East & West Caroga Lakes ProcellaCOR EC Treatment Report

APA Permit 2024-0040

The following information summarizes the application of ProcellaCOR EC to 1.5 acres of West Caroga Lake and 35.5 acres of East Caroga Lake on Monday, June 17, 2024. The application targeted 4 treatment plots as shown on the map on the next page. The report addresses the treatment and its effect on the aquatic plant community of the lakes, as observed in August 2024. The 2024 Aquatic Plant Survey conducted by Adirondack Research (AR) accompanies and supplements this report.

Pre-treatment survey

May 16, 2024, 10:00 – 12:00pm, Weather – partly sunny, air temp – 60-65°F, slight breeze

West Caroga- Water temp – 62.6-63°F

No Eurasian watermilfoil (EWM) was found in or around the application zone (TA1). The zone contained some native plant growth in the 4-6' depth contour, primarily Largeleaf pondweed and macroalgae. Much of the shallow water (<3') contained widely scattered colonies of benthic filamentous algae which should decline naturally as water temperature increases.

The lack of observed EWM suggests hand harvesting may have occurred in 2023, and new plants have not emerged yet.

East Caroga - Water temp – 63-65°F

TA2 - The treatment area adjacent to the marina and the large cove to the south displayed pockets of last season's EWM growth which now has new green growth. These plants were 2-3' tall, and within 1-1.5' of the water surface. In areas where last year's EWM growth wasn't found (harvested??), native plants were observed. These included macroalgae, naiads, Largeleaf pondweed and Robbins pondweed, as well as white water lilies along the southern edge of this zone. All native plants were still low growing and not readily seen from the surface.

TA3 – The treatment area in the cove adjacent to the campground contained the most abundant EWM of all the treatment sites, which were last year's plants currently green and growing within 1' of the surface of the lake. In addition, the area contained robust growth of native species, including Robbins Pondweed, Largeleaf pondweed, Coontail, Isoetes, naiad and macroalgae.

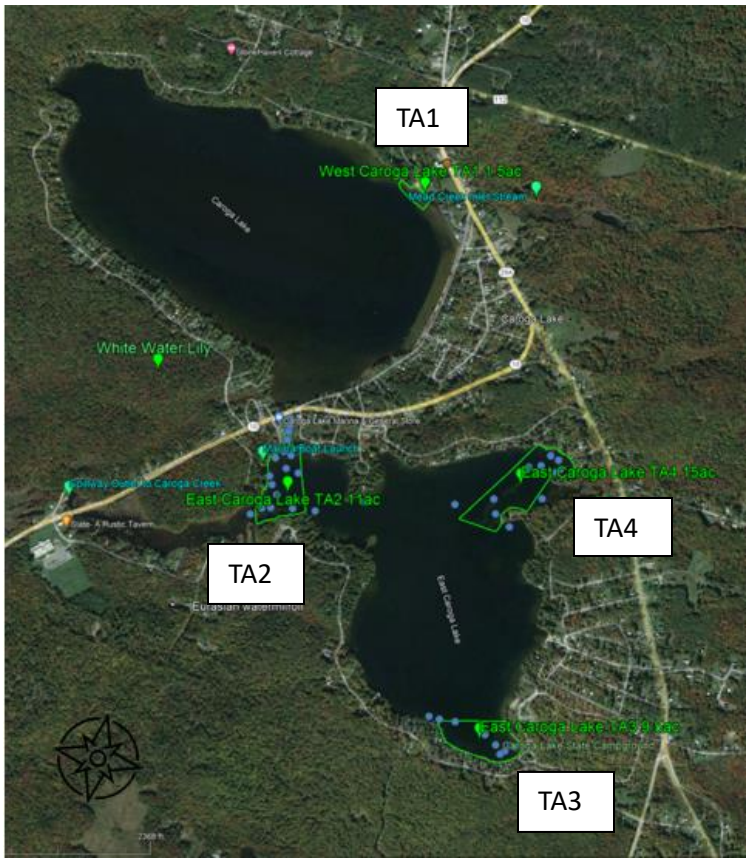
TA4 – This site was surveyed, but no EWM was observed. In fact, the Sonar displayed relatively little and low plant growth as the boat navigated this area.

ProcellaCOR EC Application – Monday, June 17, 2024

Ready Scout arrived at the boat launch at ~7:30am to begin preparation for treatment. Weather was sunny with air temperatures in the mid-70's.

