

2022 Plant Camp

ProcellaCOR: A New Tool for Invasive Milfoil Management

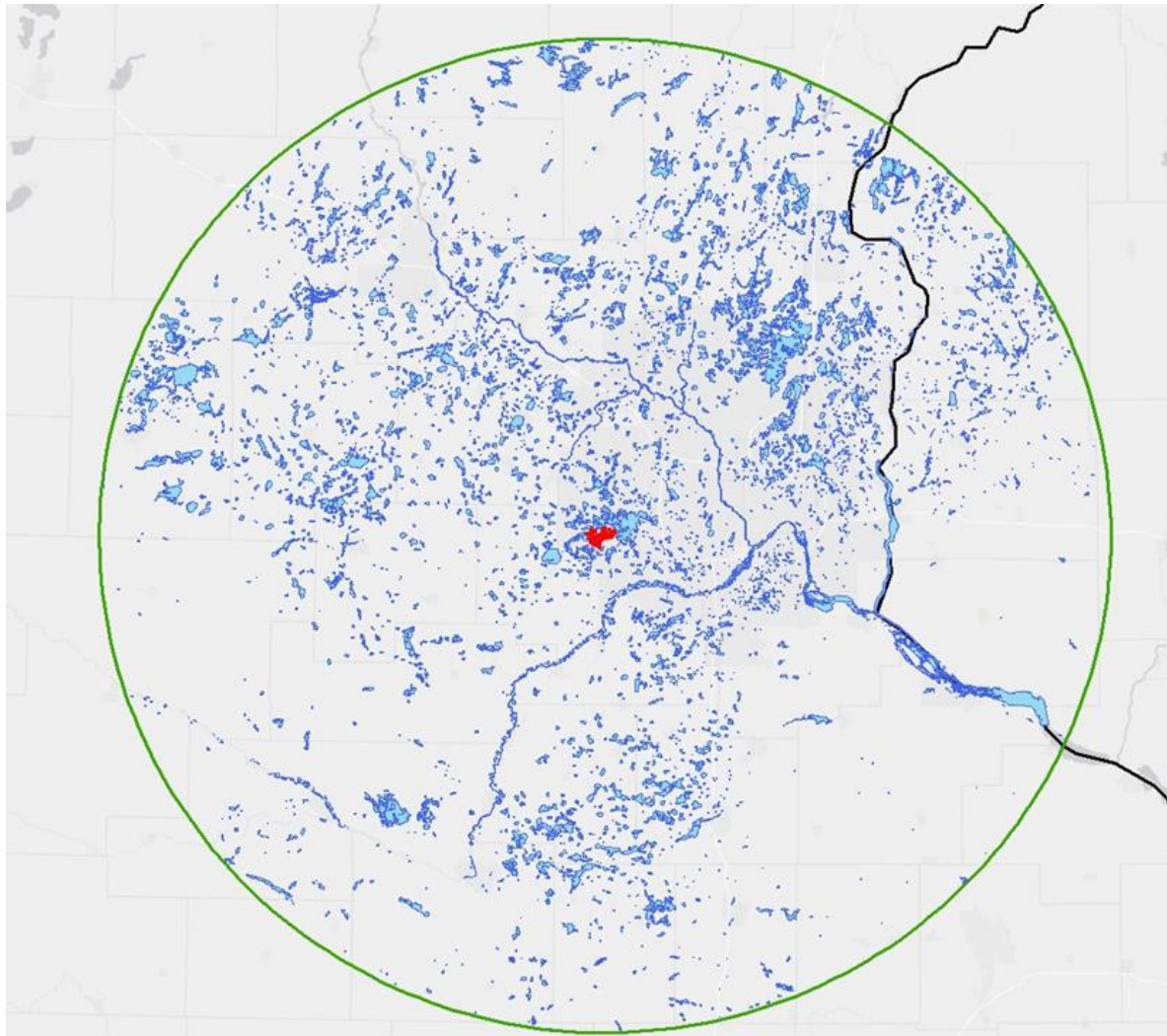
Jon Gosselin

Northeast Technical Specialist

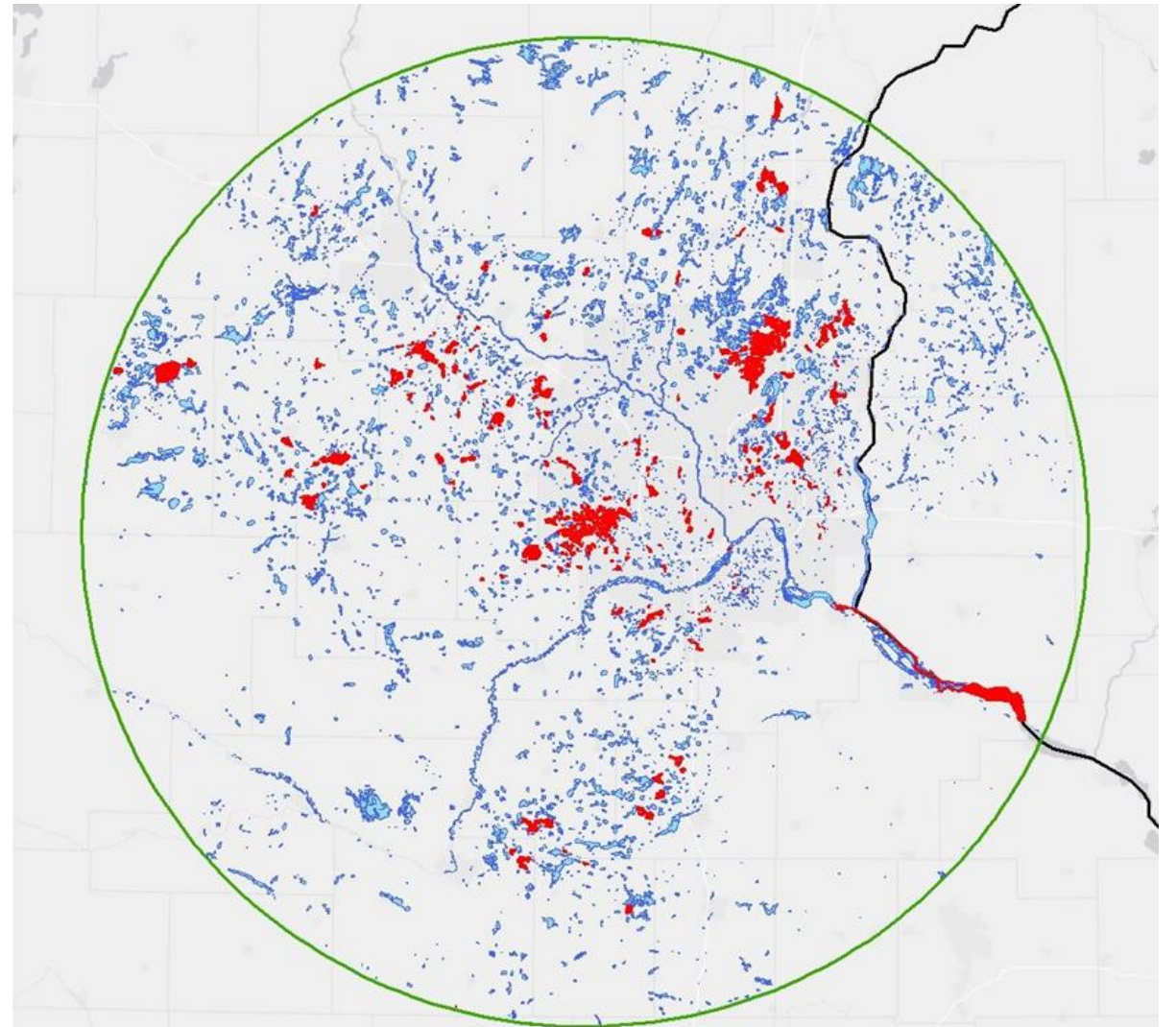
Sept 14, 2022

