



**Town of Leicester
&
Lake Dunmore Fern Lake Association**

Aquatic Invasive Species

Final Report 2016

The Town of Leicester and the Lake Dunmore Fern Lake Association respectfully submit the 2016 Final Report for Vermont Department of Environmental Conservation Grant in Aid AQ17-11.

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Overview

In the years since Hurricane Irene, Eurasian watermilfoil (EWM) has grown exponentially forcing the Lake Dunmore Fern Lake Association (LDFLA) to annually increase its AIS (Aquatic Invasive Species) operations to unsustainable levels while still failing to keep up with new EWM growth. In 2015, LDFLA fielded four harvester boats crewed by 15 crew members. The best case scenario was to hope for a holding pattern to keep EWM from overwhelming Lake Dunmore and Fern Lake. LDFLA realized our EWM abatement strategy needed to be adapted.

LDFLA decided to apply for a Vermont State Aquatic Nuisance Control permit for use of herbicide in 2016. A dedicated committee applied for and received Permit 2015-C07 (see Addendum A). LDFLA saw this as a great opportunity, but it also presented a great challenge. The LDFLA milfoil team had for years developed their annual operations plan based on their accumulated experience. Personnel planning, budgeting, and equipment planning were well established. In 2016, it was a new game.

LDFLA began to define their adaptive strategy by surveying the lake and deciding which areas would benefit from herbicide treatment and which would continue to be suction harvested. The AIS committee decided to apply herbicide in areas where EWM growth had become large, dense patches and machine harvesting was not proving effective. Less dense patches would continue to use the traditional method of machine harvesting and hand removal. LDFLA tried to balance the costs of herbicide per acre against conventional vacuum/hand picking. This calculation was mostly done by educated guess, as they had no experience. LDFLA did consult with other lake associations about their experiences, and listened to the people from Solitude Lake Management (the applicators), but the final decisions were still educated guesswork. As it turned out, they planned pretty well. By the end of the season, with a crew of ten, they had just enough crew members to keep EWM under control.

Aquatic Invasive Species (AIS) Operations

Machine Harvesting and Hand Removal Efforts

Starting in the spring, LDFLA recommissioned the four suction harvester boats. AIS Project Manager, Troy Carr, began hiring additional crew members in mid April. As usual, they interviewed over 20 prospective workers, tentatively hiring six, as they had five returning workers. Of the six, they ended up with five crew members after almost one hundred percent turnover. Crew turnover continued all season due to challenging work conditions, and difficulty retaining reliable workers.

Training on the EWM removal techniques started June 1st. The AIS Project Manager also performed early season surveys to assess EWM growth patterns. He determined areas where the crews would focus machine harvesting efforts and areas where herbicides would be applied.

Throughout the summer, the AIS milfoil crew moved the harvester boats between EWM patches in Lake Dunmore and Fern Lake. They assessed the degree of EWM and focused most of their efforts on the areas not treated with herbicide; however, they did spend time on certain treated areas.

For reporting purposes, Lake Dunmore has historically been divided into four zones. At the end of the season, the AIS Committee realized that reporting the control efforts (bushel harvested) at a patch level would better assist them in evaluating their efforts. A patch is being defined as an “area of concern” where EWM growth requires multiple days of machine harvesting to control when lake

substrate allows, or herbicide treatment when plant density is too thick and substrate too mucky for suction machine harvesting.

At the end of 2016 season, the AIS Committee identified seventeen EWM patches in Lake Dunmore (Figure 1) and five in Fern Lake (Figure 2). Typically, the EWM crew refers to these EWM patches by local names (Table 1). There were four new EWM patches this season (Keewaydin, W Shore Road, Branbury Beach, and Catfish Cove). All of these patches had some EWM plants in 2015, but new growth this season was much denser so suction machine harvesting over multiple days was required.

As LDFLA transitioned their data collection from zones to patches, minor inaccuracies in the 2016 monthly maps were identified. For example, the number of days shown in a given location on the maps may not fully capture all crew efforts; however, the maps are generally indicative of work locations and efforts. LDFLA plans to implement a revised data collection methodology in 2017 that will improve data reliability and assist with understanding the spread of EWM in the lakes. Ultimately, the AIS Committee believes collecting data at a patch level will provide data to analyze EWM both spatially and temporally and enable them to better evaluate control efforts.

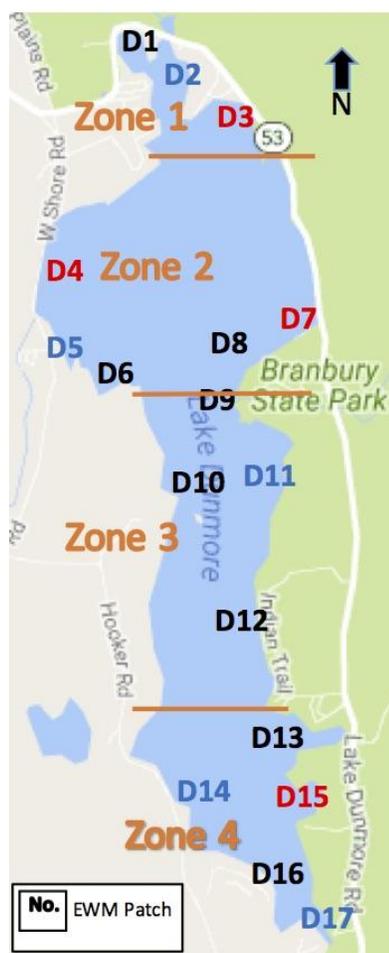


Figure 1: Lake Dunmore EWM Patches. New patches shown in red. Herbicide treated areas shown in blue.



Figure 2: Fern Lake EWM Patches. New patches shown in red. Herbicide treated areas shown in blue.

Table 1: Lake Dunmore and EWM Patch Name and Number. New patches shown in red. Treated areas shown in blue.

EWM Patch No.	Local Name	Zone No.
Lake Dunmore		
D1	North Cove	1
D2	North Bay	1
D3	Keewaydin	1
D4	W Shore Road	2
D5	Waterhouses	2
D6	Timber Lane Cove	2
D7	Branbury Beach	2
D8	Branbury Park	2
D9	Gazebo	3
D10	The Island	3
D11	The Spine	3
D12	Indian Trail	3
D13	Cove Point	4
D14	South Central	4
D15	Catfish Cove	4
D16	Jumping Rock	4
D17	South Cove	4
Fern Lake		
F1	Northwest Cove	
F2	Northeast Cove	
F3	Center Point	
F4	Southeast Shoreline	
F5	The Bowl	

In June, the EWM crew began harvesting plants with two boats in Lake Dunmore. They were able to focus on two patches before the herbicide treatment on June 15th. These patches were Branbury Park (patch no. D8) and Cove Point (patch no. D13). On June 20th, after the approval for swimming, the crew harvested at The Island (patch no. D10) and continued there for some time. They also removed a large new patch along the eastern shoreline of Keewaydin (patch no. D3). This new patch would reappear later in the season.

By June 30th, the EWM crew began to observe the effects of the herbicide application, and began to formulate their work plan for controlling these treated areas. Five areas were treated in Lake Dunmore (North Bay, Waterhouses, South Central, the Spine, and South Cove) and two areas were treated in Fern Lake (The Bowl and Northeast Cove). Two of the five herbicide treated areas in Lake Dunmore, North Bay (patch no. D2) and Waterhouses (patch no. D5), were mostly EWM free this season. The herbicide treatment also appeared to have drifted into the adjacent North Cove (patch no. D1) and killed off new plants in this area.

Two of the treated areas, The Spine (patch no. D11) and South Central (patch no. D14) would require additional machine harvesting throughout the summer. At first, The Spine appeared to have been thoroughly wiped out, with large plants lying over on themselves, while some single stranded plants were leaning over and dying. By mid-July, new EWM shoots began appearing on The Spine and one EWM crew spent time in this location for the rest of the season. By the end of August, the crew was still surprised by the explosive growth and additional resources, as available, were added to The Spine patch.



Beginning in July, the EWM crew brought a boat to Fern Lake. The effects of the herbicide were being seen in Northeast Cove (patch no. F2) and The Bowl (patch no. F5). The herbicide also seemed to drift to the patch by the boat launch and killed these plants. The EWM crew began to suction harvest the Center Point (patch no. F3) and also worked in Northwest Cove (patch no. F1).

Solitude Lake Management, the herbicide applicator, suggested that the EWM crew dig up the root crowns of the killed off plants starting about a month after herbicide application because the plant crowns may still be viable. This was attempted but the crew found it nearly impossible because of the impenetrable mass of decaying plants overlaying them.

During the same time, the EWM crew in Lake Dunmore observed the effects of herbicide application drifting from The Spine (patch no. D11) to the existing patches known as The Gazebo (patch no. 9) and The Island (patch no. D10). Plants appeared to be dying in these patches so they held off suction harvesting. The crew began work on the treated patch, South Central (patch no. D14), because the center of the patch had not been affected. Once the crew completed the unaffected growth at South Central, they returned to The Gazebo to harvest. At this time, they discovered a new patch at

Branbury Beach (patch no. D7) and removed it. The crew also returned to The Island patch and harvested plants that appeared healthy. They ended the month of July by bringing the boat to Fern Lake and spending four days harvesting along the undeveloped Southeast Shoreline (patch no. F4).

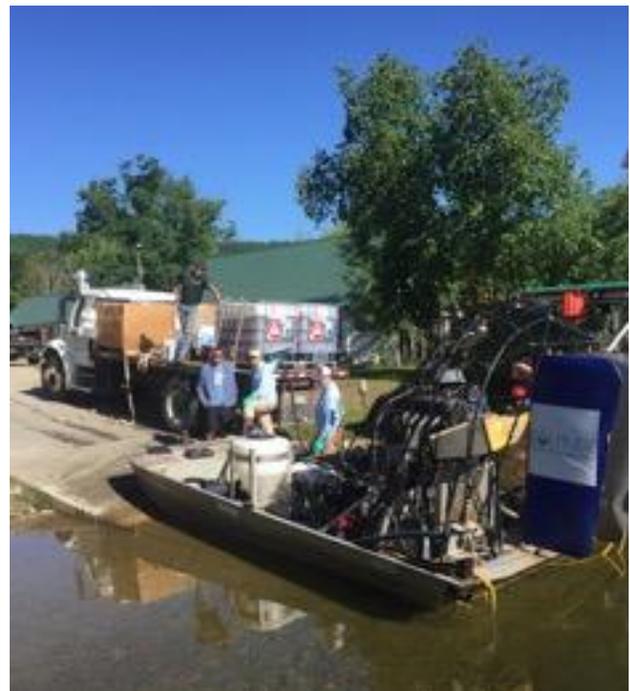
After removing EWM from The Island patch and the southeast shoreline of The Spine, the EWM crew surveyed the lake. They discovered a new large patch north of Waterhouses named W Shore Road (patch no. D4). They were able to clear the patch in one week using one harvester crew. They then went on to complete the cove south of the boat launch, named Timber Lane Cove (patch no. D6). While surveying, the crew found more growth at South Central and removed it. They also worked and completed Jumping Rock (patch no. D16).

As the crew wrapped up the season, a few new growth EWM plants were found and removed in the boat lane of North Bay. A resident and EWM crew volunteer, Cab Hatfield, surveyed North Cove all summer and found only a few new growth plants, which he personally removed. The Island patch began making a comeback so crews were quickly dispatched. A boat was also put back in Fern Lake and the crew worked on new growth found throughout Fern Lake. By September 15th, Fern Lake appeared to be EWM free. All AIS operations ceased at this point.

Herbicide Application Efforts

Beginning in the fall of 2015, LDFLA undertook efforts to secure from the State of Vermont Department of Environmental Conservation (DEC) permission to employ Solitude Lake Management (formerly called Aquatic Control Technology) to apply herbicide in select areas of the lakes to assist the LDFLA in controlling the spread of Eurasian milfoil, an aquatic plant which is deemed “invasive” and a “nuisance” by the DEC.

By the end of the 2015 summer season, the LDFLA team and DEC concluded that based on the then existing extent of EWM coverage within the lake, spot treatment using Renovate OTF, and Renovate 3 would be a reasonable alternative to minimize further establishment of EWM, to avoid additional displacement of native species, and to restore navigation access and other recreational uses which were impaired and/or at significant risk of becoming impaired. Indeed, the DEC concluded non-chemical alternatives, such as bottom barriers, mechanically powered devices, biological controls, diver-assisted suction harvesting and hand pulling while diligently employed by the LDFLA, were then proving to be ineffective in controlling the dense growth of EWM in specific locations. The DEC and the LDFLA concluded certain locations in the lakes would be better controlled by an herbicide spot treatment program in addition to the non-chemical control methods described above. Herbicides were applied to approximately 79.1 acres, 71.9 acres in Lake Dunmore and 7.2 acres in Fern Lake (Addendum C) (Figure 3 and Figure 4).



The permit application was submitted in late November 2015, made its way through all of the relevant Departments and Agencies with the State of Vermont, and was approved and delivered to LDFLA on June 2, 2016. Public notification of the planned activity was provided in accordance with the requirements of the permit which included hand delivery, roadside postings, email communication, and the like (see Addendum B). The actual application began on June 15, 2016 as planned. Representatives of Solitude Lake Management (Marc Bellaud and Michael Lannon) completed the work on both Lake Dunmore and Fern Lake in accordance with the plan, and on a single day which presented ideal conditions for the application.



As required under the permit, Solitude assisted LDFLA in providing a treatment report, and will follow up by providing the annual report as required under the permit (Addendum C). A post-treatment plant survey was conducted by Darrin Freshwater Institute (Addendum D). The results of that survey are impressive – native species appear to have been unaffected and are in fact thriving while the presence of EWM was observed being present in only 6% of survey points, a decrease from 27% reported by Darrin in 2015. It would appear that the goal of the long-range management plan established by LDFLA and the DEC (to reduce the abundance of EWM to below the levels observed and which caused alarm in the summer of 2015) has been substantially achieved.