Notification signs were placed at the private marina boat launch, and across the waterfront of the DEC campground advising of the treatment and water use restrictions (irrigation and livestock watering only). After observing public use along the beach area in West Lake (despite Private Property signs) additional herbicide treatment posters were placed in this location.

Application began approximately 8:30 in East Caroga Lake treatment area TA3 (campground) and progressed through TA4 and then TA2. Each application area was treated with the planned 2.0 PDUs/acft ProcellaCOR EC (3.86ppb), using an approximate swath width of 30'. The density and extent of Eurasian watermilfoil in each zone was similar, and milfoil was near the water surface and growing well. Treatment timing was good.



After TAs2-4, the boat returned to the launch and remobilized at the home of Walter Hogan to launch in West Caroga Lake. TA1 was then treated. TA1 displayed little milfoil growth in the shallow east side of the treatment plot, so the west side of the plot was emphasized in the application. EWM extended west beyond the treatment zone for an additional 100 feet. The site in West Caroga Lake was treated at 3 PDUs/acft (5.79 ppb).

Pre-treating Monitoring

Depth (M)	TA1		TA2		TA3		TA4	
	Temp °C	DO (ppm)	Temp °C	DO (ppm)	Temp °C	DO (ppm)	Temp °C	DO (ppm)
Surface	25.1	8.16	21.2	8.59	21.0	8.24	21.5	8.41
1m	23.4	8.22	21.2	8.18	20.8	8.40	21.1	8.38
2m	22.5	8.21	21.6	8.29	20.7	8.29	20.9	8.52
3m	22.0	7.98			20.6	8.05	20.2	8.40
4m					19.0	7.48	19.7	8/08
4.5m					17.1	2.66		

Note: Water clarity measured 11 feet in TA3.

Herbicide Sampling

Sampling was conducted in late afternoon on the day of treatment (DOT, 6/17) by boat. Sampling was conducted again in the afternoon on Tuesday, 6/18 (1DAT) by boat. An additional sampling event was conducted on Thursday, 6/20 (3DAT) at approximately 7-8pm. Since all samples collected at 3DAT returned no measurable concentrations of ProcellaCOR EC's active ingredient, samples from 7DAT were collected but not analyzed.

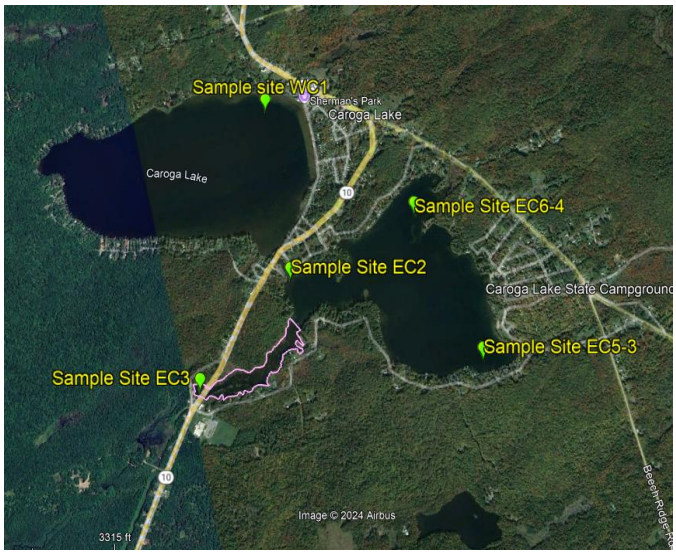
All samples were kept in an iced cooler while in the field and transferred to a refrigerator overnight prior to shipping. Samples were shipped in cooler bags.

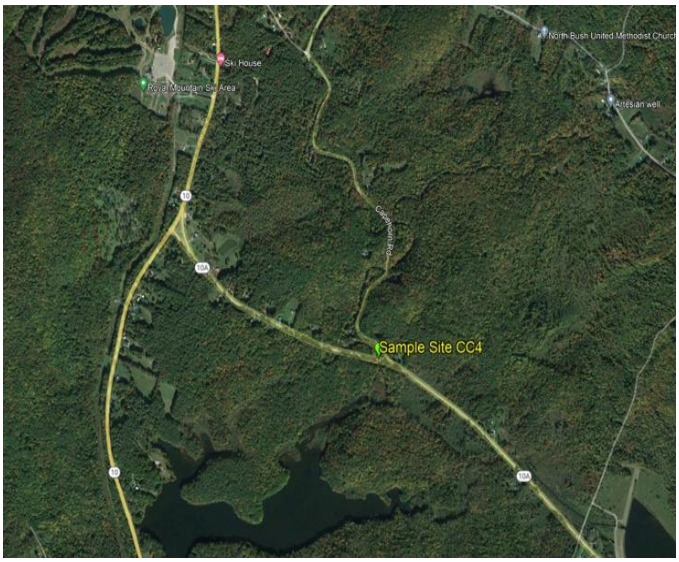
Samples from DOT and 1DAT were shipped Wednesday, 6/19 from the Walgreens in Malone, NY and were delivered to the SePRO lab on Thursday, 6/20.