Expansion of Milfoil in MN

1987 75-mile radius – 6,042 lakes



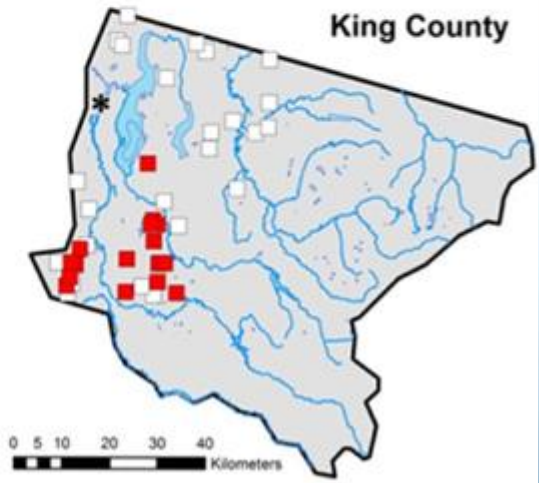
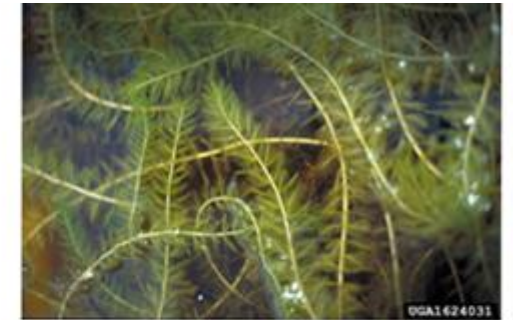
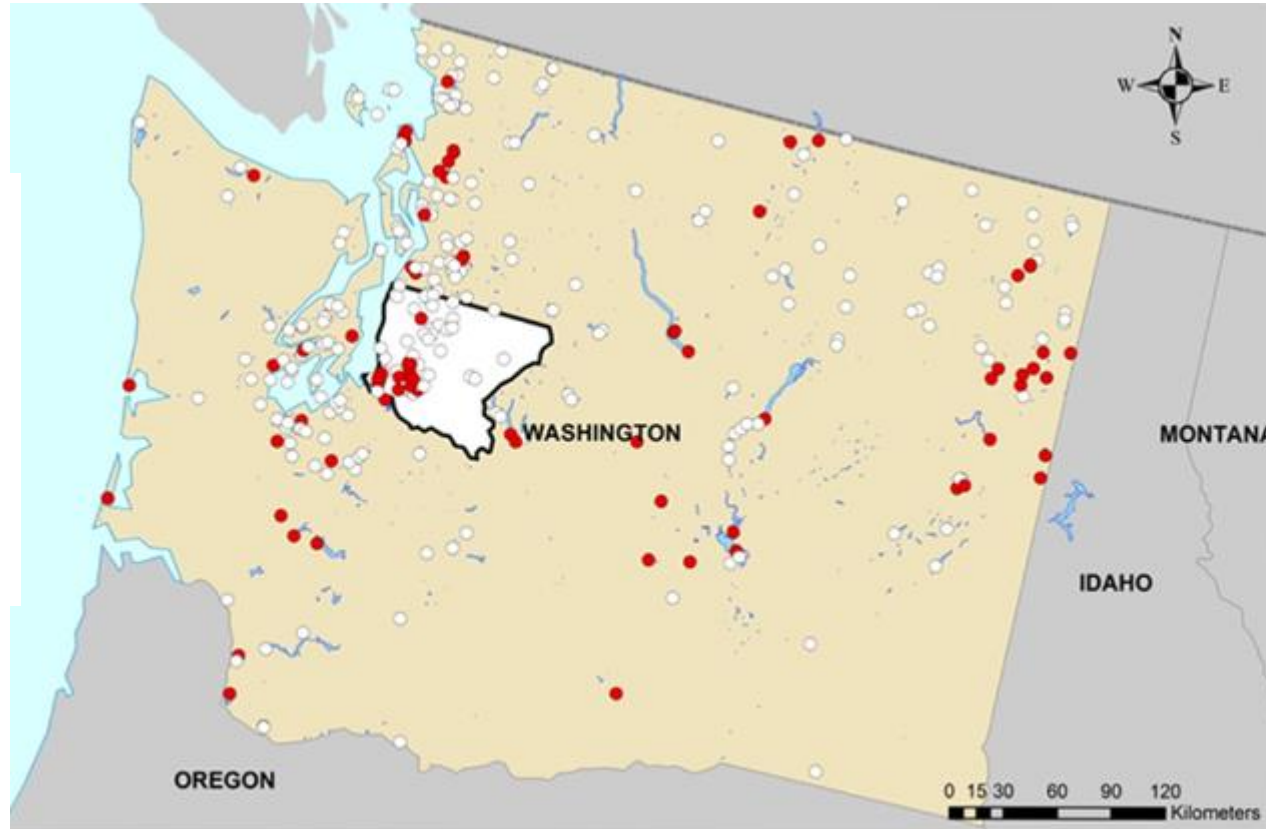
2014 296 lakes infested



