An Introduction into Aquatic Plant Management

Alejandro Reyes
Aquatic Ecologist, CLM
Northeast Aquatic Research

Talk Overview

- Invasive Aquatic Plants
- Prevention/Early Detection
- 4 “Knows” of Aquatic Plant Management
- Types of Management
- Ways to Integrate

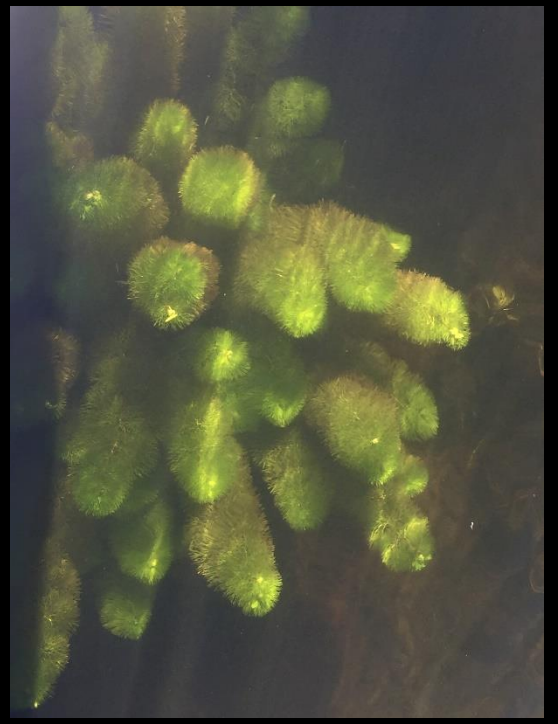
Common Terms

- **Native:** Originally from the area (usually post-glaciation).
- **Non-Native:** From outside the waterbody, but scale matters.
- **Invasive:** Non-Native, but has a documented history of impacts to ecological and recreational function.
- **Nuisance:** Native or Non-Native that are affecting ecological and/or recreational functions now.

Invasive Aquatic Plants

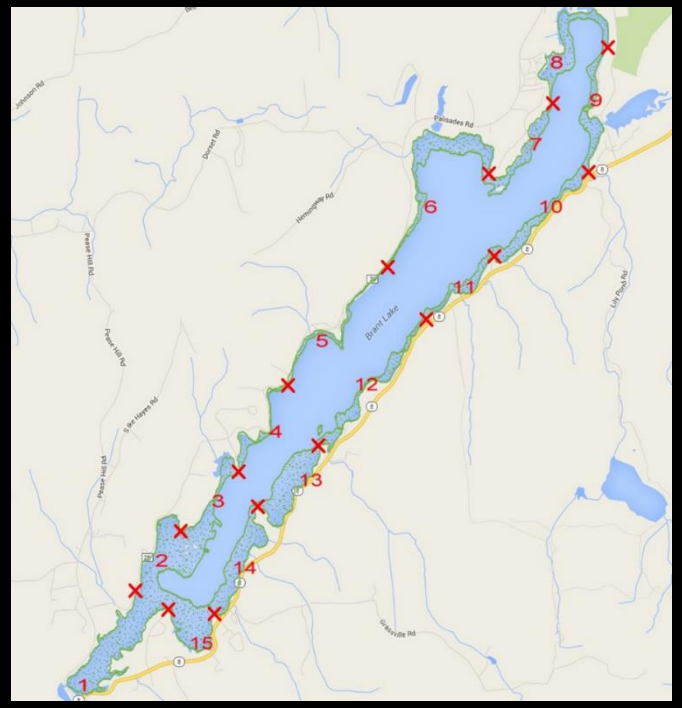
- The aquatic weed hydrilla is attributed to causing one of the greatest single impacts from an invasive species in the state. Hydrilla populations in the Santee Cooper Lake System, a large hydroelectric project north of Charleston, had been expanding rapidly since 1982. Following a storm in 1991, large rafts of hydrilla were dislodged and floated into the water intake canal and impinged on the debris screens of the St. Stephen Hydroelectric Facility. The power plant was shut down for weeks while hydrilla was removed from the screens. The economic impact from that incident alone was estimated at $4 million in lost electric power generation and associated costs. In addition, the shutdown prevented water flow downstream, which resulted in oxygen depletion and one of the state's largest fish kill incidents with $526,000 in lost game fish. Hydrilla continued to impair electric power generation at St. Stephens to a lesser extent during subsequent years.
- Interfering with power generation

Key Players



Preventing Invasions

Early Detection



4 “Knows” Before Starting Aquatic Plant Management”

- **“Know” Your Goals**
  - How much, where management takes place, How long is desired control?
- **“Know” Your Species**
  - Life history, Reproduction strategies, Resistances to management, distribution/abundance.
- **“Know” Your Lake**
  - Water quality, rare-endangered species, hydrology, potential non-targets, location of wetlands.
- **“Know” Your Stakeholders**
  - Fisherman, seasonal vs permanent, anti-chemical, state/federal land.

