

Benthic Barriers: An Assessment of Effectiveness and Feasibility at two New York State Parks

Gabriella CebadaMora and Karen Terbush

New York State Office of Parks, Recreation and Historic Preservation, Environmental Management Bureau



Solmax Barriers

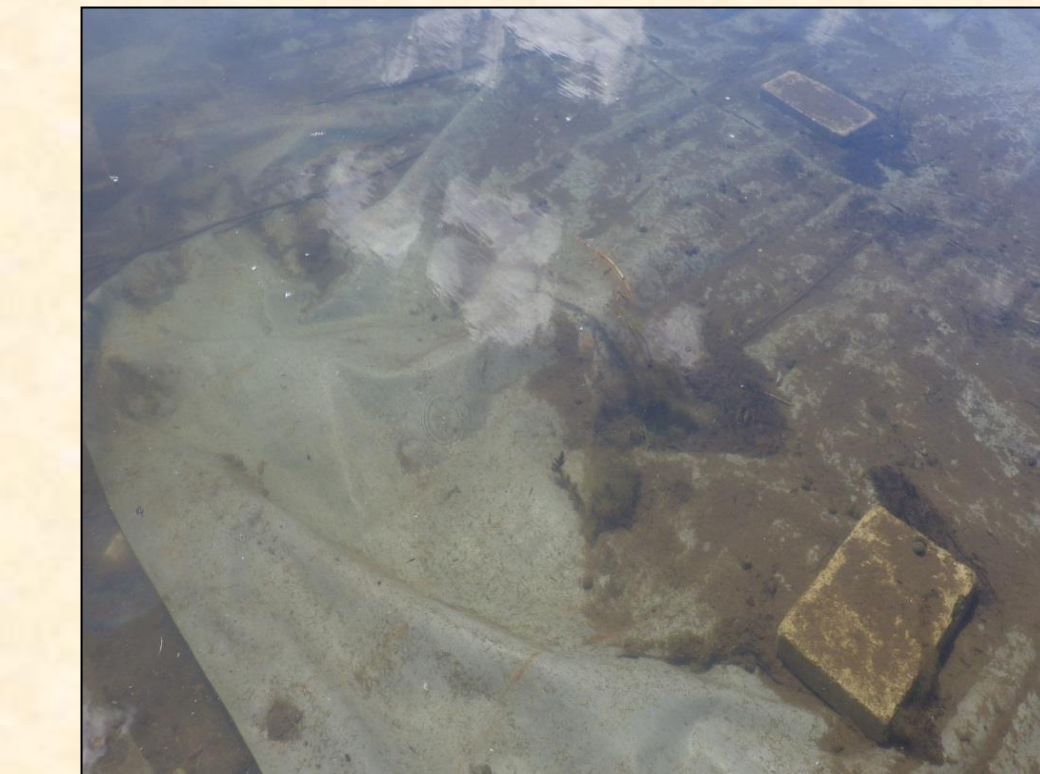
Introduction

In 2008 and 2009, NYS Parks used benthic barriers at Belmont Lake in Belmont Lake State Park on Long Island to control the growth of Fanwort (Cabomba) a submerged aquatic invasive plant in the boat rental area. Two types of barriers were used: Solmax, a nonporous light grey plastic material and Aquascreen, a porous plastic mesh material. Contractors were hired to install and remove the barriers. In 2013, Solmax barriers and burlap were installed by NYS Parks staff at Rudd Pond in Taconic State Park to control Curly-leaf pondweed (*Potamogeton crispus*) and Eurasian watermilfoil (*Myriophyllum spicatum*) near the swim area and boat launch. In 2014 and 2015, Lake Mat barriers were installed in place of the burlap and Solmax.