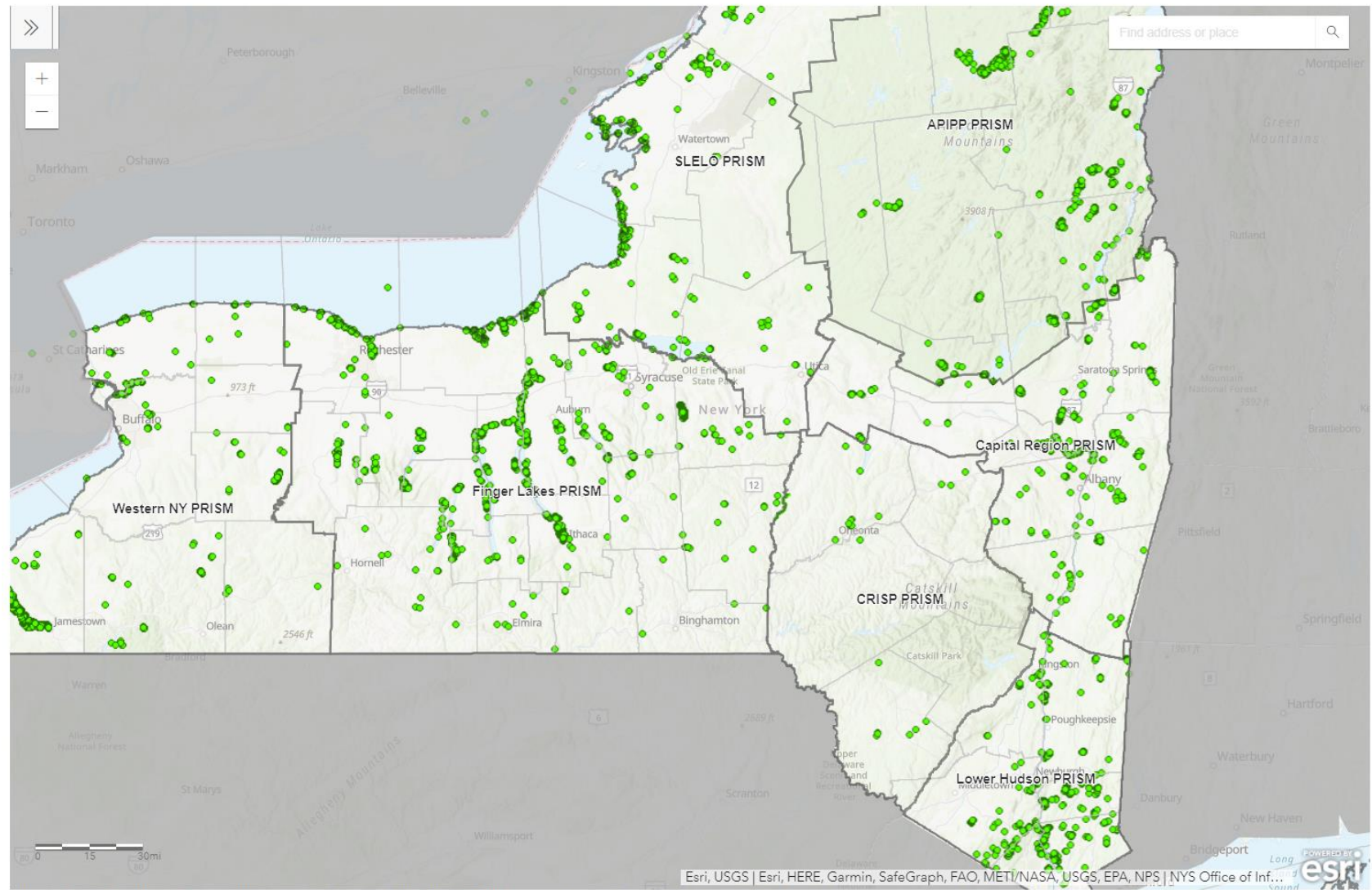
Olden and Tamayo 2014 (UW)