Physical Harvesting

- Physical removal of plant biomass
- Types of harvesting
  - Hand pulling/Diver Assisted Suction Harvesting (DASH)
  - Mechanical harvesting
  - Hydro-raking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	DASH Harvesting	Mechanical Harvesting	Hydro-Rake
Plant Selectivity	High	Low	Low
Non-Target Impacts	Low	Med	Med
Estimated Cost	~$1,600 per day	~$1,500 per day + mobilization fees	~$1,500 per day + mobilization fees
Area Covered	~ 10 days/acre	~ 0.5 to 1.5 days per acre	~ 2-5 days per acre
Most Effective on:	Milfoils, Pondweeds, smaller infestations	Non-rooted plants, Bladderworts, Coontails,	Water Lillies, Emergent Vegetation
Least Effective on:	Larger infestations, plants with extensive roots, fanwort	Milfoils, plants that reproduce via fragmentation	Plants that reproduce via fragmentation
Depth range	3-15 ft	0-6 ft	0-6 ft

Physical Alteration (Lake Drawdown)

- Idea is to expose sediment and plants during winter months to freezing conditions.
- Relatively inexpensive technique for plant control.

Drawdown Details

- Key: Prolonged exposure of sediment to freezing conditions
  - Hampered by groundwater intrusion and intensity of winter.
- Information needed:
  - Map of plants in area of exposure.
  - Detailed hydrology and lake morphometry.
  - Surveys of potential non-target organisms.
  - Knowledge of outlet features that are key in holding and releasing water.

- Some plants are not susceptible to drawdown

Susceptible	Not Susceptible
Eurasian watermilfoil, variable Leaf Milfoil, Brazilian elodea, fanwort, Water lilies.	Species that reproduce primarily by seed/turions. Pondweeds, naiads, Hydrilla.

Chemical Management

- Use of EPA registered herbicides
- Currently 15 active ingredients
  - Newest one: Florpyrauxifen-benzy (Procellacor ™)
  - In NYS, must be administered by a certified pesticide applicator
- Two “modes of action”
  - Contact
  - Systemic

Herbicides in Water

- Challenge of adding water depth as a factor.
  - Systemic (and some contact) herbicides often require exposing entire plant to a set concentration diluted in water.
- Wind patterns and hydrology play a large role.
  - Influences choice of herbicide based on required contact time.

Required Contact time of Select Herbicides

Herbicide	Required Exposure
Copper	Hours to 1 day
Endothall	Hours to days
Fluridone	45 + days
Imazamox	14 + days
Triclopyr	Hours to days

Herbicide Considerations

- Most versatile aquatic plant management technique
- Financially scales better than harvesting
- More targeted than grass carp and drawdowns
- Significant public opposition can be present
- Permitting requirements make early detection treatment less feasible than physical techniques
- Often comes with water use restrictions

Biological Controls (5,000 foot view)

- Have the greatest potential for long term control
- Need to be as species-specific as possible
- Cannot become a nuisance itself
- Cannot spread outside intended control area
- Lots of success in agriculture, some in aquatic plant management

Grass Carp (*Ctenopharyngodon idella*)

- Native to Eastern Asia, Russia
- Introduced in 1963 in Arkansas
- “Selective Generalist”
- Can grow to 70lbs and be over 20 years old.
- Inexpensive (~$10-12 per fish)
- Very common technique in NY
  - Only sterile fish allowed “triploid”

Preferred	Not preferred	Avoid
Hydrilla	Eurasian watermilfoil	Lillies
Pondweeds	Coontail	Emergent Veg.
Naiad	Water Hyacinth	Filamentous algae
Elodea	Parrotfeather	
Egeria	Vallisneria	

Grass Carp Stockings

- How many fish are needed?
  - Too low: preferential feeding
  - Too high: de-vegetation
  - Intermediate control the hardest to achieve, but often the most desired.
- Lack of info on population dynamics, mortality rates, etc.

Integration Strategies

- Large infestations often require multiple techniques to achieve desired result
- Common examples
  - Herbicide to knock down biomass, then suction harvesting
  - Spot mechanical harvesting for short term, grass carp for long term

Questions?