Figure 3

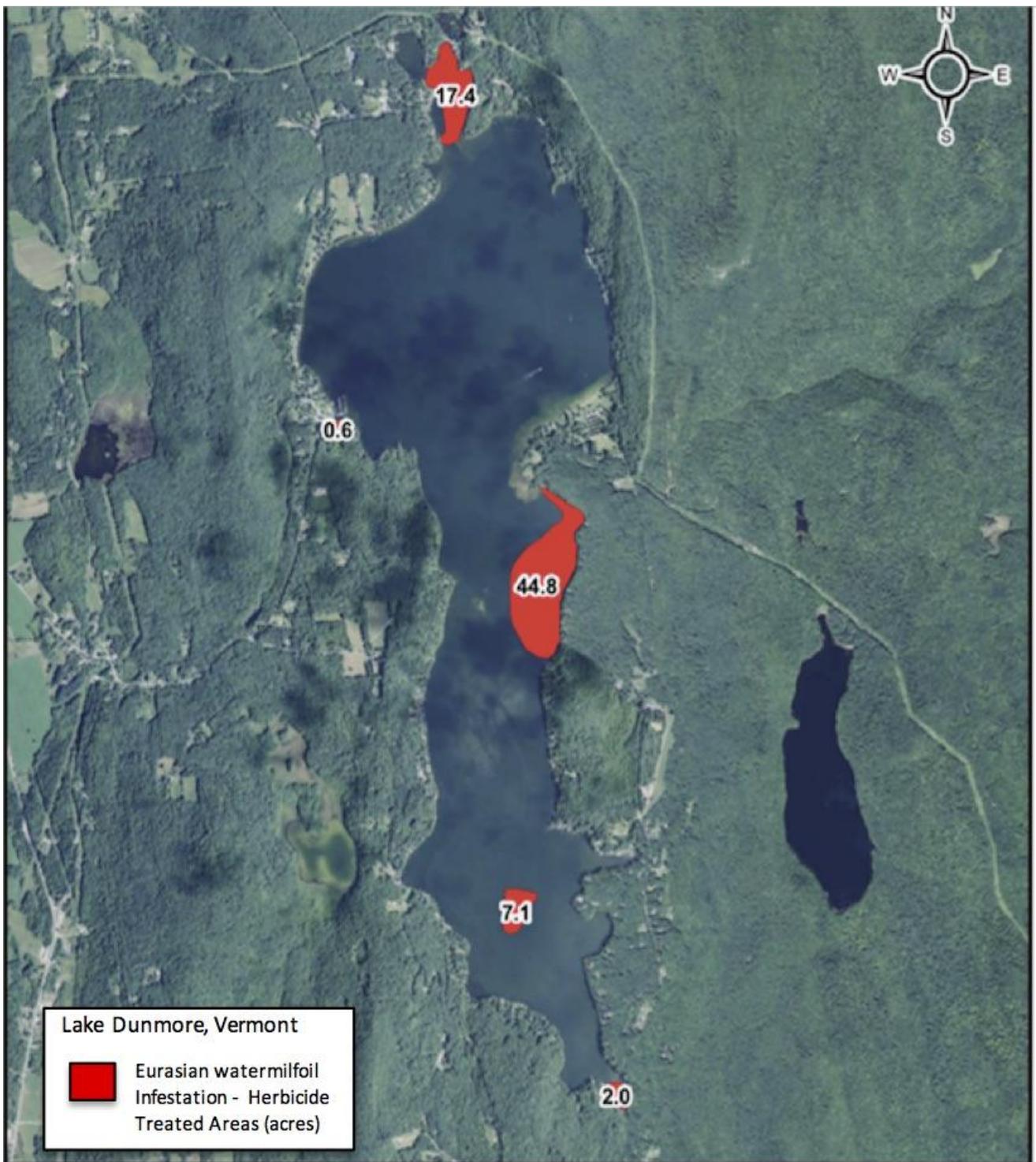
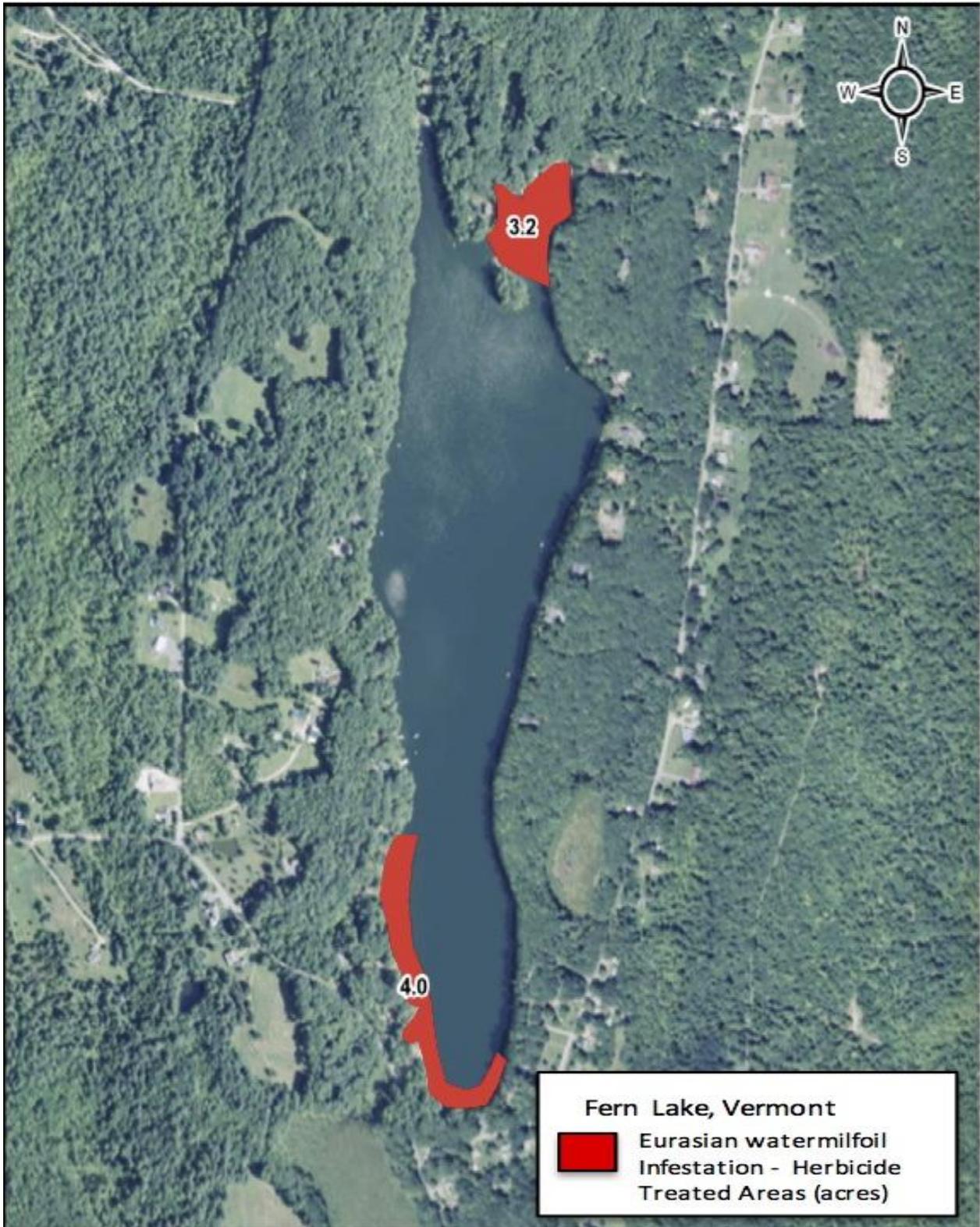


Figure 4



EWM Harvest Collection Data and Herbicide Results

To date, harvest collection data consists of total number of bushels per zone and number of days spent harvesting in a location. This year, in addition to zones, LDFLA has identified seventeen EWM patches in Lake Dunmore and five patches in Fern Lake. These patches have dense mats of EWM that require either suction harvesting or herbicide application. Quantities harvested at these specific patches is not available since the patch specific designations were determined after the season, but LDFLA plans to begin capturing this data next year.

The EWM is disposed of by loading buckets from the harvesters into a dump trailer, either at Songadeewin base or Magoon Launch, and hauling it to vacant land owned by J. Blake Enterprises on the east side of West Shore road. Using this land protects the lakes from any EWM re-entering.

Lake Dunmore:

In Lake Dunmore, the total number of bushels harvested decreased by 42 percent in 2016 from the previous year to 2,013 bushels (Table 2). This decrease is attributed to the use of herbicides as an abatement strategy. LDFLA believes the herbicide treatment helped turn back the clock to 2011-2012 EWM harvesting amounts. Hopefully, this improved condition will provide an opportunity to stay on top of EWM control and begin more detailed data collection and analysis. A summary of the changes within a zone are presented below.

Table 2: Summary of EWM harvested per bushel over time.

Year	2011	2012	2013	2014	2015	2016
Lake Dunmore						
Zone 1	390	300	175	875	721	96
Zone 2	50	175	425	400	668	628
Zone 3	677	2,000	2,900	4,150	1,588	892
Zone 4	17	150	100	75	502	397
Total	1,134	2,625	3,600	5,500	3,479	2,013

Zone 1:

In Zone 1, herbicide was applied to one patch, North Bay (patch no. D2), covering 17.4 acres. Total EWM harvested was reduced to only 96 bushels. The majority of EWM harvested came from the newly established Keewaydin patch (patch no. D3).

The three areas of concern in Zone 1 are North Cove, North Bay, and Keewayden. In North Bay, EWM was very dense in 2015 and required a channel to be cut to allow boats to use the boat lane so plants were not constantly being fragmented and spread. The severity of EWM in North Bay, combined with the mucky substrate, made suction harvesting ineffective, so LDFLA decided to apply herbicide to this area in 2016. It was a huge success. North Bay and North Cove were almost clear of EWM the entire 2016 season. The crew only spent two days in North Bay and none in North Cove. It is interesting to note that no herbicides were applied to North Cove, so the effects of the herbicide were due to water

flow in this area. The Keewaydin patch is now being considered a new patch because EWM growth increased significantly. The crew increased their number of days from one in 2015 to six in 2016.

Zone 2:

In Zone 2, herbicide was applied to only 0.6 acres and 628 bushels were harvested. Harvest quantities are about the same as in 2015. The difference from 2015 was 40 bushels. Since the lake bottom in Zone 2 is mostly deep, EWM is found along the shoreline edge and in the coves.

Of the five patches in Zone 2, two are along the eastern shoreline (Branbury Beach and Branbury Park) and three are along the western shoreline (W Shore Road, Waterhouses, and Timber Lane Cove). Along Branbury State Park, there are two large distinct patches. Overall EWM growth remained consistent in the Branbury Park shoreline area when compared to 2015 efforts. The crew spent a total of 17 days working along this shoreline area this season compared to 15 days in 2015.

There are two new patches in this zone: Branbury Beach (patch no. D7) and W Shore Road (patch no. D4).

Two of the western shoreline patches (W Shore Road and Timber Lane Cove) required significant days of harvesting. W Shore Road patch is a new patch this year and the EWM crew spent seven days here. Timber Lane Cove required a total of six days in July and August.

Waterhouses Marina has been a source of EWM for some time, therefore, it was identified as patch that would be treated with herbicides. The EWM crew did not need to harvest at this location in 2016.

Zone 3:

In Zone 3, herbicide was applied to one huge patch covering 44.8 acres. A total of 892 bushels were harvested this season, almost half of what was harvested in 2015.

This zone has five significant areas of concern: The Gazebo, The Island, The Spine, Indian Trail, and Cove Point. The Spine, 44.8 acres, is the largest and most troublesome of all the patches in the lake and required the most herbicide of all the treated areas. By the end of the summer, the crew observed an explosive new growth at The Spine.

Another troubling patch is The Island. In 2015, part of this patch was considered new and required nine days to control. This season the Island patch had spread significantly and plants were denser. It is now considered to be one large patch. The EWM crew spent a total of 28 days at The Island returning every month this season.

The Gazebo patch is also in this zone, south of Branbury Park. The EWM crew observed a significant decrease at The Gazebo because the herbicide drifted to this area.

The Indian Trail patch also required 12 days of harvesting, which is 4 days less than in 2015.

Zone 4:

In Zone 4, herbicide was applied to two areas totaling 9.1 acres and 397 bushels were harvested, a decrease of 21 percent from 2015 efforts.

Of the five areas of concern in Zone 4, South Central (patch no. D14) and South Cove (patch no. D17), 7.1 acres and 2.0 acres respectively, required herbicide to control. The South Central patch exploded in 2015 with large plants scattered around a huge area. The sediment in the area is very silty with no bottom to stand on making it extremely difficult to harvest plants. LDFLA determined it would be necessary to include this area in the herbicide treatment areas as the crew would not have been able to control EWM in this area during 2016 without the treatment.

Catfish Cove is considered a new patch in 2016 and required ten days total. This was a significant increase in effort, as last year’s EWM control efforts in this cove were only one day.

Cove Point, a new patch in 2015, required six days in both June and July.

South Cove and Jumping Rock are also areas of concern in Zone 4. The herbicide appeared to be affecting the plants in South Cove as they were leaning over and dying.

Fern Lake:

In Fern Lake, herbicide was applied to two areas totaling 7.2 acres and 171 bushels of EWM were harvested, a decrease of approximately 42 percent (Table 3).

Overall, LDFLA had great success in controlling EWM this year in Fern Lake. Herbicide treatment was effective in Northeast Cove (patch no. F2) and The Bowl (patch no. F5) along the southwest shoreline near the boat launch. With the plants dying in these areas, the crew was able to suction harvest the three patches that were not treated. The crew spent a total of 16 days harvesting in Fern Lake. By the end of the season, the crew had gained significant control of new growth. This was a stark contrast to efforts in 2015, which were to isolate the two main EWM patches while trying to keep areas clear for swimming and dock access.