*Incentivizing the Public to Support Invasive Species Management:
Eurasian Milfoil Reduces Lakefront Property Values*

**19% Mean
Reduction
in
Property Value**



New York Distribution Map



This map shows confirmed observations (green points) submitted to the NYS Invasive Species Database. Absence of data does not necessarily mean absence of the species at that site, but that it has not been reported there. For more information, please visit [iMapInvasives](http://iMapInvasives.com).



SePRO Research & Technology Campus



ProcellaCOR was in development for a decade before US EPA registration in 2017

Extremely effective milfoil control tool, majority of native plants not impacted, excellent environmental and human health profile



A New Solution without Old Challenges

- New chemistry --- *invasive plant seeking technology*
- Systemic control, with native plant selectivity
- Rapid uptake and fast-acting
 - gets in weeds, acts fast and gone from water
 - ideal for spot and partial lake control

Safer Chemistry



- Reduced Risk Classification
- Short half life in water (hours to days)
- No potable or recreation water use restrictions
- Extremely low use rates/volumes
 - Up to 400X lower than several older chemistries

Common Native Plant Sensitivity to ProcellaCOR® EC with In-water Applications

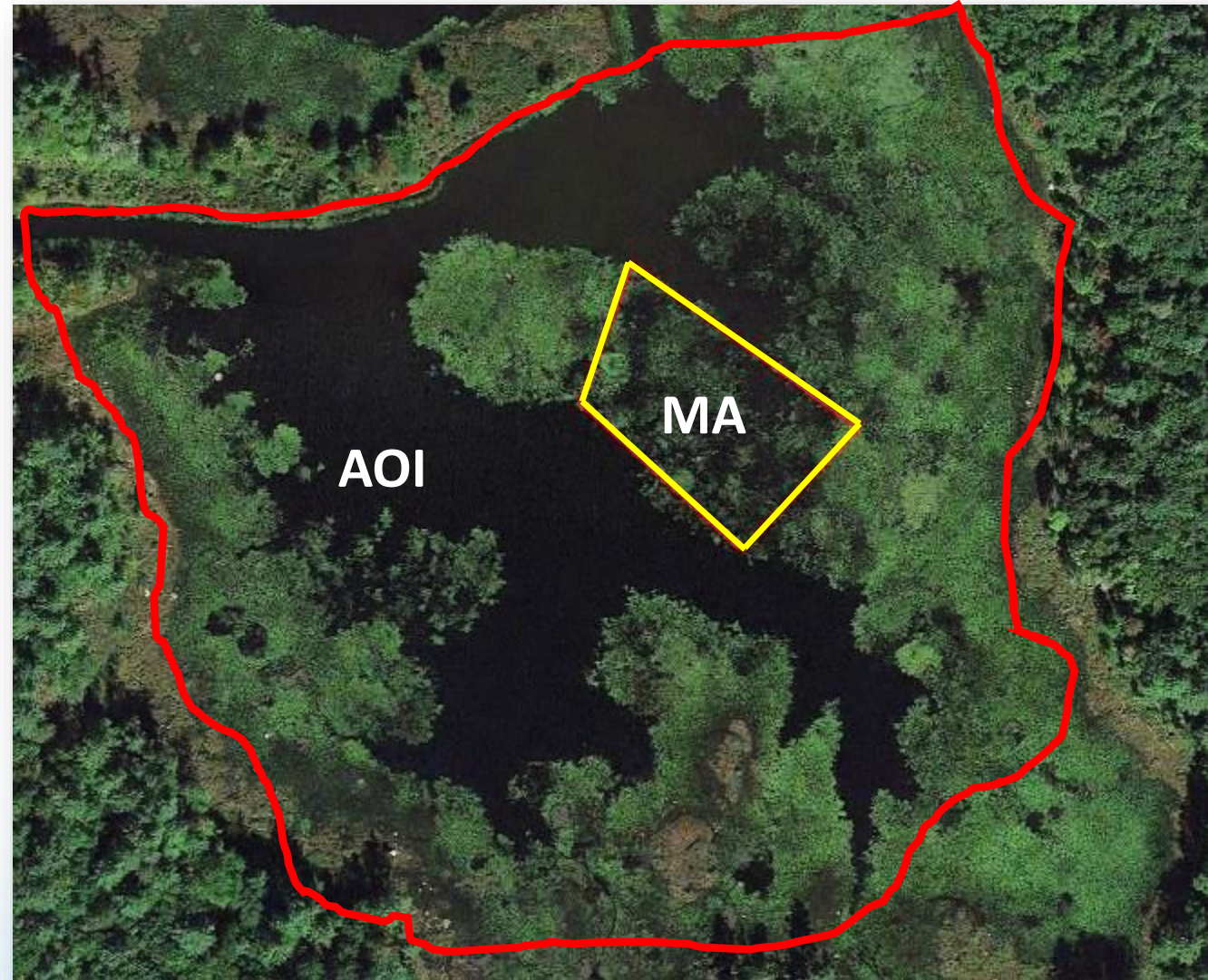
PLANT	SENSITIVITY	COMMON INJURY SYMPTOMS & OTHER NOTES (PDU rates are per acre-foot)
Northern and other native watermilfoils	High	Slightly more tolerant than invasive Eurasian but highly sensitive; Control/strong reductions at most PDU™
Watershield	Moderate - High	Epinasty, chlorosis and some biomass reductions at PDU 2+; Control at PDU 4 - 5
White water lily	Moderate	Partial control with extended exposure to PDU > 3; Some petiole extension/epinasty (twisting), leaf curl with extended exposure to PDU 2 - 3; some light symptoms may be observed at all PDU with longer exposure
Stargrass	Moderate	Light epinasty (twisting) and low/moderate reduction in growth with longer exposures to PDU > 2
Water Chestnut	Moderate	Growth suppression from extended exposure to PDU > 2; some subtle symptoms may be observed at all PDU with longer exposure Addition of 64 fl. oz./acre of Clearcast provides longer control
Yellow pond lily (spatterdock)	Low - Moderate	Less sensitive than white water lily but similar symptoms; Low-level response with extended exposure to PDU 2 - 4; Stronger symptoms with extended exposure to PDU 5+
Pickerelweed	Low	Slight growth suppression and/or chlorosis at elevated PDU and longer exposures
Arrowheads	Low	Slight growth suppression and/or chlorosis at elevated PDU and longer exposures
Waterweed (<i>Elodea</i>)	Low	Some growth suppression and tissue fragility with extended exposure to PDU > 5



