Effective Herbicide Control of *Phragmites australis* for the Restoration of a Native Plant Community

Keith Gazaille, *Senior Biologist*
Aquatic Control Technology, Inc.

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Overview of *Phragmites* Management Techniques

Biological Control

- Currently no biological control agents are available for the control of *Phragmites* in North America.
- Research is on-going to evaluate European insect species that show herbivory on *Phragmites*.

Larvae of gall midge (*Lasioptera hungarcia*)

Adult *Rhizedra lutosa* moth

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Why Manage *Phragmites* Growth?

- Rapidly colonizes and out-competes native vegetation species.
- Reduces species diversity and richness by the formation of dense monotypic stands – up to 200 stems/m^2 (Haslam, 1972).
- Impairs water flow and stormwater retention in inland wetlands.

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Overview of *Phragmites* Management Techniques

Prescribed Burning

- Generally does not reduce *Phragmites* growth unless root burn occurs.
- Effectively removes *Phragmites* thatch and improves light penetration to soil.
- Most effective when used in conjunction with chemical treatment and/or flooding.

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Overview of *Phragmites* Management Techniques

Covering with Plastic

- Can be effective on a small scale, but labor intensive and non-selective.
- Plastic must remain intact for multiple growing season to exhaust rhizome reserves.
- High soil temperatures impact native seed bank, which impair native plant recolonization.

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Overview of *Phragmites* Management Techniques

Excavation/Disking

- Generally inappropriate on a large scale due to level of disturbance.
- *Phragmites* rhizomes can extend as much as two meters below ground.
- Activities that promote the breaking and/or cutting of the rhizomes have the potential increase *Phragmites* growth.

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Overview of *Phragmites* Management Techniques

Mowing/Cutting

- Mowing at certain times of the year can increase stem density.
- Mowing just before flowering over multiple seasons can reduce stand vigor.
- Mowing alone does not provide long-term control, but is a critical component to the re-establishment of native species following herbicide treatment.

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Overview of *Phragmites* Management Techniques

Manipulation of Water Level and Salinity

- Enhancement of natural tidal flushing can provide sustainable long-term control.
- Sufficient flooding of new *Phragmites* shoots can provide control, but most effective when performed in conjunction with cutting.
- Not applicable in all sites and expensive and labor intensive.

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CHEMICAL CONTROL TECHNIQUES

Available Herbicides for *Phragmites* Control

ACTIVE INGREDIENT	TRADE NAME	MANUFACTURER	TYPE
Glyphosate	Rodeo, AquaMaster, AquaPro, etc.	Dow, SePRO, Monsanto	Amino acid inhibitor
Imazapyr	Habitat	BASF	Amino acid inhibitor (AHAS)
Imazamox	Clearcast	BASF	Amino acid inhibitor (AHAS)
Triclopyr	Renovate 3, Garlon 3a	SePRO, Dow	Auxin mimic

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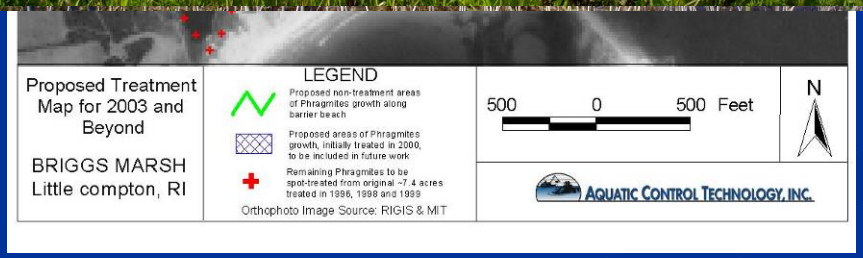
Methods of Application

Phragmites Control Equipment

NEW ENGLAND CASE STUDIES

Briggs Marsh – Little Compton, RI



- *Phragmites* infestation around coastal freshwater pond totaling ~12 acres.
- Initiated Rodeo herbicide spot-treatments in 1997.
- Treated with Airboat, but pond breaches to ocean regularly.
- Switched to Argo track-driven amphibious vehicles.
- Infestation reduced to maintenance levels.
- Converted to Habitat herbicide spot treatment in 2008 in an effort to approach eradication.