Table 3: Plants harvested from Fern Lake (in bushels)

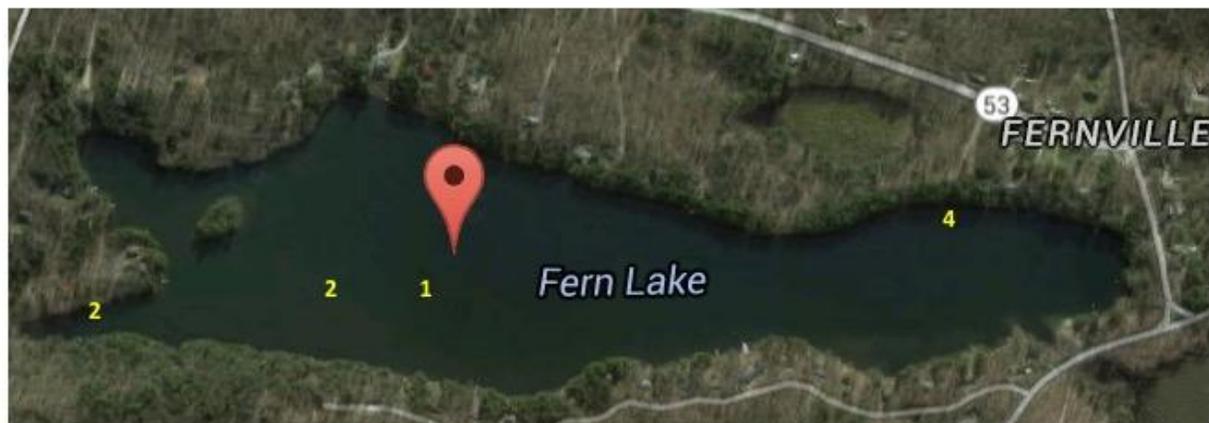
Year	2011	2012	2013	2014	2015	2016
Zone 1	25	300	200	100	297	171
Zone 2	50	525	625	600		
Zone 3	150	1000	700	615		
Zone 4	75	500	275	250		

Maps of Harvesting Data

June 2016



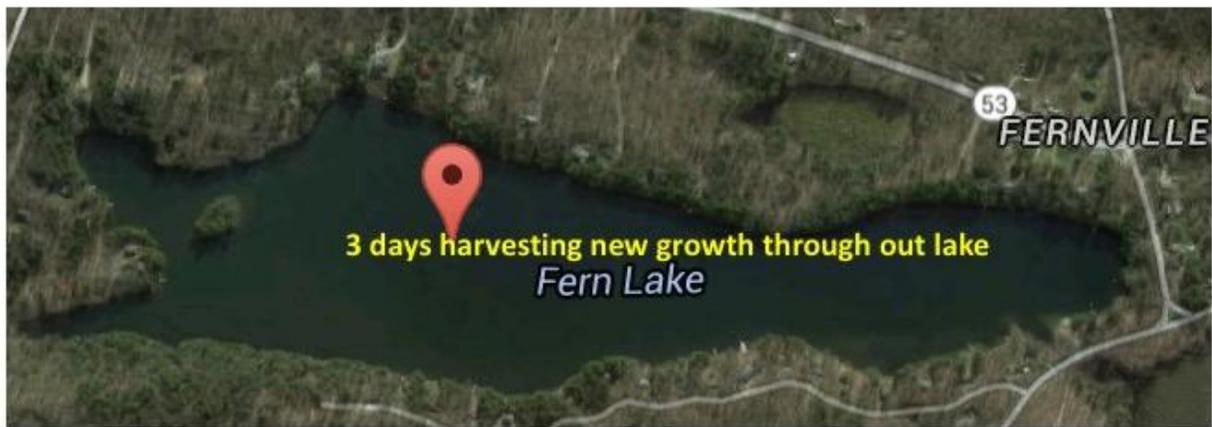
July 2016



August 2016



September 2016



Supplemental Milfoil Control Programs

2016 Public Access Greeter Program

Program Training History Summary:

The 2016 season started off with a training session conducted by Meg Modley at Lake Champlain Basin Program offices. In attendance for the LDFLA was: Jim Meyersburg and Todd Byrne. Laura Hawksley received training at another courses provided by DEC. Troy Carr followed-up with new greeters by reviewing the 2015 greeter training manual, locating AIS, reviewing materials for distribution in launch area, and use of an electronic reporting application.

Name	Coordinator, Volunteer, or Paid Staff?	Training Year (circle one)
Todd Byrne	Paid Staff	2016
Laura Hawksley	Paid Staff	2016
Jim Meyersburg	Volunteer	2016

Troy Carr e-mail: milfoilman@rocketmail.com

Number of Launches and Retrievals

Boats Launched: **1044** Familiar with AIS prevention: 859 (82%)

Boats Retrieved: **201** Familiar with AIS prevention: 134 (67%)

TOTAL:

Canoes Launched:	42
Canoes Retrieved:	10
Motorboat Ballasted Launched:	2
Motorboat Ballasted Retrieved:	2
Kayaks Launched:	329
Kayaks Retrieved:	24
Motorboat including Pontoons Launched:	562
Motorboat including Pontoons Motor Retrieved:	152
Paddle boards Launched:	29
Paddle boards Retrieved:	6
PWCs Launched:	53
PWCs Retrieved:	2
Rowboat Launched:	4
Sailboats Launched:	21
Sailboats Retrieved:	4
Misc. WC Launched:	2
Misc. WC Retrieved:	1

2016 Greeter Program Inspection Results

Total number of boats inspected: **1183** (1245 total boats, 62 not inspected)

Number of inspected boats (launching or retrieving) that were found to be carrying any plant or animal material: **5.16 (%)**

- Number carrying plant/animal material when launching: 39
- Number carrying plant/animal material when retrieving: 25

Incidents in which invasive species were suspected and/or confirmed:

Date	Count	Launch/ Retrieve	If Launching, Last Waterbody	Plant found	Sample taken?
6/19/2016	1	Retrieve		EWM	Yes
6/24/2016	1	Retrieve		EWM	Yes
6/26/2016	1	Retrieve		EWM	No
6/26/2016	1	Retrieve		EWM	No
6/29/2016	1	Launch	Lake Champlain	Hydrilla	Yes
6/29/2016	1	Retrieve		Non-AIS	No
6/30/2016	1	Launch	Lake Champlain	Milfoil, Unidentified	No
6/30/2016	1	Launch	None	Milfoil, Unidentified	Yes
6/30/2016	1	Launch	Lake Iroquois	Non-AIS	No
6/30/2016	1	Retrieve		EWM	Yes
7/1/2016	1	Launch	Bristol Pond	Non-AIS	No
7/1/2016	1	Launch	Lake Dunmore	Non-AIS	No
7/1/2016	1	Retrieve		Non-AIS	No
7/1/2016	1	Launch	Lake Dunmore	Non-AIS	No
7/2/2016	1	Launch	None	Non-AIS	No
7/2/2016	1	Launch	None	Milfoil, Unidentified	Yes
7/2/2016	1	Launch	Lake Dunmore	EWM	No
7/2/2016	1	Launch	Lake Dunmore	Milfoil, Unidentified	Yes
7/2/2016	1	Launch	None	Non-AIS	No
7/2/2016	1	Retrieve		Non-AIS	No
7/2/2016	1	Retrieve		Non-AIS	No
7/2/2016	1	Retrieve		Milfoil, Unidentified	Yes
7/2/2016	2	Retrieve		Milfoil, Unidentified	Yes
7/2/2016	1	Launch	Lake Dunmore	Non-AIS	No
7/3/2016	1	Launch	None	Non-AIS	No
7/3/2016	1	Launch	None	Non-AIS	No
7/3/2016	1	Launch	Gaile meadows, Stratton	Non-AIS	No
7/3/2016	1	Launch	None	Curly leaf pondweed	Yes
7/4/2016	1	Launch	Lake Dunmore	EWM	No
7/4/2016	1	Retrieve		EWM	No
7/5/2016	1	Retrieve		Non-AIS	Yes
7/5/2016	1	Retrieve		Non-AIS	Yes
7/6/2016	1	Retrieve		Non-AIS	No
7/6/2016	1	Retrieve		Non-AIS	Yes
7/7/2016	1	Launch	None	Non-AIS	No
7/7/2016	1	Launch	Lake Dunmore	Non-AIS	No
7/7/2016	1	Retrieve		Milfoil, Native	No
7/7/2016	1	Retrieve		Non-AIS	No
7/7/2016	2	Launch	Chittenden Reservoir	Non-AIS	No
7/8/2016	3	Launch	Lake Dunmore	Non-AIS	No
7/9/2016	1	Retrieve		Milfoil, Unidentified	No
7/11/2016	1	Launch	None	Non-AIS	No
7/11/2016	1	Launch	None	Non-AIS	No
7/12/2016	1	Retrieve		EWM	No
7/15/2016	1	Launch	Lake Bomoseen	Milfoil, Unidentified	No
7/15/2016	1	Launch	Lake Dunmore	EWM, Milfoil-unidentified	Yes
7/15/2016	1	Launch	None	Non-AIS	No
7/16/2016	1	Launch	None	EWM	No
7/17/2016	1	Launch	None	EWM	No

Date	Count	Launch/ Retrieve	If Launching, Last Waterbody	Plant found	Sample taken?
7/23/2016	1	Retrieve		Milfoil, Native	No
7/29/2016	1	Launch	None	Non-AIS	Yes
7/29/2016	1	Launch	Lake Dunmore	Non-AIS	No
7/29/2016	2	Launch	Lake Champlain	Non-AIS	No
7/30/2016	1	Launch	None	Non-AIS	No
7/30/2016	1	Launch	Crystal Lake, Goshen	Non-AIS	No
8/11/2016	1	Retrieve		Non-AIS	No
8/11/2016	1	Launch	Lake Dunmore	Non-AIS	No
8/28/2016	1	Retrieve		Non-AIS	No
8/28/2016	1	Retrieve		Non-AIS	No

LDFLA was awarded \$14,267 from the Lake Champlain Basin Program for the Boat Access Greeter Program. The award required the greeter program to adhere to the Generic Lake Champlain Basin Boat Launch Steward Quality Assurance Project Plan and required quarterly reporting to LCBP.

Member Education and Outreach

In 2015, LDFLA sponsored Milfoil Training Workshops and created a member communication flyer regarding AIS. This year LDFLA updated their website to include detailed information on the EWM control efforts to date, as well as posting the 2015 Aquatic Invasive Species Final Report (AQ16-11). The new website also has an online form for landowners to submit EWM sightings.

Communication outreach was necessary to inform property owners on the herbicide treatment planned for June and details on water quality safety. LDFLA included this information in their newsletter and blog. LDFLA also printed, laminated, and posted Warning Aquatic Pesticide in Use flyers on every road along the lake (Addendum B).

At the LDFLA annual meeting in July, nets were passed out to members for collecting EWM fragments. The greeter crew at the boat launch also offered them for free if requested.

Conclusion

The effort to control new EWM growth in Lake Dunmore and Fern Lake was successful this year due to spot treatments of herbicide to high density patches. Herbicides were applied to approximately 79.1 acres, 71.9 acres in Lake Dunmore and 7.2 acres in Fern Lake (Addendum C). Without the use of herbicides, LDFLA would have continued at an unsustainable level of effort, as in past years, without gaining control of the spread of EWM throughout the lakes. Herbicides allowed LDFLA to dedicate limited resources to new growth patches where machine harvesting is effective. They made significant progress containing these areas and ended the season feeling optimistic about their future efforts to control EWM while fully recognizing they must be diligent and proactive in protecting the lakes.

As LDFLA moves forward, the hope is to further the understanding of environmental conditions that promote EWM new growth. They believe they have a great opportunity because they finally have control of EWM in the lakes, which will allow them to be proactive rather than reactive. One of their goals is to improve data collection methods. Now that LDFLA has identified and named new and recurring patches, they will begin to capture quantity data on bushel harvested per patch and map these patches using GPS so they may begin to analyze spatial and temporal patterns. This data may

help provide a better understanding of drivers for EWM growth and effectiveness of EWM control, as well as provide data to evaluate the effectiveness of EWM abatement strategies.

Summary of Major Problems

The greatest challenge this season was definitely planning and budgeting. For years, LDFLA had incrementally developed and expanded their AIS control program. By 2015, they had four suction harvesters, a support boat, a crew of twenty, and a supportive Board of Directors. Even though they fielded those impressive resources, they were unable to keep up with the growth and were overwhelmed. They always finished the season with a significant infestation.

LDFLA realized that the lakes required an herbicide permit, but unfortunately, had no experience using herbicide. They knew that it would decimate the large stands of EWM, but were unsure how to balance the projected cost of the herbicide applications to the cost of a reduced crew. They had many long planning sessions and ended up with a crew reduced by half, and three manned harvesters (one was prepositioned on Fern Lake but crewed part time). LDFLA's planning worked out perfectly. The season ended with just enough work for the available crews, and EWM was well controlled.

LDFLA also had a challenge because some land owners and a youth camp required LDFLA to provide them with potable water for several days before the water was approved for household use following the herbicide treatment. LDFLA solved this by supplying free water at local store and a water buffalo water tank for the camp.

Another ongoing challenge was crew staffing. EWM harvesting is hard work and there is a washout period for harvester workers. LDFLA also had a harder than usual time hiring and keeping greeters. This was the first year that the launch area was manned seven days a week. Next year, they hope to expand this to even more hours.

Our Greatest Success

Overall, efforts to control EWM were a rousing success this season. Weather conditions were ideal for herbicide treatment. Drought conditions limited nutrients flowing into the lake and kept inflow minimized. The spot treatment of herbicide resulted in virtually no loss in native plant life and no loss in fish stock (Addendum D). Surveying conducted after treatment found EWM present in 6 percent of survey points a decreased from the 27 percent reported in 2015 and 18 percent in 2014 (Addendum D).

The use of herbicides allowed the EWM crew to mostly ignore major EWM forests, and concentrate on new growth. LDFLA had just enough manpower to control the growth in both lakes.

Organizationally, LDFLA also was successful in gathering almost unanimous support from lake residents for the AIS Committee's work, which included using herbicides as a new EWM abatement strategy. In addition, almost 60% of lake residents have committed financial support of the AIS Committee efforts in the form of meaningful contributions to Lakes Alive.

In 2013 the Lake Dunmore/Fern Lake Association embarked on a 5 year capital campaign to develop greater funds to meet increased costs associated with managing water quality, water safety, invasive

species, and development issues. Funds were raised to meet immediate needs (Years 2013-2017) and to create an income producing “endowment fund” to help meet needs in future years. The Campaign, known as “Lakes Alive – Now & Forever,” is overseen by the LDFLA Board and it is still in progress. The endowment, where funds are invested in perpetuity, will receive approximately 2/3 of the total funds raised by the campaign, and the balance of the funds raised will be used to meet current needs not otherwise covered by annual dues or state/local grants.

For 2016 the Association deployed \$50,000 from the “immediate needs” funds and, because of limited Grant monies, also drew an additional \$75,000 from the Association’s reserves (Rainy Day) Funds to meet Milfoil Control and Prevention program costs.

2016 LDFLA Volunteer Hours

Volunteer	Hours	Volunteer	Hours	Volunteer	Hours
Chip Paison	180	Brett Zimmerman	50	Alan Campell	10
Jim Meyersburg	150	Lynne Peck	45	Bill Powers	10
Jay Michael	140	Jonathan Blake	43	David Callum	10
Jim Foley	100	Jane Meyersburg	40	Ray Churchill	10
Stephanie Foley	100	Sue Mackey	30	Jack Hooker	4
Cab Hatfield	80	Sheila Conroy	25	Chris Malcolm	3
Diane Snyder	75	Ken Scupp	20	Mary Bugnacki	3
Debbie Wing	60	Josie Scupp	20	John Wright	2
Christopher Pray	60	Susan Patterson	20	Judy Zimmerman	2
Katie Gellenbeck	55	Nancy Malcolm	20	Sandy Hooker	2
Chris Naylor	50			Total	1419

Attachment D

Final Expenditure Form

PROJECT: AQ17-11
WATERBODY: Lakes Dunmore and Fern
TOWN OF: Leicester

A. PERSONNEL SALARIES	Total	\$92,657
B. FRINGE BENEFITS (Percent of paid salaries, e.g., social security, etc.)	Total	\$14,512
C. TRAVEL 2002 miles @ \$0.54/mi	Total	\$1,081
D. EQUIPMENT	Total	\$5,342
E. SUPPLIES	Total	\$10,670
F. CONTRACTUAL	Total	\$92,114
G. OTHER	Total	\$10,148
H. INDIRECT COSTS	Total	\$0
I. IN-KIND PERSONNEL	Total	\$ 17,028
J. IN-KIND SERVICES	Total	\$16,100
K. TOTAL EXPENDITURES	Total	\$259,652

Attachment D Supplemental Sheet

A. Personnel Salaries: Includes current payroll expense and anticipated payroll expenses through December 31, 2016.

- a. Supervisor annual compensation at \$41,100.
- b. 9 crew members at hourly rates ranging from \$11 to \$20 / hour = \$45,859.
- c. 2 Greeters at hourly rate of \$11 / hour = \$5698.
- d. 1 Education Coordinator who worked as a volunteer.