1-Acre Demonstration

Variable Watermilfoil - New Hampshire 2016

- New Hampshire DES and US Army Corps of Engineers
- Management Area 1-acre
- Treated August 8, 2016



Dense topped-out VWM in July 2016



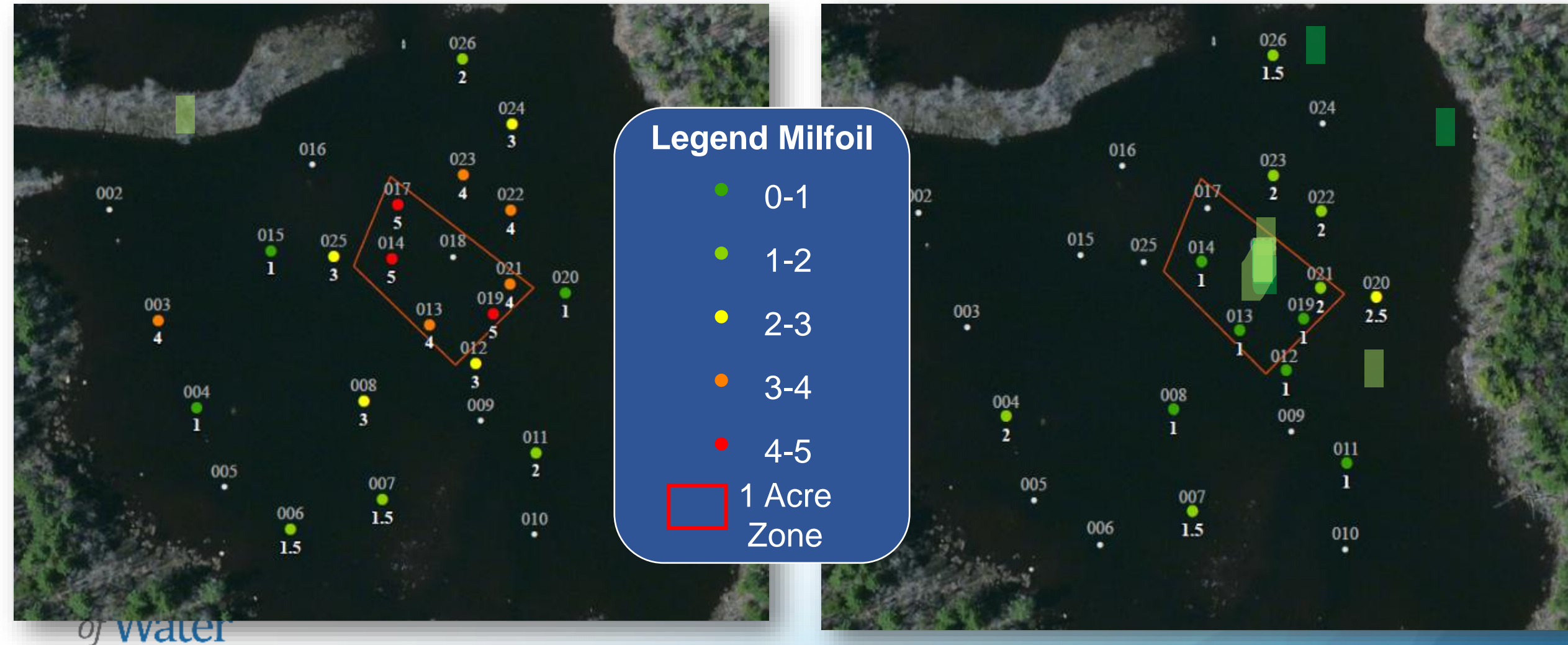
Variable Watermilfoil New Hampshire 2016