Methods

Year	Site	Barrier Material	Installation Method	Size of Mats	# of mats	Area covered	Cost
2008 & 2009	Belmont Lake	Solmax	Contractor	7'X50'	62	21,700 sq. ft.	\$170/mat
2009	Belmont Lake	Aquascreen	Contractor	7' X 100'	10	3,500 sq. ft.	\$440/mat
2013	Rudd Pond	Solmax	In-house	7'X50'	15	5,250 sq. ft.	\$170/mat
2013	Rudd Pond	Burlap	In-house	3'X24'	6	432 sq. ft.	\$14/mat
2014 & 2015	Rudd Pond	LakeMats	In-house	12'X24'	16	4,608 sq. ft.	\$360/mat

Material	Factors to Consider	Lessons Learned
All Materials	<ul style="list-style-type: none"> Installation/removal costs Material cost 	<ul style="list-style-type: none"> Contracting adds a significant cost to project. In-house installation and removal more cost effective. Use of divers may be required depending on water depths Sediment build-up on mats, type of material influences amount, accumulation can lead to plant growth Remove or flip over at minimum once a year Broad spectrum, cause die-off of all plant
Solmax	<ul style="list-style-type: none"> Requires venting - material is non porous plastic. Requires rebar and cement blocks for anchoring. No built-in frame. 	<ul style="list-style-type: none"> Mats tend to bubble up, particularly if placed over a foot or more of aquatic plant growth, this requires venting (ie: slits need to be cut in mats and mats re-anchored). Mats are extremely slippery in water. Hard to grip/move by hand. Rebar and cement blocks can be lost/left behind. Aquatic macroinvertebrates seem drawn to mat (snails, crayfish, odonate larvae)
Aquascreen	<ul style="list-style-type: none"> Does not require venting - material is a porous fine mesh. Requires rebar and cement blocks for anchoring. No built-in frame. 	<ul style="list-style-type: none"> Mats can be placed over established plant growth. Hard to grip/move by hand. Rebar and cement blocks can be lost/left behind.
Burlap	<ul style="list-style-type: none"> Does not require venting - material is a porous fine mesh. Requires rebar and cement blocks for anchoring. No built-in frame. Lowest cost 	<ul style="list-style-type: none"> Disintegrates after one season (long-term costs) Rebar and cement blocks can be lost/left behind. Unknown impacts from multiple years of installation. No maintenance needed
Lake Mats	<ul style="list-style-type: none"> Does not require venting - material is a porous fabric. Does not require rebar, has a built-in metal frame. Cement blocks can be placed to anchor if desired. 	<ul style="list-style-type: none"> Plants root into / through fabric material. Aquatic macroinvertebrates seem drawn to mat (snails, crayfish, odonate larvae). Requires significantly less anchoring material. Easiest to install and remove. After second year some material ripped / frame warped