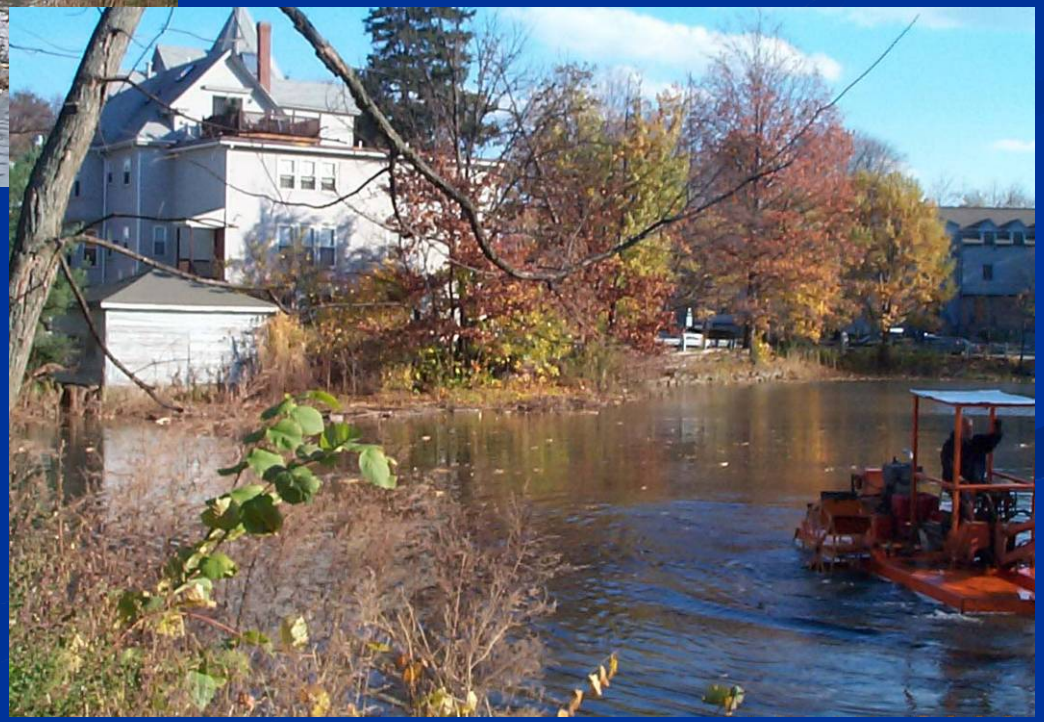
Briggs Marsh – Little Compton, RI

Lord's Cove (CT River) – Old Lyme, CT

- Dense tidal *Phragmites* infestation on CT River – approx. 200 acres.
- Initiated glyphosate herbicide treatment in 2000.
- Accessed and treated growth using low-ground pressure amphibious vehicles (Argo & Marsh Master).
- Mechanical cutting of treated areas in early spring following treatment.
- By 2004 infestation was reduced to a scattered 50 acres.