Total Milfoil Removal	= \$	86,959
Total Greeter Program	= \$	<u>5,698</u>
Total Salaries	= \$	92,657

B. Fringe Benefits:

Removal Benefits	= \$	13,620
Total Greeter benefits	= \$	<u>892</u>
Total Benefits	= \$	14,512

C. Travel:

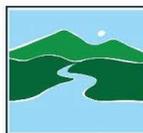
Between lakes, to haul milfoil, acquire fuel, obtain repairs & inspections.
2002 miles @ \$0.54/mile = \$1,081

D.	<u>Equipment:</u>		
	Equipment Repair	= \$	2,784
	New Equipment	= \$	<u>2,558</u>
	Total Equipment	= \$	5,342
E.	<u>Supplies:</u>		
	Gas & Oil	= \$	2,223
	Misc. parts & supplies	= \$	5,926
	Tools, buoys, equipment	= \$	<u>2,521</u>
	Total Supplies	= \$	10,670
F.	<u>Contractual:</u>		
	Administrative/Accounting	= \$	4,288
	Lake surveys (Darrin)	= \$	3,200
	Herbicide Treatment	= \$	<u>84,626</u>
	Total Contractual Services	= \$	92,114
G.	<u>Other:</u>		
	Insurance	= \$	9,155
	Telephone & office supplies	= \$	<u>993</u>
	Total Other	= \$	10,148
H.	<u>Indirect Costs:</u>		None
I.			
J.	<u>In-Kind Personnel:</u>		
	Shoreline Watch Volunteers: 31 people for a total of 1419 hours @\$12/hr. = \$17,028		
K.	<u>In-Kind Services:</u>		
	Storage for boats & trailers	= \$	3,600
	Milfoil Disposal	= \$	1,500
	Office rental & parking	= \$	<u>11,000</u>
	Total In-Kind services	= \$	16,100
L.	<u>Total Expenditures:</u>	\$	259,652

Addendum A: Vermont State Aquatic Nuisance Control Permit 2015-C07

Aquatic Nuisance Control Individual Permit

Under 10 V.S.A. § 1455



VERMONT DEPARTMENT OF
ENVIRONMENTAL CONSERVATION
WATERSHED
MANAGEMENT DIVISION
LAKES & PONDS PROGRAM

<p>Permittee(s): Lake Dunmore Fern Lake Association & Solitude Lake Management</p> <p>Control Activity: Pesticide (SePRO Renovate OTF® & Renovate 3®)</p>	<p>Permit Number: 2015-C07</p> <p>Waterbody: Lake Dunmore</p>
<p>Based upon the Findings contained in this permit, the Secretary of the Agency of Natural Resources has determined that the proposed aquatic nuisance control activity will comply with 10 V.S.A. § 1455, and is hereby approved under the following conditions and specifications.</p>	
<p>a. Specific Conditions</p> <ol style="list-style-type: none"> 1. <u>Pesticide Use.</u> The Permittee is authorized to apply the following pesticides in accordance with the Approved Application and the pesticides shall be registered with the U.S. Environmental Protection Agency (EPA) and the Vermont Agency of Agriculture, Food and Markets at the time of use and handled, applied, and disposed of in conformance with all state and federal regulations: <ol style="list-style-type: none"> A. SePRO Renovate OTF® (EPA Registration Number 67690-42), a flake formulation active ingredient 14% triclopyr (3, 5, 6-trichloro-2-pyridinyloxyacetic acid, triethylamine salt); and B. SePRO Renovate 3® (EPA Registration Number 62719-37-67690), a liquid formulation active ingredient 44.4% triclopyr (3, 5, 6-trichloro-2-pyridinyloxyacetic acid, triethylamine salt). 2. <u>Certified Applicator.</u> All applicators of the authorized pesticide shall be certified by the Vermont Agency of Agriculture, Food and Markets in Category Five – Aquatic Pest Control. 3. <u>Treatment Plan.</u> A final treatment plan shall be submitted to the Secretary for approval not less than two weeks prior to pesticide use. The treatment plan shall include the following: <ol style="list-style-type: none"> A. A map identifying all area(s) in which pesticide will be used; B. Approximate date(s) of pesticide use; C. Pesticide target concentration(s); D. Pesticide concentration monitoring locations; and, E. Pesticide application procedure. 4. <u>Target Concentration.</u> In accordance with the approved treatment plan, the authorized pesticides shall be applied in a manner to achieve and maintain a target concentration of no greater than 2.5 parts per million (ppm) of the active ingredient triclopyr, based upon the bottom 4 feet of the water column (or deeper as conditions warrant). 5. <u>Agency Notification.</u> Written notification to the Secretary shall be provided at least two weeks in advance of pesticide use. 6. <u>Public Informational Notification.</u> Prior to treatment, informational notifications shall be provided to the public of the water use advisories and recommendations as outlined below: <ol style="list-style-type: none"> A. The informational notification shall include: <ol style="list-style-type: none"> i. Date of the treatment; ii. Pesticide(s) to be used; iii. Summary of the use advisories and recommendations (per condition a.8. below); iv. Map of the waterbody and treatment areas; v. Statement that informational signs posted along shoreline properties and roadways will provide the exact treatment date/time and applicable use advisories and recommendations; vi. Statement that bottled water may be provided by the Permittee upon request to any person restricted from using their domestic water supply (taken directly from the lake or its effluent) for drinking or for food preparation; vii. Contact name(s), address(es), and telephone number(s) for all Permittees; and, 	

- viii. Statement informing all property owners that if their property is leased, rented, or used at any time during treatment and/or while the use advisories are in effect, the property owner is responsible for properly informing all transient users.
- B. The informational notification shall be provided to all abutting property owners (including commercial camps) to Lake Dunmore and within one mile of the effluent at least two weeks prior to the scheduled treatment date by one of the following:
 - i. Hand-delivery;
 - ii. Confirmation receipt electronic mail;
 - iii. Stamped, return postcard to indicate receipt;
 - iv. Sent USPS Certified Mail™ or via [Certificate of Mailing \(PS Form 3817\)](#); or,
 - v. Other methods that provide proof of notification.
- C. The informational signs shall be/posted:
 - i. In locations visible to vehicle traffic, shoreline property owners, and potential lake users;
 - ii. Weather resistant and at least 8½ inches in width by 11 inches in height;
 - iii. At least two days prior to the scheduled treatment date;
 - iv. Along all public roadways approximately 1,000 feet in the vicinity of the shoreline;
 - v. At all public and private campgrounds, hotels, inns, beaches, and access points;
 - vi. At the municipal office(s);
 - vii. Updated immediately when water use advisories or treatment plans change; and,
 - viii. May be removed no sooner than 30 days after treatment, when only the irrigation advisories remain.
- D. Copies of the aforementioned notification and signs shall be provided to the Secretary at the same time as they are made available to the public.
- E. Treatments should occur only on a Monday, Tuesday, Wednesday, or Thursday to minimize unnecessary pesticide exposure to the public over a weekend.
- 7. Pesticide Concentration Monitoring. Triclopyr concentrations shall be monitored as follows and in conformance with an approved treatment plan as identified in a.3.:
 - A. At least two weeks prior to treatment, the Permittee shall submit to the Secretary a map of proposed sample locations for review and written approval.
 - B. The Permittee shall collect water samples or arrange for samples to be collected for the analysis of triclopyr.
 - C. Samples shall be collected within the bottom four feet of water (or deeper as conditions warrant) at each sample site using appropriate equipment and techniques to collect samples at this depth.
 - D. Sampling shall proceed as follows and continue until all sample results demonstrate triclopyr is at or below 75 ppb, at which point sampling may be discontinued:
 - i. Sampling shall proceed as follows for when only Renovate 3® is used:
 - a. Twenty-four hours after the initial application of Renovate 3®, representative samples of the treated waterbody and its outlet stream(s) (within one-quarter mile of the effluent) shall be chemically tested to determine if triclopyr is present at less than or equal to 75 parts per billion (ppb). Sampling locations shall be identified as described under a.3.D.
 - b. If triclopyr is confirmed to be at or below 75 ppb, full use of the treated waterbody, its waters and outlet stream(s), including all domestic uses may resume. However, if triclopyr is detected in representative samples from these waters above 75 ppb, an additional 24 hour waiting period shall occur during which time the treated waterbody and its outlet stream(s) (within one mile downstream of the effluent) shall again not be used for drinking water or in the preparation of food or drink. At the end of this second 24 hour waiting period, representative samples of the treated waterbody and its outlet stream(s) (within one-quarter mile downstream of the effluent) shall again be taken and chemically analyzed for triclopyr. This process shall be repeated until representative sampling indicates that the level of triclopyr in

- the treated waterbody and outlet stream(s) is at or below 75 ppb. This process also applies to any and all booster applications.
- c. Only once residues of triclopyr are confirmed to be below 75 ppb shall full use of the treated waterbody and/or its outlet stream(s) resume.
 - ii. Sampling shall proceed as follows for when only Renovate OTF® is used or for when a combination of Renovate 3® and Renovate OTF® is used:
 - a. Forty-eight hours after the initial application of Renovate OTF®, representative samples of the treated waterbody and its outlet stream(s) (within one-quarter mile of the effluent) shall be chemically tested to determine if triclopyr is present at less than or equal to 75 ppb. Sampling locations shall be identified as described under a.3.D.
 - b. If triclopyr is confirmed to be at or below 75 ppb, full use of the treated waterbody, its waters and outlet stream(s), including all domestic uses shall resume. However, if triclopyr is detected in representative samples from these waters above 75 ppb, an additional 24 hour waiting period shall occur during which time the treated waterbody and its outlet stream(s) (within one mile downstream of the effluent) shall again not be used for drinking water or in the preparation of food or drink. At the end of this second 24 hour waiting period, representative samples of the treated waterbody and its outlet stream(s) (within one-quarter mile downstream of the effluent) shall again be taken and chemically analyzed for triclopyr. This process should be repeated until representative sampling indicates that the level of triclopyr in the treated waterbody and outlet stream(s) is at or below 75 ppb. This process also applies to any and all booster applications.
 - c. Only once residues of triclopyr are confirmed to be below 75 ppb shall full use of the treated waterbody and/or its outlet stream(s) resume.
 - E. Additional samples and sample locations, including but not limited to lake sediments and adjacent water supply wells may be required as determined by the Secretary.
 - F. Samples shall be analyzed at the SePRO Corporation laboratory (or another qualified laboratory) to analyze triclopyr by the FasTEST method (or approved equivalent) with a detection limit of 1 ppb for triclopyr.
 - G. Laboratory results shall be submitted to the Secretary within 24 hours of completion.
 - H. Sampling and laboratory analysis may be discontinued with written approval from the Secretary.
8. Water Use Advisories & Recommendations. To minimize unnecessary exposure, the following water use advisories and recommendations apply:
- A. For the use of Renovate 3®, the public uses of the waterbody shall proceed as follows:
 - i. No use of the treated waterbody and its associated outlet stream(s) (for one mile downstream of the effluent) for any purpose (including recreational uses such as boating and fishing) is recommended on the day of application.
 - ii. Boating, fishing, and toilet flushing may resume at the beginning of the day following application.
 - iii. Swimming and domestic use other than drinking and using to prepare food or drink, may resume 24 hours after application.
 - iv. Drinking and using such waters to prepare food or drink should not resume until sampling conditions identified under a.7.D. have been met.
 - B. For the use of Renovate OTF®, the public uses of the waterbody shall proceed as follows:
 - i. No use of the treated waterbody and its associated outlet stream(s) (for one mile downstream of the effluent) for any purpose (including recreational uses such as boating, fishing and swimming and all domestic uses including toilet flushing) is recommended on the day of application and the entire day thereafter.
 - ii. Recreational uses such as boating, fishing, and swimming may resume at the beginning of the second day following application.
 - iii. Domestic use other than drinking and using such waters to prepare food or drink, may resume at the beginning of the second day following application.

- iv. Drinking and using such waters to prepare food or drink should not resume until sampling conditions identified under a.7.D. have been met.
 - C. Water from the treated waterbody and any associated outlets for one mile downstream used for irrigation purposes, such as watering lawns, trees, shrubs or plants, is not recommended for 120 days after the day of treatment or until the Secretary provides notification to the Permittee that this restriction has been lifted.
 - D. Until full use of the waterbody can be resumed, bottled water shall be supplied by the Permittee to those who may depend upon the treated waterbody and/or its outlet stream(s) (within one mile of the effluent) for their domestic drinking water or food and drink preparation water supply.
9. Treatment Report. A treatment report shall be submitted to the Secretary within one week following the date of the treatment to include the following:
- A. Date, time, and duration of treatment;
 - B. Pesticide manufacturer, trade name, and formulation used;
 - C. Total amount of pesticide applied;
 - D. Total surface area of pesticide treatment;
 - E. Target pesticide concentration and related calculations;
 - F. Pesticide treatment technique and equipment used;
 - G. Weather and lake conditions at time of pesticide treatment; and,
 - H. Description of any problems encountered during treatment.
10. Plant Surveys. A quantitative aquatic plant survey (pre-treatment) shall be conducted prior to any pesticide use. A post-treatment plant survey shall be conducted during the same year of treatment and two consecutive years thereafter. All aquatic plant surveys shall include the following:
- A. Date of survey;
 - B. Herbicide effectiveness on target plants;
 - C. Herbicide impact on nontarget plants;
 - D. Map depicting survey areas;
 - E. Description of all plant species present and their relative abundance, and;
 - F. Survey data shall be reported in a similar format to prior years.
11. Annual Report. An annual report shall be submitted, on the year of treatment and the following year thereafter, to the Secretary by December 31st of each year and shall include the following:
- A. Summary of all pesticide concentration monitoring;
 - B. Qualitative assessment of the status of Eurasian watermilfoil (EWM), *Myriophyllum spicatum*, growth and its distribution;
 - C. Map of the final pesticide treatment areas with EWM growth distribution and density depicted;
 - D. Description of other nuisance control activity (if any);
 - E. Status of aquatic plant re-growth in treatment areas;
 - F. Other observations and actions taken; and,
 - G. Recommendations (if any).
12. Annual Meeting. The Permittee shall organize a meeting with the Secretary on the year of treatment and two years thereafter to discuss the plant surveys, annual reports, level of EWM control achieved, long-term management plans, and other pertinent issues.
13. Approved Application. The project shall be completed as shown on the application, plans, and support documents as submitted by the Permittee, and approved by this permit.
14. Non-target Impact Mitigation.
- A. Aquatic Plants: All Operators shall be capable of identifying narrow-leaved water-weed (*Elodea nuttallii*) and humped bladderwort (*Utricularia gibba*). Any observations shall be reported as identified under b.5.
 - B. Other Aquatic Organisms: All control activity shall not result in injured or killed nontarget aquatic organisms.