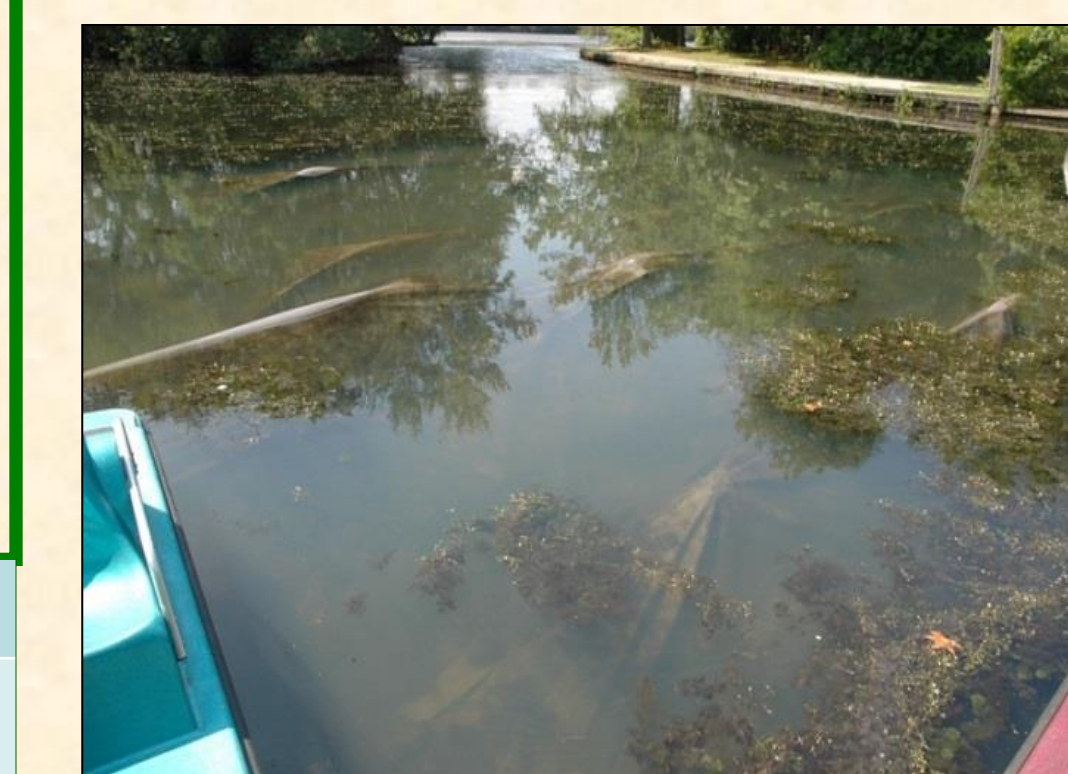


Cement Blocks



Rebar

Anchoring Materials



Gas Buildup Under Barrier



Sediment Buildup On Barrier



Plant Growth



Plants Rooted Through Barrier

Conclusions

An assessment of the different types of mats and installation processes provided insight on the pros and cons of the different barrier types. All the barriers achieved a similar level of treatment (plant reduction) in the areas they covered compared to non-treated areas. Differences related to the amount of effort needed to install, manage (ie: venting gas bubbles and re-submerging), remove and clean the barriers; the cost of in-house installation/removal versus hiring a contractor; the durability of the material; the amount/type of additional material needed to keep mats in place. Overall, benthic barriers have proven to be highly effective at controlling plant growth, however, they are best used in small, targeted areas due to the amount of time and effort needed for installation, management, and removal.