Pre-Treatment

Milfoil 7/14/2016

3 weeks post treatment

Milfoil 8/30/2016



Variable Watermilfoil New Hampshire 2016



**Heavily injured VWM fragment
@ 3 weeks post in Management Area**



VWM 20 yards outside Management Area

ProcellaCOR concentrations < non detectable within 24 hours

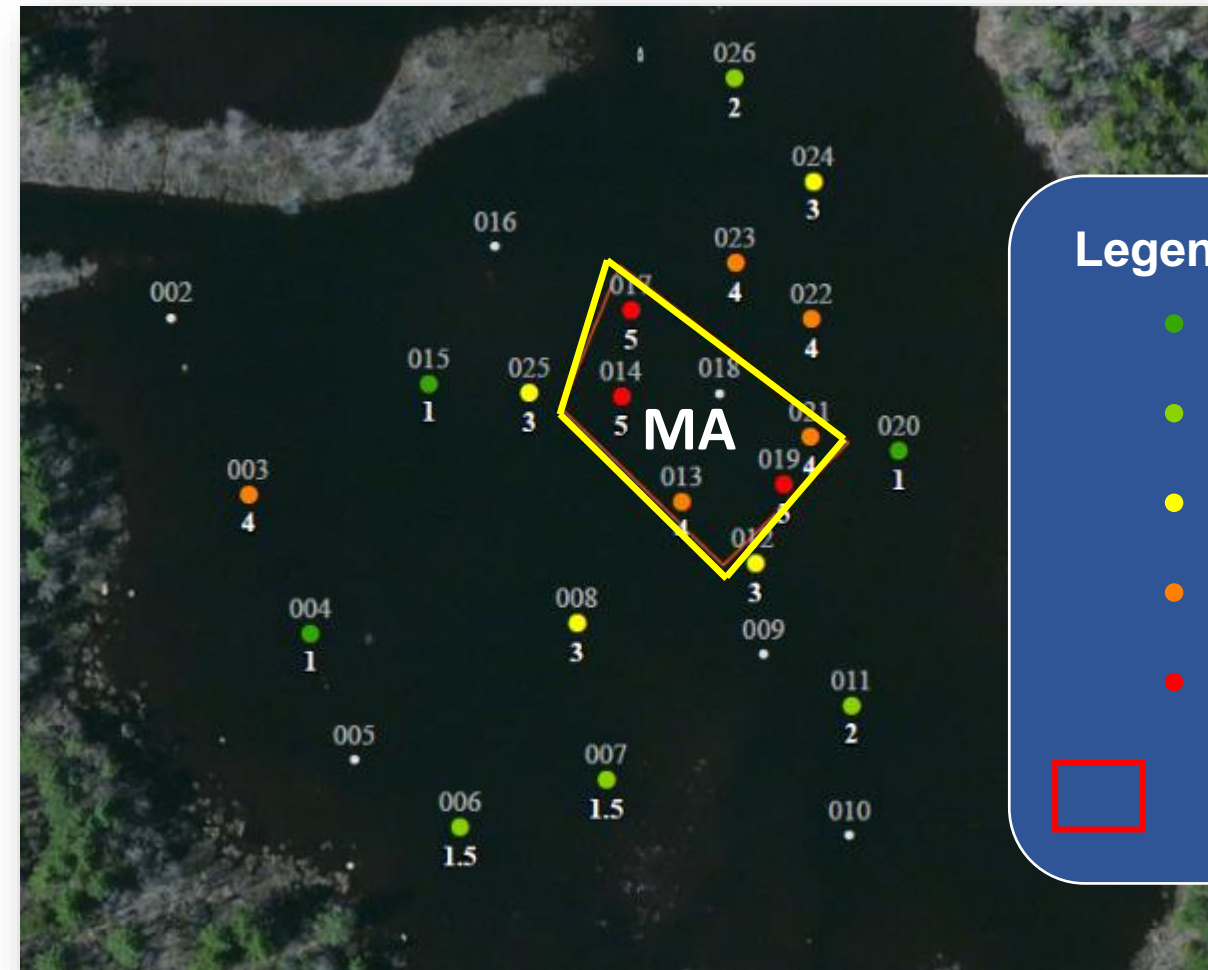
Selective VWM control @ 6 weeks post treatment