b. Standard Conditions

1. Reporting & Correspondence. All aforementioned, requisite correspondence directed to the Secretary pertaining to this permit, including notifications, surveys and reports, shall be (preferably) submitted via email to ANR.WSMDShoreland@vermont.gov or mailed to the following address:

Lake & Shoreland Permitting
Watershed Management Division
1 National Life Drive, Main 2
Montpelier, VT 05620-3522
2. Aquatic Invasive Species Spread Prevention. Prior to any control activity occurring, all equipment, including but not limited to boats, trailers, vehicle, and gear, that has been in or on any other waterbody, shall be decontaminated in accordance with the *Voluntary Guidelines to Prevent the Spread of Aquatic Invasive Species through Recreational Activities*, Aquatic Nuisance Species Task Force, November 2013, or its replacement.
3. Decision-makers & Operators as Permittees. A Permittee is defined to mean any person associated with aquatic nuisance control activities (activity) (1) who performs the activity or who has day-to-day control of the activity; or, (2) any person with control over the decision to perform the activity including the ability to modify those decisions. Permittees identified as (1) are referred to in this permit as Operators while Permittees identified as (2) are referred to in this permit as Decision-makers. More than one Operator may be responsible for complying with this permit. Permittees are defined as a Decision-maker, as an Operator, or as both. When a Permittee is both a Decision-maker and an Operator, the Permittee must comply with all applicable requirements.
4. Authorization Modification or Amendment. This permit may be modified or amended upon request by the Permittee or by the Secretary. Any modification under this condition shall be performed in accordance with the *Public Review and Comment Procedures for Aquatic Nuisance Control Permit Applications and General Permits*, January 30, 2003, or its replacement.
5. Rare, Threatened or Endangered Species. Encounters with any rare, threatened, or endangered species shall be reported to the Secretary immediately. If determined necessary by the Secretary, an Endangered & Threatened Species Taking Permit, per 10 V.S.A. § 5408, shall be obtained prior to commencement or continuance of activity.
6. Compliance with Other Regulations. This permit does not relieve the Permittee from obtaining all other approvals and permits prior to commencement of activity, or the responsibility to comply with any other applicable federal, state, and local laws or regulations.
7. Access to Property. By acceptance of this permit, the Permittee agrees to allow representatives of the state of Vermont access to the property covered by the permit, at reasonable times, for the purpose of ascertaining compliance with Vermont's statutes, regulations, and permit conditions.
8. Legal Responsibilities for Damages. The Secretary, by issuing this individual permit, accepts no legal responsibility for any damage direct or indirect of whatever nature and by whoever suffered arising out of the approved activity.
9. Rights & Privileges. This permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to public or private property or any invasion of personal rights, nor any infringement of federal, state, or local laws or regulations.
10. Duty to Comply & Enforcement. The Permittee shall comply with all terms and conditions of this permit. Any permit noncompliance shall constitute a violation of 10 V.S.A. § 1455 and may be cause for any enforcement action and revocation, modification, or suspension of the permit. It shall not be a defense for the Permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity to maintain compliance with the conditions of this permit.
11. Duty to Reapply. If the authorized activity is anticipated to continue after the expiration date of this permit, the Permittee shall reapply for coverage under a new permit sixty (60) days prior to the expiration date of this permit.

12. Twenty-four Hour Non-compliance Reporting. Unless provided otherwise by this permit, the Permittee shall report any noncompliance which may endanger public health or the environment. Any such information shall be provided within 24 hours from the time the Permittee becomes aware of the circumstances. A written submission shall also be provided within 5 days of the time the Permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance, its cause; the period of noncompliance including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; as well as steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance.
13. Official Duties. This permit shall not restrict law enforcement of emergency operations or the performance of official duties by a government agency.
14. Public Access Area. In accordance with Fish and Wildlife Board Rule 641, pursuant to 10 V.S.A. § 4145(a), Vermont Department of Fish & Wildlife Access Areas shall not be used for this activity without proper authorization.
15. Reopener. If after granting this permit the Secretary determines, at his or her discretion, that there is evidence indicating that an authorized activity does not comply with the requirements of 10 V.S.A. Chapter 50, the Secretary may reopen and modify this permit to include different limitations and requirements.
16. Appeals. Pursuant to 10 V.S.A. Chapter 220, any appeal of this decision must be filed with the clerk of the Environmental Division of the Superior Court within 30 days of the date of the decision. The Notice of Appeal must specify the parties taking the appeal and the statutory provision under which each party claims party status; must designate the act or decision appealed from; must name the Environmental Division; and must be signed by the appellant or the appellant's attorney. The appeal must give the address or location and description of the property, project, or facility with which the appeal is concerned and the name of the applicant or any permit involved in the appeal. The appellant must also serve a copy of the Notice of Appeal in accordance with Vermont Rules for Environmental Court Proceedings. For further information, see the Vermont Rules for Environmental Court Proceedings available at www.vermontjudiciary.org. The address for the Environmental Division is: 32 Cherry Street; 2nd Floor, Suite 303; Burlington, VT 05401 Telephone: 802-951-1740.

c. Findings

1. Jurisdiction - 10 V.S.A. § 1455(a): Within waters of the state, no person may use pesticides, chemicals other than pesticides, biological controls, bottom barriers, structural barriers, structural controls, or powered mechanical devices to control nuisance aquatic plants, insects, or other aquatic nuisances, including lamprey, unless that person has been issued a permit by the secretary. The project, as described in permit application #2015-C07, involves the use of a pesticide to control Eurasian watermilfoil (EWM), *Myriophyllum spicatum*, within Lake Dunmore in Salisbury and Leicester. Therefore, the Department has jurisdiction under 10 V.S.A. Chapter 50.
2. Application Receipt & Review: An application, prepared and submitted by the Lake Dunmore Fern Lake Association (LDFLA), and Solitude Lake Management (SLM), was received on December 29, 2015 for an Aquatic Nuisance Control (ANC) permit for the use of SePRO Renovate OTF® and Renovate 3® under 10 V.S.A. 1455(d). It was reviewed in accordance with the Department of Environmental Conservation's *Permit Application Review Procedure*, adopted May 22, 1996.
3. Background; Aquatic Nuisance Control Permit History: The LDFLA and shoreline property owners have used numerous control methods for EWM, including bottom barriers, diver assisted suction harvesting, mechanical harvesting, and the use of a biological control. ANC permits #2010-B01, #2014-B02, and #2015-B02 permitted the use of a bottom barrier. ANC permit #2010-H03 permitted diver assisted suction harvesting. ANC permit #1996-H01 permitted the use of a mechanical harvester. ANC permit #2012-W01 permitted the use of a biological control (*Eurychiopsis lecontei*). All of the above mentioned ANC permits were issued for the control of the aquatic invasive plant EWM.
4. No Reasonable Nonchemical Alternative Available – 10 V.S.A. 1455(d)(1): Based on the current extent of EWM coverage, spot-treatment with Renovate OTF® and Renovate 3® is a reasonable alternative to

minimize further establishment of EWM, to avoid additional displacement of native species, and to restore navigation access and other recreational uses. Additional details of the proposed herbicide treatment program are provided in the Approved Application. Non-chemical alternatives, such as bottom barriers, mechanically powered devices, biological controls, diver assisted suction harvesting, and hand-pulling have been employed on Lake Dunmore previously. However, dense growth of EWM in specific locations as identified on the Approved Application are better suited to be controlled by an herbicide spot-treatment program in addition to the aforementioned non-chemical control methods.

The Secretary has determined that there is no reasonable nonchemical alternative available.

5. Nontarget Environment – 10 V.S.A. 1455(d)(2): One rare species, *Utricularia gibba* (S3), was observed as being present during a survey conducted in August 2014 as described in the Approved Application. Populations of *Utricularia gibba* in other bodies of water within Vermont have not been observed to significantly change following triclopyr treatments. One additional rare species, *Elodea nuttallii* (S3), was last observed in 1984 in Lake Dunmore. The Permittee will report any observation of rare, threatened, or endangered species in accordance with this permit.

To mitigate the risk of introduction or transport of non-native, aquatic invasive species proper spread prevention measures must be taken. Thus, prior to any control activity occurring, all equipment (such as a boat, trailer, vehicle, and gear) that has been in or on any other waterbody, will be decontaminated in accordance with the [Voluntary Guidelines to Prevent the Spread of Aquatic Invasive Species through Recreational Activities](#), Aquatic Nuisance Species Task Force, November 2013, or its replacement.

The Secretary has determined that there is acceptable risk to the nontarget environment.

6. Public Health – 10 V.S.A. 1455(d)(3): At the request of the Secretary, the Vermont Department of Health (VDH), Radiological and Toxicological Science Program has reviewed and provided recommendations pertaining to the risk of the proposed activity to public health, in which it examined potential concerns for public health that may be associated with exposure to Renovate OTF[®] and Renovate 3[®] as well as to any potential triclopyr metabolites. The recommended water use conditions are based upon review of current scientific information for potential health effects; half-life of the pesticide and inert compounds; complete dissolution rates; consideration of direct contact with treated waters and the manner in which it may occur; and, several health protective assumptions. The review also includes standard risk assessment procedures, knowledge of previous chemical control efforts, and the consideration that a combination of two products may be applied. Based upon the VDH's evaluation and recommendations, and the resulting permit conditions, it has been determined that human exposure is not likely to result in an increase in the level of concern for public health.

The Secretary has determined that there is negligible risk to public health.

7. Long-range Management Plan – 10 V.S.A. 1455(d)(4): A long-range management plan has been developed that incorporates a schedule of pesticide minimization that combines the initial use of a chemical treatment followed by non-chemical control methods to manage and prevent the spread of EWM. The goal of this plan is to reduce the abundance of EWM to below nuisance levels. By employing all of the components of the plan, and updating and revising it as appropriate, the LDFLA is seeking to control EWM in order to restore recreational uses as well as enhance the native aquatic plant community and habitat diversity. The LDFLA recognizes that eradication is not attainable, and EWM management is an ongoing undertaking. A diligent and sustained effort will be required to maintain EWM control below nuisance conditions.

The plan will achieve its goal provided that the chemical treatment is conducted in accordance with the conditions of this permit; the components of the plan are implemented and updated routinely; adequate, stable funding is maintained; and, a framework exists for continuing the ongoing management efforts indefinitely.

The Secretary has determined that a long-range management plan has been developed.

8. Public Benefit – 10 V.S.A. 1455(d)(5): Based upon findings c.4-7., the Secretary has determined that there is a public benefit to be achieved from the application of a pesticide.

9. Public Notification – 10 V.S.A. 1455(h): An opportunity for the public to review and comment on this application was provided in accordance with the Department of Environmental Conservation’s *Public Review and Comment Procedures for Aquatic Nuisance Control Permit Applications and General Permits*, adopted per 3 V.S.A. Chapter 25, on January 30, 2003.
10. References:
[SePRO Renovate OTF® Specimen Label](#)
[SePRO Renovate OTF® Material Safety Data Sheet](#)
[SePRO Renovate 3® Specimen Label](#)
[SePRO Renovate 3® Material Safety Data Sheet](#)

d. Authorization

By delegation from the Secretary, the Vermont Department of Environmental Conservation has made a determination that the above activity qualifies for an individual aquatic nuisance control permit. The Permittees are authorized per 10 V.S.A. § 1455(i) subject to the conditions herein specified.

This permit shall be effective on the day of signing, and expire five years thereafter.

Alyssa B. Schuren, Commissioner
Department of Environmental Conservation

By:  Perry Thomas
2016.06.02 08:37:47 -04'00'

Perry Thomas, Manager
Lakes & Ponds Management and Protection Program
Watershed Management Division

Addendum B: LDFLA Herbicide Treatment Advisory

**WARNING
AQUATIC PESTICIDE IN USE**

Due to aquatic herbicide use in Lake Dunmore and Fern Lake with SePRO Renovate OTF and Renovate 3 (active ingredient triclopyr), authorized under Aquatic Nuisance Control Permits #2016-C02 and #2016-C07 the following advisory water use restrictions are in effect for the entire lake and outlet stream.

Lake Water Advisory Use Restrictions

NO USE of Lake Dunmore or Fern Lake waters and water from their outlet streams FOR ANY PURPOSE including boating, fishing, swimming, domestic (household) use or irrigation, the day of treatment on	June 15, 2016
Swimming/wading, boating and fishing may resume on	June 17, 2016
WATER USE from Lake Dunmore and Fern Lake and from their outlet streams FOR DOMESTIC PURPOSES other than drinking and using such waters to prepare food and drink may resume on	June 17, 2016
WATER USE from Lake Dunmore and Fern Lake and from their outlet streams DRINKING AND USING SUCH WATERS TO PREPARE FOOD AND DRINK may resume on	TBD*
NO USE of water from Lake Dunmore and Fern Lake and from their outlet streams FOR IRRIGATION PURPOSES including for watering lawns, trees, shrubs or plants may resume on	TBD*



*Herbicide residue test results will be posted on LDFLA website: www.ldfla.com

Bottled water is available at the Kampersville Store and the Waterhouse’s Camp Store to any person restricted from using their domestic water supply for drinking or food or drink preparation.

Any person who chooses to ignore these use advisories does so at their own risk.

For additional information contact:
 Marc Bellaud, SŌlitude Lake Management
 590 Lake St, Shrewsbury, MA 01545
 508-865-1000

Misha Cetner, VT Dept of Environmental Conservation
 1 National Life Drive, Montpelier, VT 05602
 802-490-6199

Addendum C: Solitude Herbicide Treatment Report



Project Completion Report 2016 Renovate Herbicide Treatment Program Lake Dunmore & Fern Lake Leicester and Salisbury, Vermont

Prepared by: SOLitude Lake Management
590 Lake Street
Shrewsbury, MA 01545

Prepared for: Lake Dunmore Fern Lake Association
P.O. Box 14
Salisbury, VT 05769

The following will serve as the year-end report for the Renovate herbicide treatment program performed at Lake Dunmore and Fern Lake in 2016 for control of Eurasian watermilfoil (*Myriophyllum spicatum*). The treatment was performed under ANC Permits #2015-C07 & 2016-CO2 that were issued to the Lake Dunmore and Fern Lake Association (LDFLA) and SOLitude Lake Management. The following report details the treatment and herbicide residue monitoring tasks conducted by SOLitude Lake Management during the 2016 season.

Introduction and Management History

Lake Dunmore is a 985-acre lake located in Salisbury and Leicester, Vermont. Presence of the invasive aquatic plant Eurasian watermilfoil (EWM) was first confirmed in the lake in 1988. Volunteer control efforts were initiated immediately, but after a second infestation was discovered at the north end of the lake in 1994 a more comprehensive, paid management program began. Eurasian watermilfoil control efforts have continued and grown to a current budget that exceeds \$300,000 annually. The program was initially developed and it continues to be coordinated and overseen by the LDFLA. Funding is provided by LDFLA, along with contributions from the Towns of Salisbury and Leicester and the Vermont Aquatic Nuisance Control Grant in Aid program. Program elements include a Greeter Program at the State Boat Launch and an extensive diver hand-pulling and suction-harvesting program. More than 20 people were employed for these efforts during the 2015 season, along with significant volunteer contributions.

