limit impacts on native submersed vegetation
4. Monitor/Adapt mgmt. in future years based on findings

CHOICE OF AQUATHOL HERBICIDE

The herbicide Aquathol is compatible with our management objectives

- Short-term exposure- canal flow reduced for 48 hrs
- No restrictions on fishing, swimming, recreation, or irrigation
- Compatible for vallisneria selectivity
- Used throughout the United States
  - Large-scale hydrilla control (Cayuga Lake project)
    - Over 235,000 gallons of Aquathol applied in FL in 2012
  - Whole-lake management – (MN, WI)
  - Western Irrigation – thousands of miles of canals
    - Treated water applied directly to food crops

STATUS OF ERIE CANAL HYDRILLA CONTROL DEMONSTRATION PROJECT – 2015

- Hydrilla has been contained
  - Greatly reduced threat of spread
    - Frequency reduced by >99%
    - Tubers reduced by > 99%
  - Synchronous sprouting documented
- Easy to demonstrate progress in years 1 and 2
  - More difficult to show progress in out years
- We must improve small-scale management strategies

HYDRILLA FREQUENCY OF OCCURRENCE 2015

Date	June 22	Jul 13	Jul28	Aug 25	Sep 16	Oct 16
Hydrilla	**0.1**	**1.7**	**5.7**	**0.4**	**0**	
# points sampled	1389	1793	1120	1439	1245	

CAYUGA TUBER SAMPLING – BUFFALO DISTRICT/ERDC

Sampled on May 24 – 5 sites with 40 cores/site

- 8.5% sprouting – water temp = 12 C

Sampled again on June 8

- 15% sprouting – water temp = 13 C

Sampled again on June 28

- 82% sprouting – water temp = 21 C

Sampled again on Aug 8 and Sept 18

- 88% reduction in tubers in Aug
- 93% reduction in tuber in Sept. (no new tubers !!)
- 179 total tubers on 6/28 to 14 total tubers on 9/18

STATUS OF ERIE CANAL HYDRILLA CONTROL DEMONSTRATION PROJECT – 2016

- Tuber population reduced by >99%
- Observed hydrilla frequency in August 0.01%
- ~50% reduction in the use of endothall
- Native SAV species continue to rebound
- Demonstrated efficacy of burlap as a benthic barrier

STATUS OF ERIE CANAL HYDRILLA CONTROL DEMONSTRATION PROJECT – 2017

- 2017 – 4th Year of Treatment and Monitoring
  - ~ 8000 points sampled in 2017
  - First year we did not make significant progess
- Multi-agency effort
  - LRB, US FWS, NY DEC, and NY Canal Corp.
- Hydrilla frequency has been reduced by >98%
  - Tubers reduced by > 99%
  - We are playing a high level game of whack-a-mole