Samples collected on Thursday, 6/20 (3DAT) were stored in a refrigerator until Sunday and shipped from Walgreens in Sydney, NY to be delivered to SePRO lab on Tuesday, 6/25. (SePRO recommended shipping on Sunday).

Sample site notes:

WC1 – collected off dock (1.5') at campground. Water depth <5'
EC2 – collected at surface (1.5') and at depth (~6')
EC5-3 – collected at surface (1.5'). Water depth <5'.
EC6-4 - collected at surface (1.5') and at depth (~6')
EC3 – collected off dock at Slate Restaurant.
EC4- collected from outlet stream on south end of Cape Horn Road.





ProcellaCOR EC Residual Sample results-(parts per billion)

Sample date	WC1	EC2	EC2 Deep (5.5')	EC3	EC4	EC5-3	EC6-4	EC6-4 Deep (6')
6/17/24	<1	**1.4**	<1	<1	<1	**2.2**	**3.5**	**2.6**
6/18/24	<1	<1	<1	<1	<1	**1.1**	<1	<1
6/20/24	<1	<1	<1	<1	<1	<1	<1	<1

Post-Treatment Area Survey - August 6, 2024 (Ready Scout)

West Lake – 77.8°F, Secchi (clarity) 12.5'

West Lake was surveyed first, focusing on the treatment area and the shoreline going northwest to the cove. No Eurasian watermilfoil was found in the treatment area. Instead, the area was dominated by dense, low-growing Southern Naiad (*Najas guadalupensis*), with scattered pondweeds (*Potamogeton* sp.) and Little Floating Heart (*Nymphoides cordata*,Figure 1).

At the time of treatment, dense Eurasian watermilfoil (EWM) was present adjacent to the treatment on the west side. This EWM was no longer present, and various waterlilies occupied the area, including some Watershield (*Brasenia schreberi*), which is susceptible to ProcellaCOR EC.

Continuing up the north shore to the northwest cove, Little Floating Heart was prevalent, and likely created a nuisance for some shoreline residents. Other areas of the shoreline were not surveyed.

Figure 1 – Little Floating Heart

East-West Channel -77.2°F

The area from the bridge to the opening with East Caroga Lake was included in the treatment zone (TA2). No EWM was found in this area, and boat docks and navigation were significantly improved. Small patches of White Water lilies (*Nymphaea* sp.), Pickerelweed (*Pontederia cordata*) and pondweeds were found in the channel, despite the lilies having some susceptibility to ProcellaCOR EC. A large patch of Watershield (Figure 2) was also found adjacent to the channel opening in West Lake. It's possible these plants had temporary damage from treatment that was no longer evident at 7 weeks after treatment.

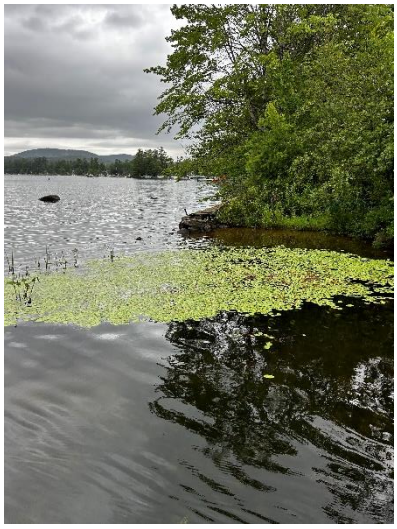


Figure 2 - Watershield

East Caroga Lake – 78.9°F, Secchi (clarity) 10'

No EWM was found in the Avery Cove or Campground treatment areas, nor in Bennett Cove (not treated). Dense Southern Naiad (Figure 3) and Robbins Pondweed (*Potamogeton robinssii*, Figure 4) were abundant and covered the bottom of the lake in all treatment areas, along with scattered pondweed species. A similar plant composition was found in Bennett Cove.