Variable Watermilfoil New Hampshire 2016

Milfoil 7/14/2016
Pre-Treatment

Milfoil 1 YAT
1 year post treatment

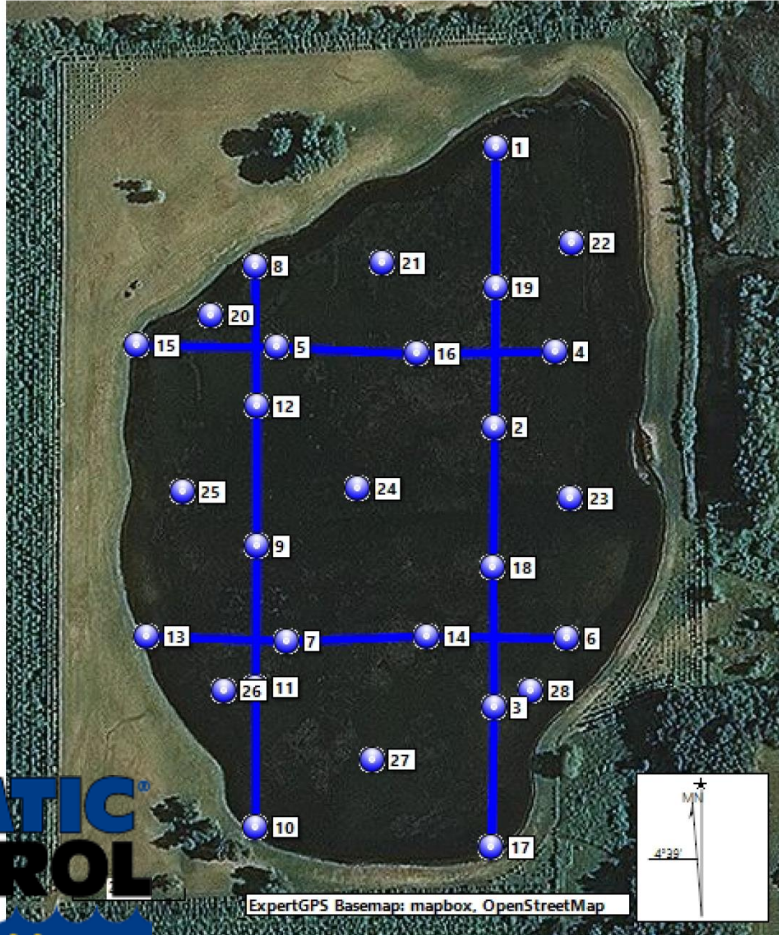


Legend Milfoil

- 0-1
- 1-2
- 2-3
- 3-4
- 4-5
- 1 Acre Zone

Small Lake

23 acre - Private Lake – Pre-Treatment





23 acre - Private lake – 2 WAT



23 acre - Private Lake – FOO out to 3 MAT

Species		Frequency of Occurrence				
		6/10/2020	6/24/2020	7/16/2020	8/12/2020	9/3/2020
Eurasian watermilfoil		86	46	0	0	0
Variable pondweed		61	57	82	75	75
Coontail		50	57	57	29	29
Chara		46	43	54	71	32
Sago pondweed		21	36	14	7	0
Curly leaf pondweed		18	18	0	0	0
Slender Naiad		14	0	7	4	4
Filamentous Algae		43	31	0	21	18



<https://sepro.com/aquatics/lake-pond-heroes/lake-pond-heroes-shohola-marsh-reservoir>



ProcellaCOR & Large-Scale Lake Treatments

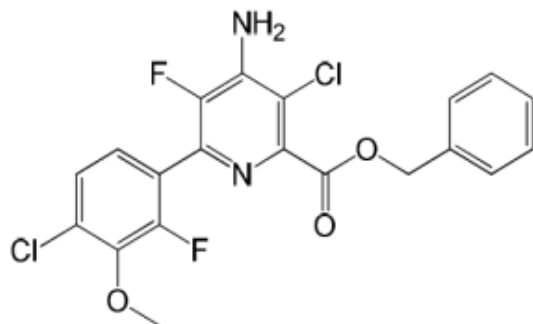
How is an Aquatic Herbicide Registered?

Federal law requires registration with the USEPA before product can be shipped or sold in the United States. To obtain registration, manufacturers are required to conduct numerous studies (i.e., over 120 studies depending upon the intended uses) and to submit a thorough and extensive data set to USEPA to demonstrate that, under its conditions of use, the product will not pose a significant risk to human health and the environment, and that the herbicide is effective against the target weeds or plants.



Environmental Fate and Ecological Effects Risk Assessment for the Registration of the New Herbicide for the Use on Rice and Aquatics

Florpyrauxifen-benzyl



Florpyrauxifen-benzyl (XDE-848 Benzyl Ester, Rinskor™)
PC Code 030093
CAS No. 1390661-72-9

Date: April 11, 2017

DP Barcode: D429728

Prepared by: José Meléndez, Chemist Van Vogel, Biologist Keith Sappington, Senior Science Advisor	U.S. Environmental Protection Agency Office of Pesticide Programs Environmental Fate and Effects Division Environmental Risk Branch V 1200 Pennsylvania Ave., NW Mail Code 7507P Washington, DC 20460
Reviewed by: Larry Liu, Ph.D., Chemist Justin Housenger, RAPL Mah T. Shamim, Ph.D., Branch Chief	

-248-page review prepared by the EPA

-Outlines the ~120 pre-registration studies

-Accessible on USEPA website or quick google search

-Following EPA registration, then state registrations occur, and individual state agencies review the data and make their determinations



Florpyrauxifen-benzyl Chemical Fact Sheet

Herbicide Degradation, Persistence and Trace Contaminants

Florpyrauxifen-benzyl is broken down quickly in the water by light (i.e., photolysis) and is also subject to microbial breakdown and hydrolysis. It has a half-life (the time it takes for half of the active ingredient to degrade) ranging from 1 – 6 days. Shallow clear-water lakes will lead to faster degradation than turbid, shaded, or deep lakes.

Florpyrauxifen-benzyl breaks down into five major degradation products. These materials are generally more persistent in water than the active herbicide (up to 3 week half-lives) but four of these are minor metabolites detected at less than 5% of applied active ingredient. EPA concluded no hazard concern for metabolites and/or degradates of florpyrauxifen-benzyl that may be found in drinking water, plants, and livestock.

Florpyrauxifen-benzyl binds tightly with surface sediments, so leaching into groundwater is unlikely. Degradation products are more mobile, but aquatic field dissipation studies showed minimal detection of these products in surface sediments.



Florpyrauxifen-benzyl Chemical Fact Sheet

Impacts on Fish and Other Aquatic Organisms

Toxicity tests conducted with rainbow trout, fathead minnow, water fleas (*Daphnia* sp.), amphipods (*Gammarus* sp.), and snails (*Lymnaea* sp.) indicate that florpyrauxifen-benzyl is not toxic for these species. EPA concluded florpyrauxifen-benzyl has no risk concerns for non-target wildlife and is considered "practically non-toxic" to bees, birds, reptiles, amphibians, and mammals.