Butler Pond – Quincy, MA

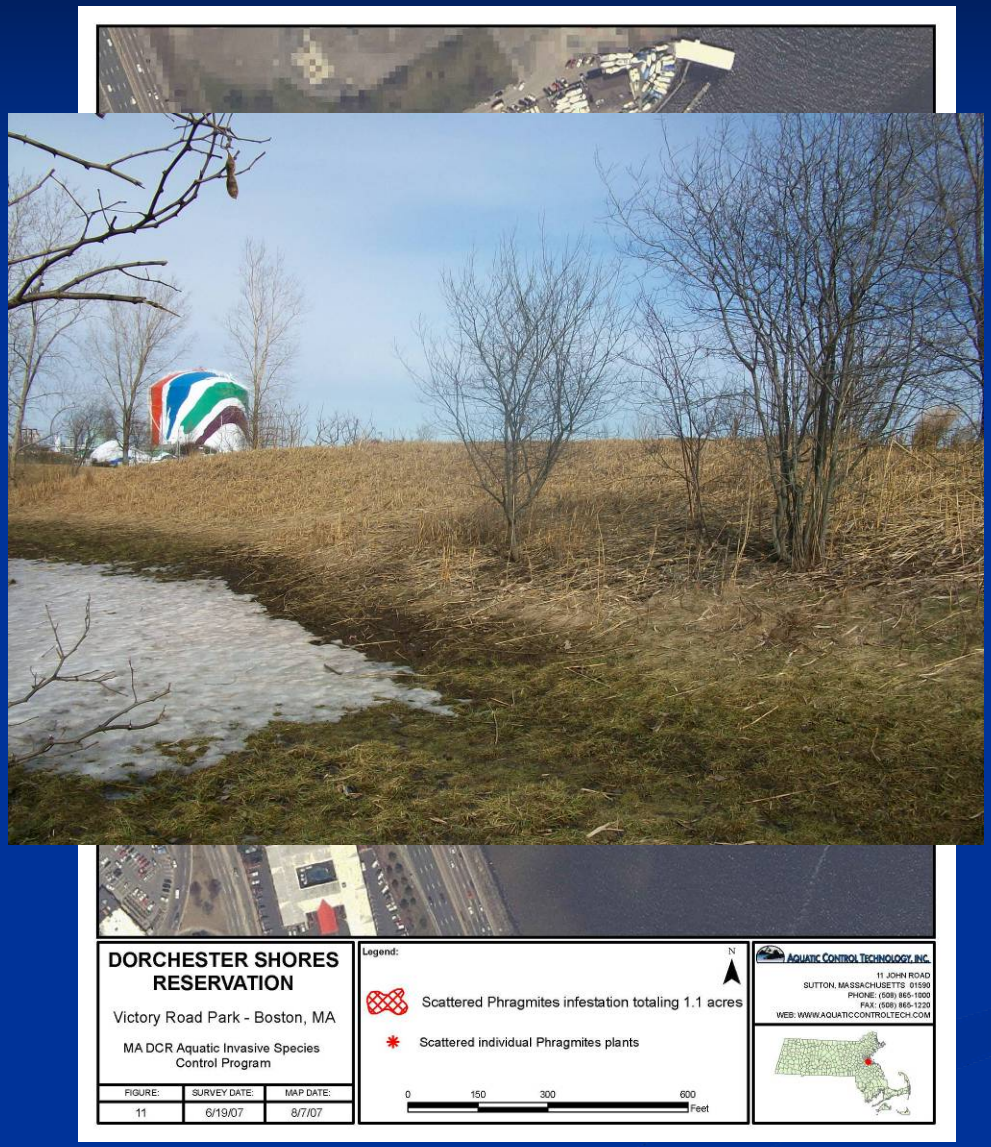
- Contiguous band of *Phragmites* growth around small pond.
- Treated with glyphosate from Jon boat with elevated spray tower in late August 2000.
- Removed dead stalks and root mat with mechanical hydro-rake in late November 2000.



Mikill Pond – Westerly, RI

- Contiguous band of *Phragmites* growth around coastal non-tidal pond – approx. 1 acre.
- Initiated glyphosate herbicide treatment in 2004.
- Accessed and treated growth using Panther airboat with elevated spray tower.
- Manual cutting during winter following treatment with removal of cut
- Scattered regrowth of less then 0.25 acre spot-treated in 2005 with back-pack sprayers.

Victory Road State Park – Boston, MA



- Fragmented *Phragmites* infestation around small island park in Boston Harbor – approx. 1 acre.
- Initiated glyphosate herbicide spot-treatments in 2008.
- Treated entire infestation with low-volume back-pack sprayers.
- Performed manual cutting during winter following glyphosate treatment.
- Immature regrowth treated with triclopyr (Renovate) in spring of 2009.
- Greater than 90% Phragmites control achieved with excellent native plant recolonization.

Victory Road State Park – Boston, MA

Questions?

Keith Gazaille..
Aquatic Control Technology
508-865-1000
KGazaille@AquaticControlTech.com