Aquascreen Barriers

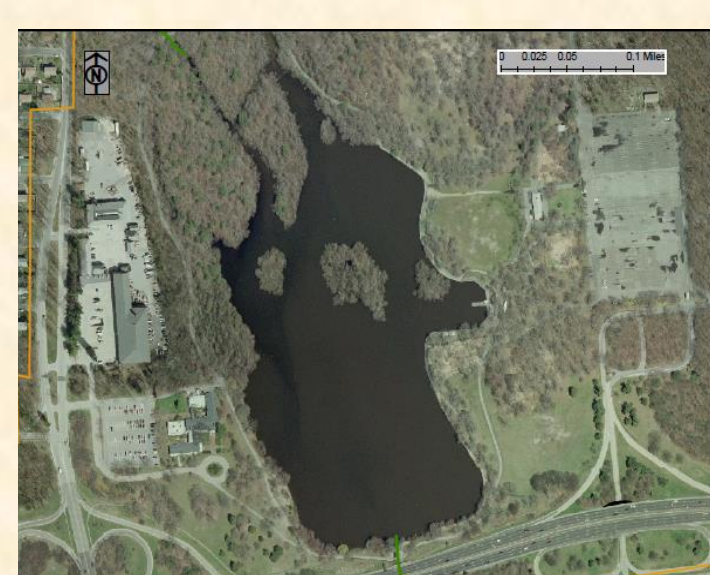


Burlap

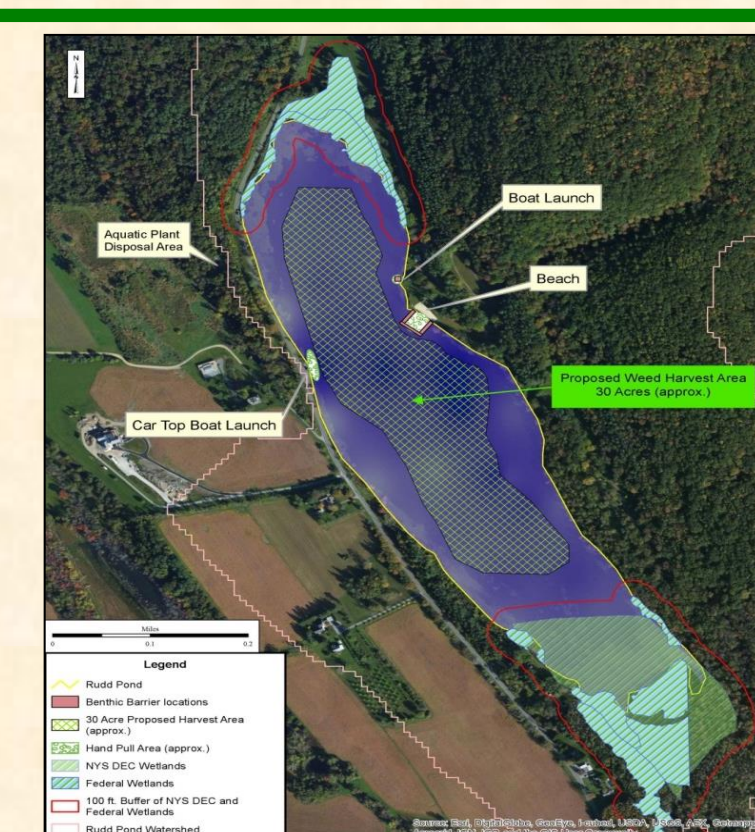
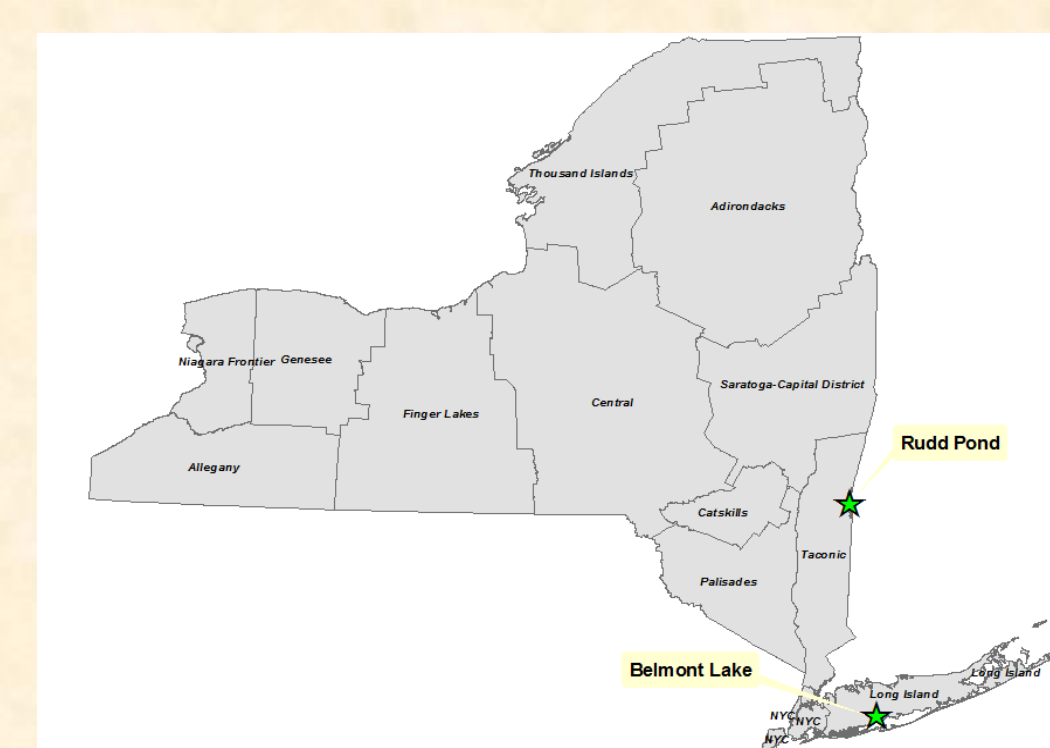


Lake Mats

Site Locations



Belmont Lake



Rudd Pond

Acknowledgements:

State Parks Albany and Regional staff including: Environmental Management Bureau, State Parks Long Island Region, and State Parks Taconic Region. With special thanks to Linda Cooper, Chris Rickard, Frank Boger, Robert Frey, and Robert Snyder.

We would also like to thank:

Allied Biological, P.C., Lycott Environmental, Ecology & Environment LLC., the New York State Department of Environmental Conservation (DEC).

Further Information

Gabriella Cebada Mora
Environmental Analyst 1
New York State Parks
625 Broadway, Albany NY
518.474.1229

Gabriella.CebadaMora@parks.ny.gov