EWM control efforts at Lake Dunmore have expanded as the EWM distribution and density has increased over the years. In 2013, an estimated 3600 bushels of EWM were removed from the lake. This number expanded to 5500 bushels in 2014. Seeing the accelerated EWM growth and expansion in recent years, prompted LDFLA to evaluate alternate management strategies. Based on the positive recent experiences of other Vermont lakes, LDFLA decided to consider the use of aquatic herbicides as part of an integrated management effort.

Darrin Fresh Water Institute (DFWI) was hired to conduct comprehensive aquatic plant surveys during the summers of 2014 and 2015. SOLitude Lake Management (formerly Aquatic Control Technology) was also contracted to survey the lake in the summer of 2015 to make specific recommendations for the use of aquatic herbicides. **Competitively Sensitive & Proprietary Materials** – The information contained herein is the intellectual property of SOLitude Lake Management. Recipient may not disclose to any outside party any proprietary information, processes, or pricing contained in this document or any of its attachments without the prior written consent of SOLitude Lake Management. This document is provided to the recipient in good faith and it shall be the responsibility of the recipient to keep the information contained herein confidential.

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herbicides at Lake Dunmore. Given the size and configuration of the milfoil infestation documented by DFWI and SÖLitude, a treatment approach using both granular and liquid formulations of Renovate was recommended.

Based on the recommendations the LDFLA prepared and filed a permit application with VT DEC in the winter of 2015/16. ANC Permits #2015-C07 & 2016-C02 were issued on 05/17/16 and 06/02/16, respectively.

2016 Treatment Program Chronology

A chronology of the 2016 treatment program is provided below:

- DEC permit issuance ANC Permit # 2015-C07 (Dunmore) #2016-C02 (Fern) 5/17 & 6/2/16
- Pre-treatment inspection to confirm active milfoil growth 5/25
- Renovate OTF & Renovate 3 Treatment 6/16
- Renovate herbicide residue monitoring (2 rounds, 16 samples) 6/17 & 6/20
- Post-treatment inspection to confirm milfoil control 8/11

2016 Triclopyr Herbicide Treatment Program Protocol

Based on the recent treatment experiences with triclopyr herbicide at the other Vermont lakes the treatment at Lake Dunmore and Fern Lake was delayed until mid-June to allow milfoil plants to mature and begin to fill the water column. We have found that plant growth should be optimally two-thirds to three-quarters the height of the water column to provide more stem/leaf surface area to maximize herbicide uptake and help slow dilution caused by water movement. Treatment was also performed as a split-treatment whereby approximately 70% of the herbicide was applied; then the remaining 30% was applied several hours later. This approach helps extend the herbicide concentration-exposure-time and improve treatment efficacy.

Both Renovate 3 (liquid) and Renovate OTF (granular) formulations of triclopyr herbicide were used at Lake Dunmore and Fern Lake. The granular formulation has proven to be effective for steeply sloped areas, smaller EWM beds and in areas where there is potential for excessive dilution from untreated water. The liquid formulation was used in larger treatment blocks and cove areas that were not subject to as much dilution. The application rate was determined by the size and configuration of the individual treatment areas but ranged between 2.0 – 2.25 ppm of triclopyr in the bottom four feet of the water column with Renovate OTF granular and 0.75-1.5 ppm of Renovate 3 liquid in the entire water column.

Summary of 2016 Treatment Program

The herbicide treatment was performed on June 15, 2016. The granular Renovate OTF herbicide was applied using a calibrated educator system. The liquid Renovate 3 herbicide was injected at depth subsurface using weighted hoses that trail the spray boat. An onboard GPS unit was used to provide real-time guidance and ensure an even application in each of the treated areas. A total of 3972 pounds of Renovate OTF and 530 gallons of Renovate 3 were applied. Treatment at both Lake Dunmore and Fern Lake took approximately 10.75 hours to complete.

A breakdown of the treatment areas and dosing used for each treatment area is provided below:

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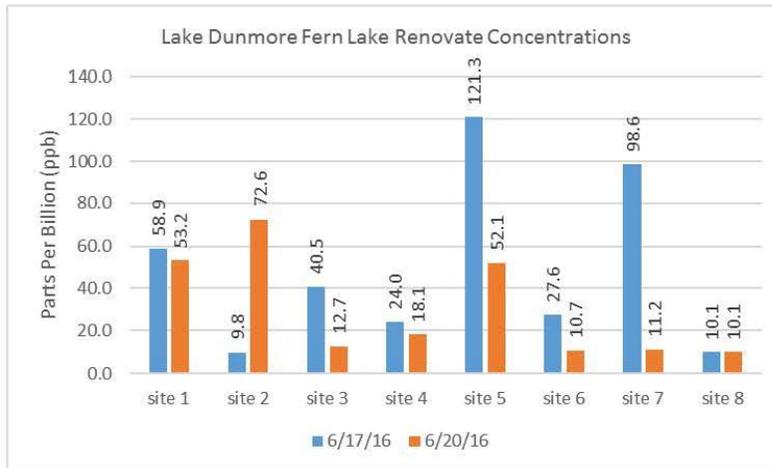
SITE	DESCRIPTION	ACREAGE	DEPTH	TYPE	RATE	gals/lbs
A	North Bay	17.4	6.0	Renovate 3	8	141
B	Northwest boat ramp cove	0.6	4.0	Renovate OTF	240	144
C	Spine	44.8	6.0	Renovate 3	8	363
D2	South center patch	7.1	6.0	Renovate OTF	360	2556
F	South end	1.3	4.0	Renovate OTF	240	312
H	Fern Lake - northeast cove	3.2	6.0	Renovate 3	8	26
I	Fern Lake - south end	4.0	4.0	Renovate OTF	240	960
	TOTAL	78.4				

Herbicide Residue Testing Summary

In compliance with conditions of the ANC Permits #2015-C07 & 2016-CO2, water samples were collected from seven (7) in-lake locations and one (1) downstream location approximately 48-hours and 120-hours following treatment (Figure 2). A total of 16 samples were analyzed. Samples were collected from the designated locations by the LDFLA representatives and were shipped via overnight delivery to SePRO’s laboratory in Whittakers, North Carolina.

Triclopyr concentrations dropped quickly in Lake Dunmore and Fern Lake and only 2 samples collected 48-hrs post-treatment were above the 75ppb domestic use threshold. By the time of the second sampling round on June 20, approximately 120 hrs. post treatment all eight sample locations were below 75ppb so domestic water use restrictions were lifted and sampling was stopped.

Sample results are summarized below:



Observations of Impacts to Aquatic Plants

A post-treatment survey was performed on 8/11/16. During the survey the extent of each treatment area was inspected and plants were identified using an underwater camera and collection with a throw rake.

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Overall treatment appeared to have worked very well and control of milfoil within the treatment areas was nearly complete. Some milfoil growth was evident immediately outside of the treatment areas especially the deeper portion of the Spine where dilution was the greatest.

Impacts to native species were negligible with dense cover of native species observed throughout most of the treated areas. Native plant growth was significantly more abundant in Lake Dunmore with an estimated average cover of greater than 80% dominated by Robbins pondweed (*Potamogeton robbinsii*), largeleaf pondweed (*Potamogeton amplifolius*), common waterweed (*Elodea canadensis*), Stonewort (*Nitella/Chara.*) with mixed densities of Illinois pondweed (*Potamogeton illinoensis*), tapegrass (*Vallisneria americana*), bushy pondweed (*Najas flexilis*) and whitestem pondweed (*Potamogeton praelongus*). Plant cover in Fern Lake was considerably lower than in Lake Dunmore with patchy low-moderate density growth dominated by stonewort, bushy pondweed and Illinois pondweed. Scattered growth of thinleaf pondweed (*Potamogeton pusillus*), whitestem pondweed, water stargrass (*Zosterella dubia*) as well as yellow and white lilies (*Nuphar & Nymphaea*) were also documented.

Summary

Results from the 2016 Renovate (triclopyr) treatment program were good with nearly complete control of milfoil in the treated areas of Lake Dunmore and Fern Lake. Based on our experiences at other Vermont lakes we expect some level of regrowth in 2017 and recommend that the LDFLA aggressively remove regrowth by hand-pulling/suction harvesting in these areas. No herbicide is capable of completely exhausting the plant's starch reserves so recovery of mature milfoil root systems is expected. Long-term control of milfoil will require diligent hand-pulling/suction harvesting of persistent regrowth and prudent use of aquatic herbicides to control areas too large or too dense to be effectively removed by suction harvesting.

Unless alternative herbicides are permitted for use at the lake(s), or new products become available, it is likely that the use of Renovate (triclopyr) will remain the most appropriate herbicide option for milfoil control at Lake Dunmore and Fern Lake. As we have seen at other sites, the contact exposure time (CET) when using Renovate is critical for achieving good milfoil control so future treatment area will continue to be evaluated based on size, shape and location to determine the appropriate formulation, dose and treatment timing.

Enclosures: Appendix

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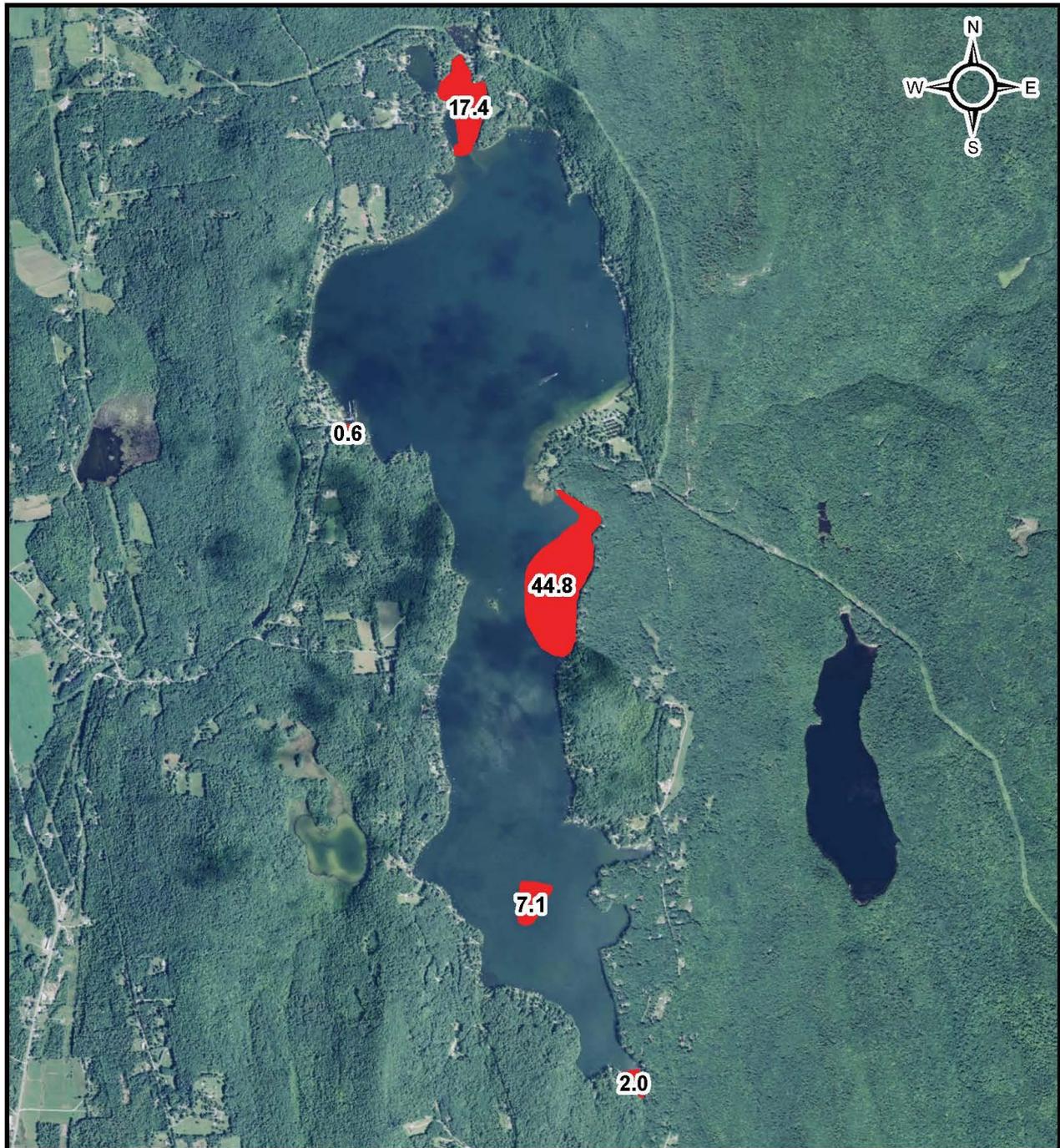


APPENDIX

- Figure 1 Treatment Areas – Lake Dunmore
- Figure 2 Treatment Areas – Fern Lake
- Figure 3 GPS Recorded Treatment Path
- Figure 4 Sample Location Map
- Triclopyr Residue Testing Laboratory Reports

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Lake Dunmore
 Leicester/Salisbury, Vermont
 2016 Herbicide
 Treatment Areas REVISED