Figure 3- Southern Naiad

Southern Naiad and Robbins Pondweed also dominated the deeper portions of the treatment area near the outlet channel of East Caroga Lake. Moving into the channel, EWM was not found at least 350' down the channel to the large red buoy, which was the extent the survey boat traveled. This area remained well vegetated with waterlilies and pondweeds, so habitat remained intact while navigation likely improved.

The ProcellaCOR EC application to control Eurasian Watermilfoil in portions of East and West Caroga Lake was successful. The dive team reported that it was difficult to find other areas of EWM to harvest following application. It appears that the three treatment areas which formed a triangle of sorts in East Caroga Lake diffused sufficiently to impact EWM in other areas. Any control achieved outside of the treatment areas will not maintain the same duration as the treatment area themselves since other areas were subject to lower concentrations and/or shorter contact-exposure times.

As expected, control of non-target native plants in East and West Caroga Lakes from the ProcellaCOR EC application was minimal, demonstrating the herbicides outstanding selectivity to milfoil. The herbicide effectively improved recreational use and navigation without reducing habitat, soil stability or oxygen levels.

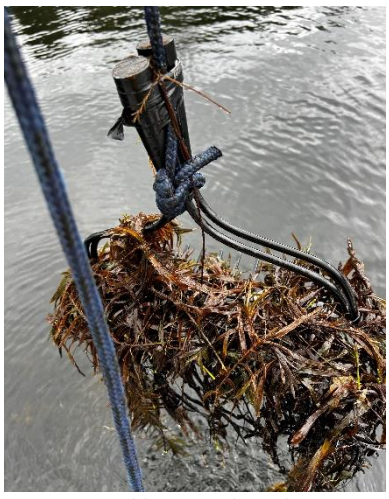


Figure 4 – Robbins Pondweed

Summary of Aquatic Vegetation Occurrences and Frequency – East Caroga Lake 2023 & 2024

(from Adirondack Research 2024 Plant Survey Report)

Common Name	Scientific Name	2023 Freaquency	2023 % Occurance	2024 Freaquency	2024 % Occurance
American eelgrass	*Vallisneria americana*	8	6.06	10	7.7
Annual hairgrass	*Deschampsia danthonioides*			2	1.5
Bur-reed spp.	*Sparganium sp.*			1	0.8
Clasping leaf pondeed	*Potamogeton perfoliatus*	1	0.76		
Common bladderwort	*Utricularia macrorhiza*	22	16.67	8	6.2
Common naiad	*Najas flexilis*	15	11.36	73	56.2
Eurasian watermilfoil	*Myriophyllum spicatum*	54	40.91		
Floating heart	*Nymphoides cordata*	11	8.33	3	2.3
Floating leaf pondweed	*Potamogeton natans*	4	3.03	2	1.5
Fragrant water lily	*Nymphaea odorata*	10	7.58	3	2.3
Grass-leaved pondweed	*Potamogeton gramineus*			1	0.8
Horsetail	*Equisetum fluviatile*	1	0.76		
Large-leaved pondweed	*Potamogeton amplifolius*	21	15.91	26	20.0
Muskgrass	*Chara sp.*	2	1.52	3	2.3
Naiad sp	*Najas sp.*	2	1.52		
Needle spikerush	*Eleocharis acicularis*			1	0.8
Northern watermilfoil	*Myriophyllum sibiricum*	8	6.06		
Pickerelweed	*Pontederia cordata*	5	3.79	2	1.5
Pipewort	*Eriocaulon aquaticum*	1	0.76		
Quillwort	*Isoetes spp.*	1	0.76	2	1.5
Ribbon-leaf pondweed	*Potamogeton epihydrus*			3	2.3
Robbin's pondweed	*Potamogeton robbinsii*	35	26.52	27	20.8
Small Pondweed	*Potamogeton pusillus*	27	20.45		
Stonewort	*Nitella sp.*	23	17.42	34	26.2
Variable leaf pondweed	*Potamogeton gramineus*	41	31.06		
Variegated yellow pond-lily	*Nuphar variegata*			1	0.8
Water bulrush	*Schoenoplectus subterminalis*	14	10.61		
Watershield	*Brasenia schreberi*	23	17.42	3	2.3
White stem pondweed	*Potamogeton praelongus*	22	16.67		

Summary of Aquatic Vegetation Occurrences and Frequency – West Caroga Lake 2023 & 2024