Florpyrauxifen-benzyl does not bioaccumulate in fish or freshwater clams due to rapid metabolism and chemical depuration.

Human Health

EPA has identified no risks of concern to human health since no adverse acute or chronic effects, including a lack of carcinogenicity or mutagenicity, were observed in the submitted toxicological studies for florpyrauxifen-benzyl regardless of the route of exposure. EPA concluded with reasonable certainty that drinking water exposures to florpyrauxifen-benzyl do not pose a significant human health risk.

The "practically non-toxic" designation is EPA's lowest of 5 levels of "Ecotoxicity Categories for Terrestrial and Aquatic Organisms". For aquatic organisms, the Acute toxicity threshold is >100 mg/L. More details can be found here: <https://www.epa.gov/pesticide-science-and-assessing-pesticide-risks/technical-exposure-risk-assessment-0#Ecotox>



MEMORANDUM

TO: Misha Cetner, Department of Environmental Conservation

FROM: Sarah Vose, State Toxicologist

SUBJECT: Aquatic Nuisance Control Permits, ProcellaCOR, EPA Registration 67690-80

DATE: March 17, 2020

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The Vermont Department of Environmental Conservation (DEC) recently received aquatic nuisance control permit applications that propose use of the aquatic herbicide product ProcellaCOR with the active ingredient floryprauxifen-benzyl, to help control the growth and spread of the aquatic nuisance plant Eurasian watermilfoil.

Per the request of DEC, the state of Vermont Department of Health (Health) has examined the product proposed for use in 2020 and the potential level of concern for public health that may be associated with exposure to water that has been treated with such. Health reviewed the 2020 permit applications for the use of ProcellaCOR at Lake Dunmore, Lake Iroquois, Lake Pinneo and Lake Beebe.

The EPA label for ProcellaCOR does not include any restrictions on use of the treated water for domestic (including drinking and cooking) or recreational use. The proposed treatments at the four sites would result in a maximum floryprauxifen-benzyl concentration of 7.72 ppb, or ~4 PDUs. The EPA label allows use of up to 25 PDUs, which corresponds to roughly 50 ppb. While EPA identified no adverse impacts in animals across the required toxicology studies, Health selected a point of departure of 300 mg/kg/day and derived a chronic oral reference dose of 3 mg/kg/day. Use of this chronic oral reference dose in Health's standard drinking water equations, assuming daily exposure to a 0-1 year old, gives a drinking water health advisory of 3,429 ppb. The drinking water health advisory for floryprauxifen-benzyl is over 400 times higher than the highest proposed concentration in the treated areas, and over 60 times higher than the highest use amount allowed on the EPA label. Thus, the proposed treatments of the four lakes with ProcellaCOR are expected to result in negligible risk to public health. Based on a review of the confidential statement of formulation, it is reasonable to conclude that human exposure to the inert compounds contained in ProcellaCOR at the concentrations that would result under the conditions proposed by the applicants, is not likely to result in an increase in the level of concern for public health.



STATE OF CONNECTICUT

DEPARTMENT OF PUBLIC HEALTH



Raul Pino, M.D., M.P.H.
Commissioner

Dannel P. Malloy
Governor
Nancy Wyman
Lt. Governor

TOCOTOLOGY OVERVIEW AND ASSESSMENT FOR SELECTED HERBICIDES:

Procellacor within Drinking Water Watersheds
Environmental Health Section, October 2018

Through the Memorandum of Understanding between the Connecticut Department of Energy and Environmental Protection and the Drinking Water Section of the Connecticut Department of Public Health (CTDPH) regarding the use of pesticides in drinking water management areas, CTDPH's Environmental and Occupational Health Assessment program has reviewed the proposed use of Procellacor. This CTDPH evaluation is intended to inform the process by providing a toxicity and environmental fate review.

In summary, our findings are that Procellacor has low mammalian toxicity and no clear indication of carcinogenicity, mutagenicity or ability to cause reproductive effects, especially at the low environmental concentrations possible from its proper application. Procellacor's environmental degradation time is short, indicating that there is a low probability of detecting the parent compound in drinking water. Degradation time is longer however for hydroxyl acid breakdown product which also sequesters in plant sugars. Despite the uncertainty around the environmental persistence of Procellacor's degradedates, the CTDPH does not believe that the use of this herbicide in watershed areas will adversely impact drinking water supplies or human health when used in accord with US EPA label instructions.



ProcellaCOR Treatments in the Northeast

- Hundreds of waterbodies have successfully removed invasive milfoil with ProcellaCOR across the US since its introduction in 2018. I'm happy to provide contact info for a few local NY lake groups for your reference

Example NY Lakes

- Minerva Lake, NY (APA)
- Burden Lake, NY
- Cazenovia Lake, NY
- Kinderhook Lake, NY
- Chautauqua Lake, NY
- Saratoga Lake, NY


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'I'm encouraged': Minerva Lake herbicide shows promising results

July 21, 2020 — [Leave a Comment](#)



Staff from Solitude Lake Management and SePro, the company that manufactures ProcellaCOR EC, conduct a Eurasian watermilfoil survey before an herbicide application on June 5 in Minerva Lake in Essex County. Photo by Gwendolyn Craig

By Gwendolyn Craig



- [Shohola Marsh Video](#)

Thank You

Jon Gosselin

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603-494-5966