FIGURE:	SURVEY DATE:	MAP DATE:
1	05/25/16	06/09/16

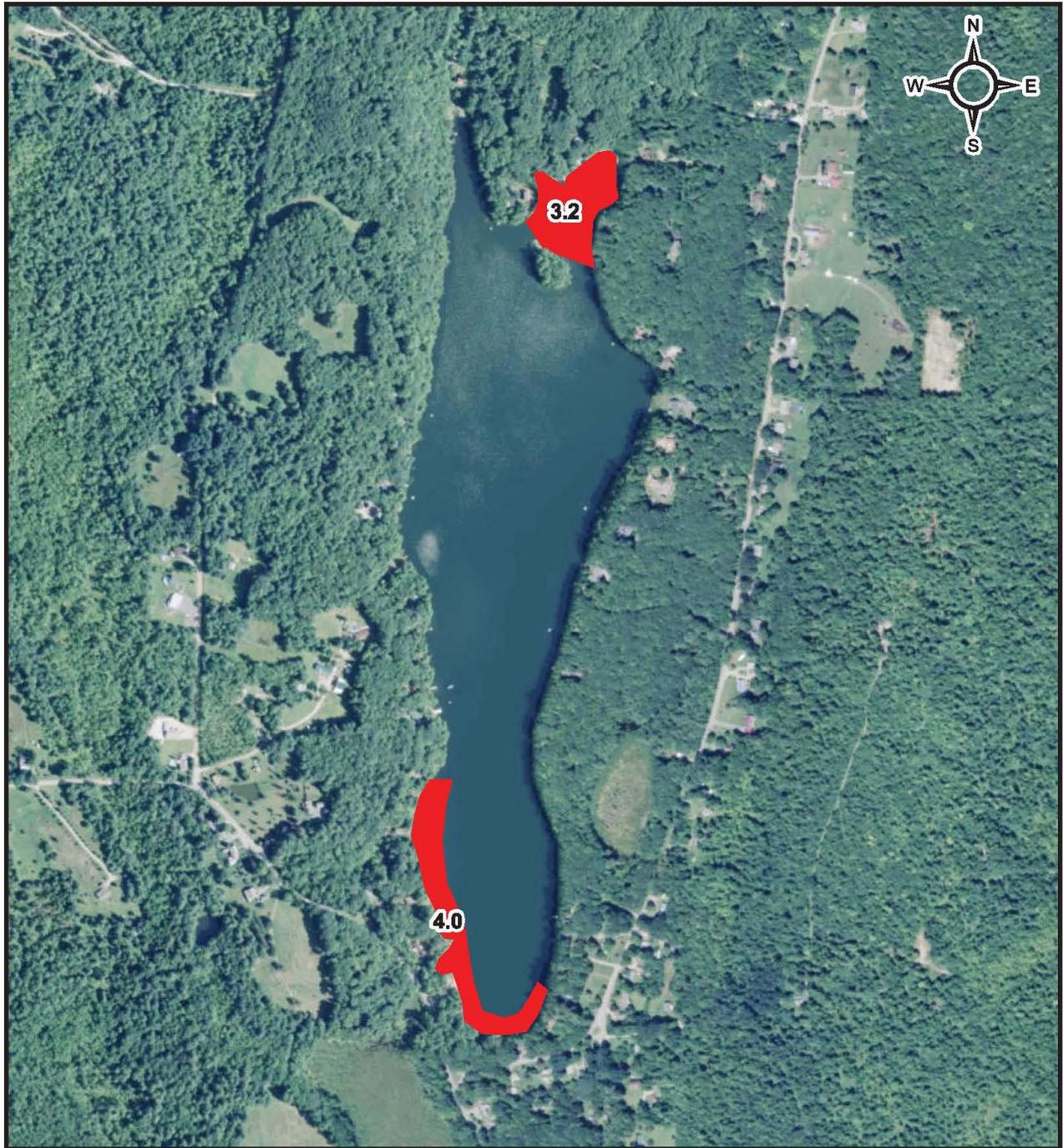
Legend:

 Treatment Areas (71.9 ac)

0 500 1,000 2,000 3,000 4,000
 Feet

SOLITUDE
 LAKE MANAGEMENT





Fern Lake
 Leicester/Salisbury, Vermont
 2016 Herbicide
 Treatment Areas

FIGURE:	SURVEY DATE:	MAP DATE:
3	05/25/16	05/27/08

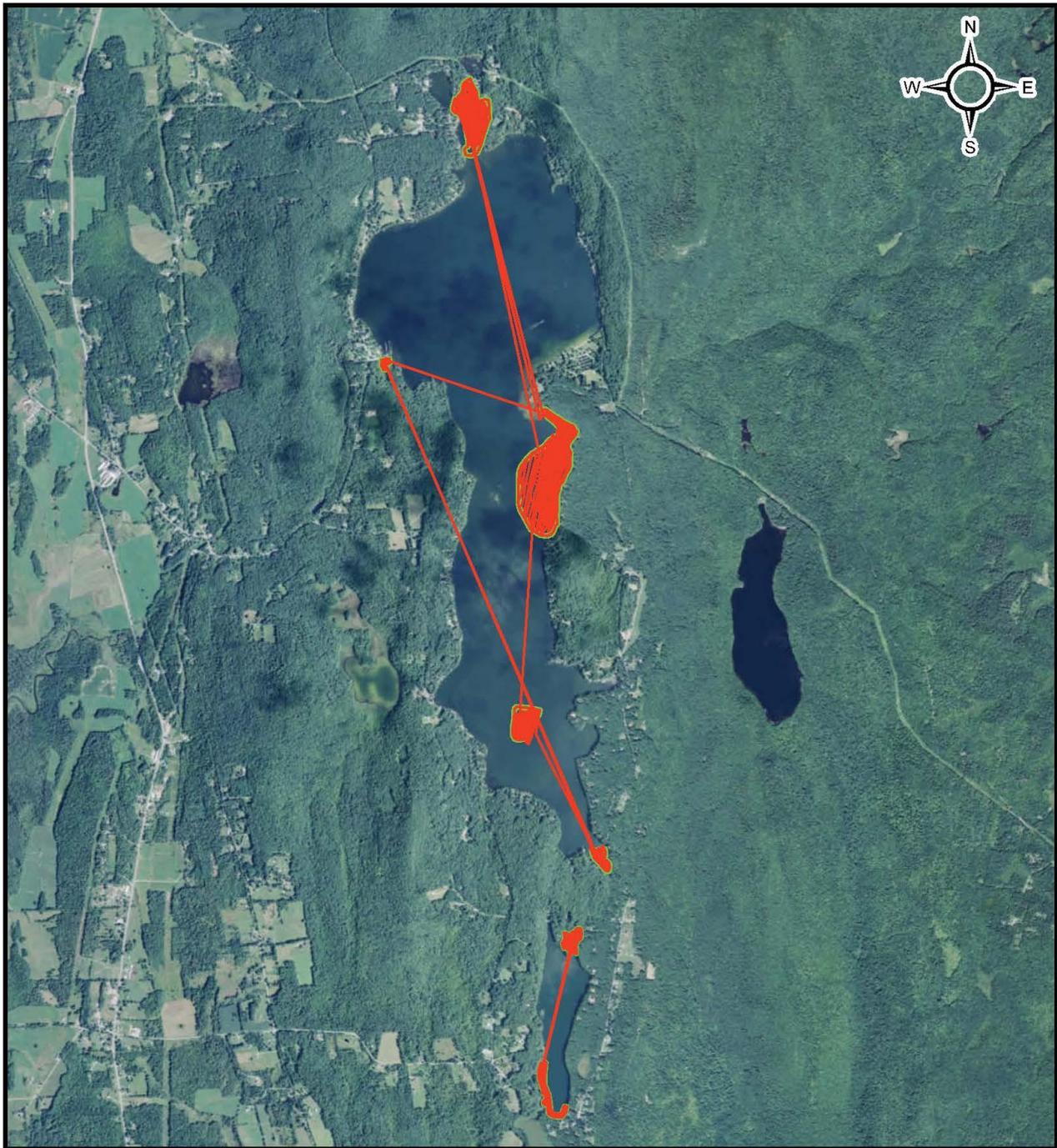
Legend:

 Treatment Areas (7.2 ac)

0 500 1,000
 Feet

SOLITUDE
 LAKE MANAGEMENT

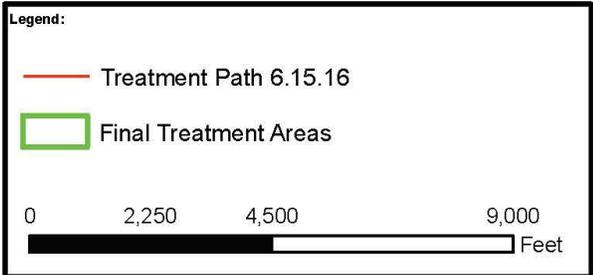


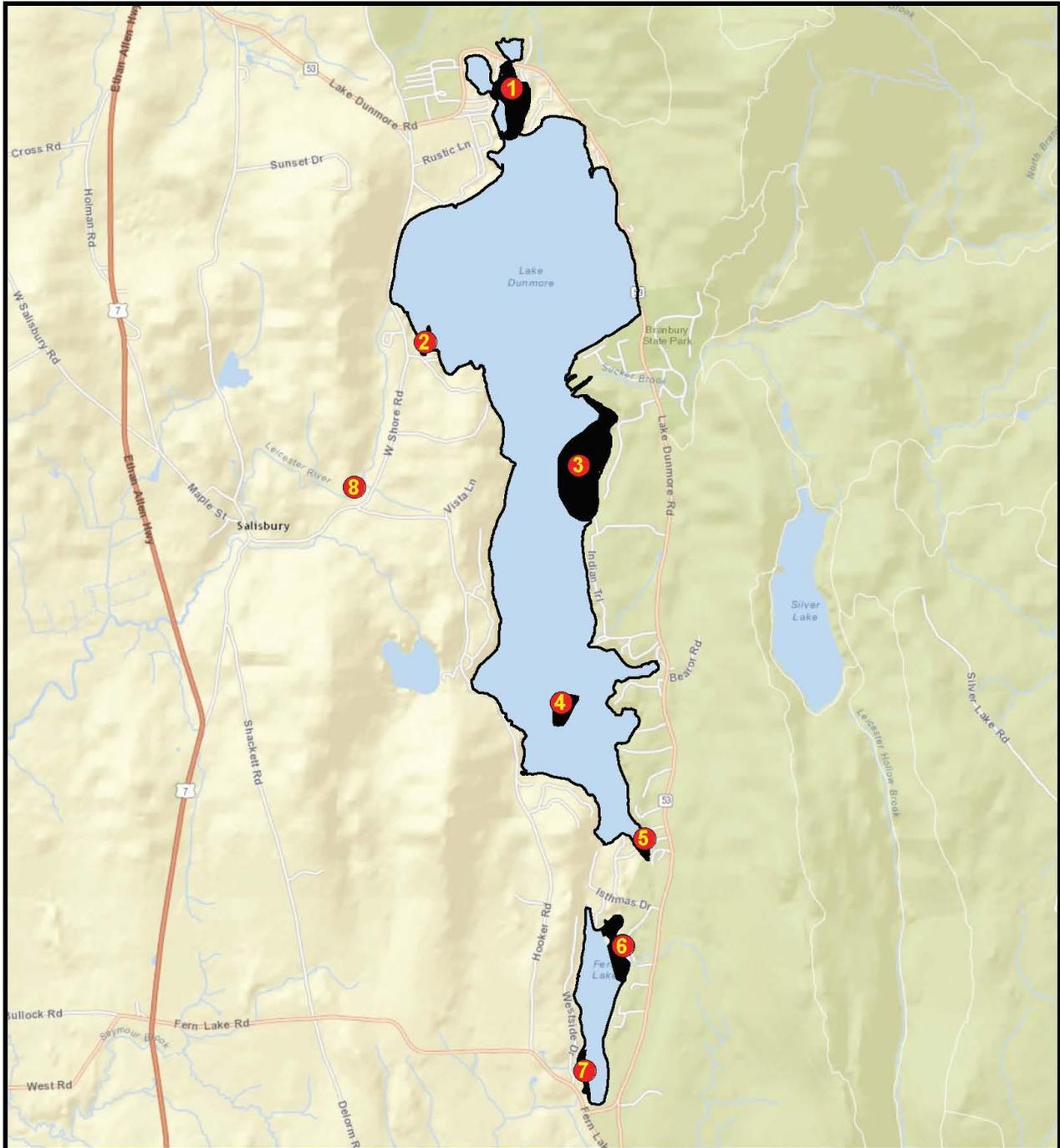


Dunmore Lake & Fern Lake
 Leicester/Salisbury, Vermont

2016 Herbicide
 Treatment Areas

FIGURE:	TREATMENT DATE:	MAP DATE:
3	6/15/16	6/21/16





Lake Dunmore & Fern Lake
 Leicester/Salisbury, Vermont
 FasTest Sample Locations

FIGURE:	SURVEY DATE:	MAP DATE:
4	--	--

Legend:

- Proposed FasTest Sample Locations

0 1,000 2,000 4,000 Feet

N

AQUATIC CONTROL TECHNOLOGY

11 JOHN ROAD
 SUTTON, MASSACHUSETTS 01590
 PHONE: (508) 885-1000
 FAX: (508) 885-1220
 WEB: WWW.AQUATICCONTROLTECH.COM

Chain of Custody: 2016-63969-00

LABORATORY REPORT

Page 1 of 2 Total

Customer Company

Company Name: SOLitude Lake Management
Address:
Shrewsbury, MA 01545

Customer Contact

Contact Person: Brea Arvidson
E-Mail Address:
Phone:
Fax:

Waterbody Information

Waterbody: Waterbody Name - Dunmore Lake Waterbody Size (acres): 985 Depth Average: 28

Sample Information

Lab ID	Sample Location	Test Method	Results	Sampling Date	Sampling Time	Temp at Receipt (C)
43590	1	Renovate/Triclopyr (µg/L) SOP: FAST 02	58.9	06/17/2016		
43591	2	Renovate/Triclopyr (µg/L) SOP: FAST 02	9.8	06/17/2016		
43592	3	Renovate/Triclopyr (µg/L) SOP: FAST 02	40.5	06/17/2016		
43593	4	Renovate/Triclopyr (µg/L) SOP: FAST 02	24	06/17/2016		
43594	5	Renovate/Triclopyr (µg/L) SOP: FAST 02	121.3	06/17/2016		
43595	6	Renovate/Triclopyr (µg/L) SOP: FAST 02	27.6	06/17/2016		
43596	7	Renovate/Triclopyr (µg/L) SOP: FAST 02	98.6	06/17/2016		
43597	8	Renovate/Triclopyr (µg/L) SOP: FAST 02	10.1	06/17/2016		

Original

Chain of Custody: 2016-63970-00

LABORATORY REPORT

Page 1 of 2 Total

Customer Company

Company Name: SOLitude Lake Management
Address:
Shrewsbury, MA 01545

Customer Contact

Contact Person: Brea Arvidson
E-Mail Address:
Phone:
Fax:

Waterbody Information

Waterbody: Waterbody Name - Dunmore Lake Waterbody Size (acres): 985 Depth Average: 28

Sample Information

Lab ID	Sample Location	Test Method	Results	Sampling Date	Sampling Time	Temp at Receipt (C)
43598	1	Renovate/Triclopyr (µg/L) SOP: FAST 02	53.2	06/20/2016		
43599	2	Renovate/Triclopyr (µg/L) SOP: FAST 02	72.6	06/20/2016		
43600	3	Renovate/Triclopyr (µg/L) SOP: FAST 02	12.7	06/20/2016		
43601	4	Renovate/Triclopyr (µg/L) SOP: FAST 02	18.1	06/20/2016		
43602	5	Renovate/Triclopyr (µg/L) SOP: FAST 02	52.1	06/20/2016		
43603	6	Renovate/Triclopyr (µg/L) SOP: FAST 02	10.7	06/20/2016		
43604	7	Renovate/Triclopyr (µg/L) SOP: FAST 02	11.2	06/20/2016		
43605	8	Renovate/Triclopyr (µg/L) SOP: FAST 02	10.1	06/20/2016		

Original

Addendum D: Darrin Post Treatment Report

Interim Report on the Aquatic Vegetation of Lake Dunmore and Fern Lake, Salisbury, Vermont

Lawrence Eichler
Darrin Fresh Water Institute
Bolton Landing, NY 12814
(518) 644-3541 (voice) (581) 644-3640 (fax)
eichll@rpi.edu

1. Background.

At the request of Mr. Brett Zimmermann of the Lake Dunmore Fern Lake Association, quantitative aquatic plant surveys were undertaken for Lake Dunmore and Fern Lake, Vermont. The survey consisted of frequency of occurrence and relative abundance data for all aquatic plant species present in points distributed throughout both lakes. The Point-Intercept Rake Toss method presently used by the US Army Corps of Engineers and others was employed. The assessment ultimately will include the distribution and density of existing aquatic plant communities, the extent of exotic species infestation and a review of ongoing management efforts to control Eurasian watermilfoil (*Myriophyllum spicatum*).