(from Adirondack Research 2024 Plant Survey Report)

Common Name	Scientific Name	2023 Freaquency	2023 % Occurance	2024 Freaquency	2024 % Occurance
American eelgrass	*Vallisneria americana*	10	23.26	4	8.3
Ccommon bladderwort	*Utricularia macrorhiza*			4	8.3
Clasping leaf pondweed	*Potamogeton perfoliatus*			1	2.1
Common naiad	*Najas flexilis*	6	13.96	11	22.9
Eurasian watermilfoil	*Myriophyllum spicatum*	12	27.91		
Floating heart	*Nymphoides cordata*	5	11.63		
Floating-leaf pondweed	*Potamogeton natans*			1	2.1
Grass-leaved pondweed	*Potamogeton gramineus*			6	12.5
Large-leaved pondweed	*Potamogeton amplifolius*	14	32.56	5	10.4
Muskgrass	*Chara sp.*	1	2.33		
Quillwort	*Isoetes spp.*			10	20.8
Small pondweed	*Potamogeton pusillus*	1	2.33	2	4.2
Stonewort	*Nitella sp.*	7	16.28		
Varirable leaf pondweed	*Potamogeton gramineus*	4	9.3		
Water weed	*Elodea sp.*	1	2.33	2	4.2
White stem pondweed	*Potamogeton praelongus*	8	18.6	2	4.2

Plant Control Summary

The aquatic vegetation occurrences and frequency tables above represent sample sites focused on the various treatment areas and their adjacent areas.

East Caroga Lake

The total number of species collected varied from 23 in 2023 to 19 in 2024. Plants notably absent in 2024 included EWM (41% in 2023), Small Pondweed (20% in 2023), White Stem Pondweed (17% in 2023), and Variable-leaf Pondweed (31% in 2023). Watershield decreased in abundance from 17% in 2023 to 2% in 2024. The plant which showed the greatest increase was Common (Bushy) Naiad, which increased from 11% in 2023 to 56% in 2024.

It's important to note the sampling variability at a single point when water depths drop off rapidly. A boat sitting in 2M of water which deploys a weed anchor on a 10M rope can be sampling in 1M of water on one side of the boat and 3-4M of water on the other side. The results could yield two different plant compositions, with the shallow sample yielding more Common Naiad and the deeper sample yielding more pondweeds. Therefore, it's possible that the decrease in pondweed collections and increase in naiads in 2024 have to do with sampling variability. It's difficult to offer other reasonable explanations for the disappearance of three pondweed species in one season considering the herbicide effectively removed EWM (thus improving pondweed habitat) and does not impact monocots like pondweeds. Sampling results did show an increase in Largeleaf Pondweed (15% to 20%), but this would not be significant in terms of native plant biomass. The Ready Scout post-treatment qualitative survey did not note the disappearance of pondweed species, but did note the more abundant species of Robbins Pondweed and Southern Naiad. In general, the Ready Scout survey didn't observe a notable reduction in native plant community from the pre-treatment to the post-treatment survey.

West Caroga Lake

Both the 2023 and 2024 plant surveys by Adirondack Research recorded 11 aquatic plant species in the sampling area on the northeast side of West Caroga Lake. Species composition varied with 5 plants found only in 2023 and 5 plants found only in 2024. Eurasian watermilfoil was effectively controlled by the ProcellaCOR EC application and was not found in 2024. Muskgrass and Stonewort (both macroalgae, 8 sites combined) were not found in 2024, nor was Variable-leaf pondweed. Little Floating Heart was also not found in the 2024 AR survey but was prevalent along the lake's north shoreline during the RS survey.

The most significant appearance in 2024 was Quillwort, which was not found in 2023 but was found at 21% of the sample sites in 2024.

The Town of Caroga has operated its own Diver Assisted Suction Harvesting (DASH) team for several years to manage EWM growth in the lake, and only supplemented those efforts with ProcellaCOR EC in 2024 since EWM growth was outpacing harvesting efforts and funding. The DASH team continued to operate in 2024 but lakewide EWM growth was minimal. The current lake management plan calls for an expansion of ProcellaCOR EC use and continued DASH use to control EWM going forward. Given the excellent EWM control achieved in 2024 by ProcellaCOR EC, the Town plans to target a small cove in East Caroga Lake (Bennett Cove) with the herbicide in 2025, while continuing its long-term DASH efforts.

Respectfully submitted,

Glenn P. Sullivan, President

Ready Scout LLC