2. Methods

2a. Species List and Herbarium Specimens. As each lake was surveyed, the occurrence of each aquatic plant species observed in the lake was recorded and herbarium specimens collected where necessary. The herbarium specimens were pressed, dried, and mounted (Hellquist 1993). Specimens were photographed and became part of the permanent collection at the Darrin Fresh Water Institute Laboratory in Bolton Landing, NY. All taxonomy is based on Crow & Hellquist, 2000.

2b. Point Intercept. The frequency and diversity of aquatic plant species were evaluated using a point intercept method (Madsen 1999). At each grid point intersection, all species located at that point were recorded, as well as water depth. Species were located by a visual inspection of the point and by deploying a rake to the bottom, and examining the plants retrieved. A total of 54 points were selected for Fern Lake, and 106 points were surveyed for Lake Dunmore, based on a 100 m grid. A global positioning system (GPS) was used to navigate to each point for the survey observation. Point intercept plant frequencies were surveyed on October 12, 2016 at a time of maximum aquatic plant abundance. Data presented in the summary are on a whole-lake basis, and have not been adjusted for the littoral zone only.

3. Results

3a. Species List. A total of 30 species of aquatic plants have been observed in Lake Dunmore and 14 species were reported in Fern Lake (Table 1). The aquatic plant community of Lake Dunmore included twenty submersed species, four floating-leaved species and six emergent species. This number of species greatly exceeds the 15 species typically reported for moderately productive lakes in our region and indicates good water quality and a variety of habitat types. One of the species present in Lake Dunmore, Humped Bladderwort (*Utricularia gibba*) is found on Vermont's rare plant list (VT DEC 2012). For Fern Lake, the aquatic plant community included ten submersed species, two floating-leaved species and four emergent species. None of the species reported for Fern Lake were on Vermont's rare plant list. With the exception of Eurasian watermilfoil, all other species were native to our region.

3b. Species Frequency. Species richness in Lake Dunmore remains high, with a large number of species occurring in more than 5% of survey points (Table 2). Robbins pondweed (*Potamogeton robbinsii*) was the most common plant (34% of survey points). Eurasian watermilfoil (*Myriophyllum spicatum*) was present in 6% of survey points a decrease from the 27% reported in 2015 and 18% reported in 2014. A number of native species were also commonly observed. Common native species for Lake Dunmore included *Potamogeton robbinsii* (34% of survey points), *Potamogeton illinoensis* (25%), *Chara/Nitella* (25%), *Elodea canadensis* (21%), *Potamogeton amplifolius* (18%), *Najas flexilis* (14%), *Vallisneria americana* (11%), *Sagittaria graminea* (9%) and *Potamogeton gramineus* (6%).

For Fern Lake, Illinois pondweed (*Potamogeton illinoensis*) was the most common species, present in 37% of survey points in 2016. Eurasian watermilfoil (*Myriophyllum spicatum*) was found in 11% of survey points, a decline from 48% observed in 2015. A number of native species were commonly observed. Common native species for Fern Lake included *Potamogeton illinoensis* (37% of survey points), *Sagittaria graminea* (11%), *Potamogeton praelongus* (9%), *Chara/Nitella* (9%), and *Potamogeton pusillus* (4%).

3c. Distribution of Eurasian watermilfoil. Eurasian watermilfoil occurred throughout Lake Dunmore and Fern Lake (Figures 1 and 2), with scattered growth found from a minimum depth of 2 feet (0.5 m) in both lakes to a maximum depth of 16 feet (5 m) in Lake Dunmore and 19 feet (6 m) in Fern Lake. Macroalgae or charophytes form a carpet at the outer margin of aquatic plant growth, in depths from 19 to 22 feet (6 to 7 m) in Lake Dunmore and 19 to 32 feet (6 to 10 m) in Fern Lake. For Lake Dunmore, Eurasian watermilfoil reached its maximum abundance in the north cove in 2015 (Figure 1) with slightly greater density than observed in 2014. Following an herbicide treatment in 2016, Eurasian watermilfoil declined sharply to 6% of survey points, with scattered growth predominantly on the eastern shore and in the area known as the spine. In Fern Lake, Eurasian watermilfoil formed moderate to dense stands to the northwest of the boat launch (Figure 2), in the center of the lake, along the eastern shore and at the north end in 2015. In 2016 following an herbicide treatment, Eurasian watermilfoil was only present in Fern Lake as scattered plants in a few locations. The exception was the northwest cove where a dense bed of Eurasian watermilfoil remained.

Figure 1. Distribution of Eurasian watermilfoil (*Myriophyllum spicatum*) in Lake Dunmore in 2014 thru 2016.

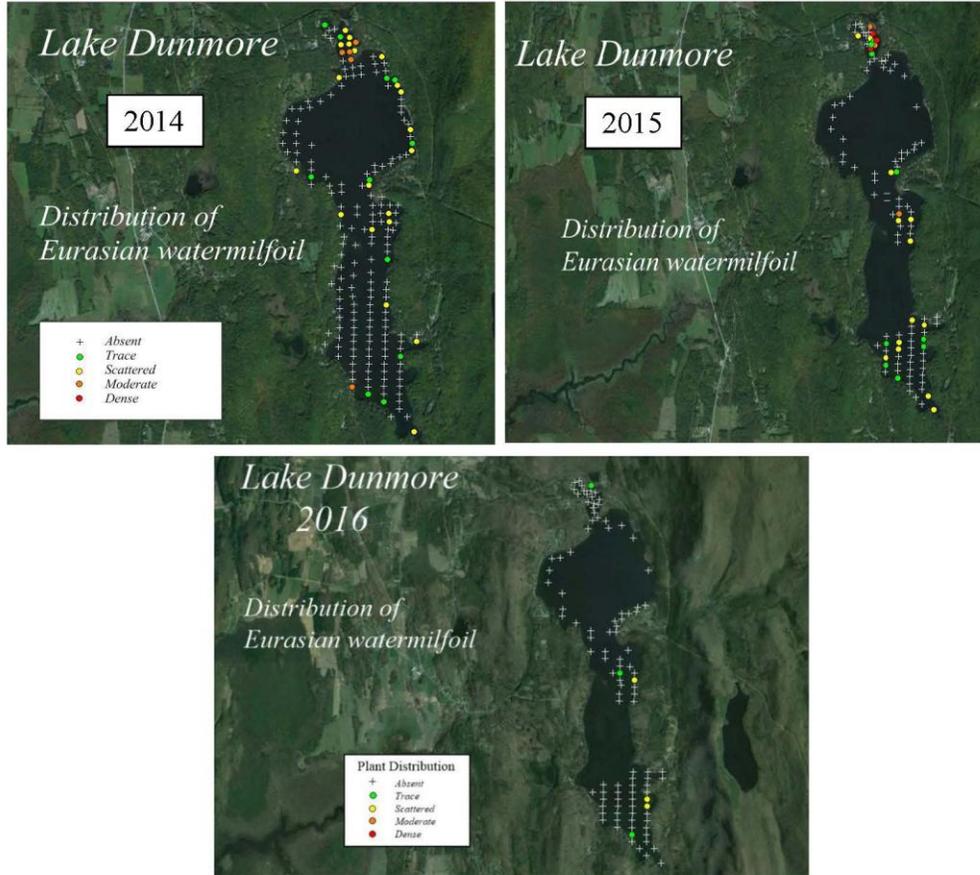
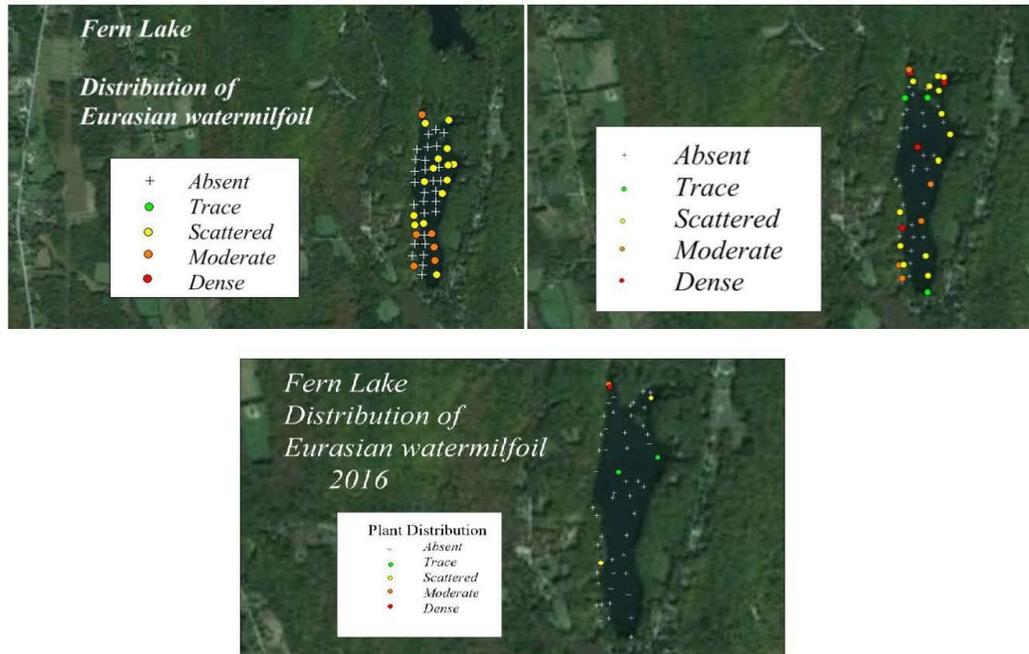


Figure 2. Distribution of Eurasian watermilfoil (*Myriophyllum spicatum*) in Fern Lake in 2014 thru 2016.



4. References

- Getsinger, K.D., R.M. Stewart, J.D. Madsen, A.S. Way, C.S. Owens, H.A. Crosson, and A.J. Burns. 2002. Use of Whole-Lake Fluridone Treatments to Selectively Control Eurasian Watermilfoil in Burr Pond and Lake HORTONIA, Vermont. US Army Corps of Engineers, Engineer Research and Development Center, Aquatic Plant Control Research Program. ERDC/EL TR-02-39.
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- Madsen, J.D. 1999. Point intercept and line intercept methods for aquatic plant management. US Army Engineer Waterways Experiment Station Aquatic Plant Control Research Program Technical Note CC-02, Vicksburg, MS.
- VT DEC. 2012. Rare and Uncommon Native Vascular Plants of Vermont. Vermont Natural Heritage Inventory. Vermont Fish & Wildlife Department. 21 November 2012. www.vtfishandwildlife.com/.../List_of_Rare_and_Uncommon_Native_Plants_of_Vermont.pdf

Table 1. Species list for Lake Dunmore and Fern Lake.

<i>Species</i>	Common Name	Lake Dunmore	Fern Lake
<i>Brasenia schreberi</i> J.F. Gmel	watershield	fl	
<i>Ceratophyllum demersum</i> L.	coontail	s	
<i>Chara/Nitella</i> sp.	muskgrass, chara	s	s
<i>Eleocharis acicularis</i> (L.) Roemer & Schultes	needle spike-rush	e	e
<i>Elodea canadensis</i> Michx.	waterweed	s	s
<i>Fontinalis</i> sp.	moss	s	
<i>Isoetes echinospora</i> Dur.	quillwort	e	
<i>Megalodonta beckii</i> Torr.	white water crowfoot	s	
<i>Myriophyllum tenellum</i> L.	leafless watermilfoil	s	
<i>Myriophyllum spicatum</i> L.	Eurasian watermilfoil	s	s
<i>Najas flexilis</i> (Willd.) Rostk. & Schmidt.	bushy pondweed	s	s
<i>Nuphar variegata</i> Engelm. ex Durand	yellow pondlily	fl	fl
<i>Nymphaea odorata</i> Ait.	white pondlily	fl	fl
<i>Nymphoides cordatum</i> (EIL.) Fern.	floating heart	fl	
<i>Polygonum amphibium</i>	smartweed		e
<i>Pontederia cordata</i> L.	pickersweed	e	e
<i>Potamogeton amplifolius</i> Tuckerm.	largeleaf pondweed	s	
<i>Potamogeton epihydrus</i> Raf.	variable-leaf pondweed	s	
<i>Potamogeton gramineus</i> L.	small pondweed	s	
<i>Potamogeton illinoensis</i> Morong	Illinois pondweed	s	s
<i>Potamogeton praelongus</i> Wulf.	White-stem pondweed	s	s
<i>Potamogeton pusillus</i> L.	Narrow-leaf pondweed	s	s
<i>Potamogeton robbinsii</i> Oakes	Robbins pondweed	s	
<i>Potamogeton spirillus</i> Tuckerm.	pondweed		s
<i>Sagittaria graminea</i> Michx.	arrowhead	s	s
<i>Scirpus</i> sp.	rush	e	
<i>Sparganium</i> sp.	burreed	e	
<i>Typha</i>	cattail	e	e
<i>Utricularia gibba</i> Hayne	bladderwort	s	
<i>Utricularia vulgaris</i> L.	giant bladderwort	s	
<i>Vallisneria americana</i> L.	wild celery	s	
<i>Zosterella dubia</i> (Jacq.) Small	water stargrass	s	s

fl=floating leaved e=emergent s=submersed

Table 2. Aquatic plant percent frequency by species for surveys of Lake Dunmore and Fern Lake in 2014 thru 2016.

Species	Dunmore			Fern		
	2014	2015	2016	2014	2015	2016
<i>Brasenia schreberi</i>	1.0%		1.0%			
<i>Ceratophyllum demersum</i>	0.5%	0.9%				
<i>Chara/Nitella</i>	26.5%	25.5%	24.8%	16.7%	7.4%	9.3%
<i>Eleocharis acicularis</i>	0.5%	1.9%	4.8%	7.4%	3.7%	1.9%
<i>Elodea canadensis</i>	33.7%	33.0%	21.0%	1.9%	3.7%	
<i>Isoetes echinospora</i>	1.5%					
<i>Megalodonta beckii</i>	1.5%	1.9%	2.9%			
<i>Lemna minor</i>		0.9%				
<i>Myriophyllum tenellum</i>	2.6%	0.9%			1.9%	
<i>Myriophyllum spicatum</i>	18.4%	27.4%	5.7%	48.1%	48.1%	11.1%
<i>Najas flexilis</i>	27.6%	24.5%	14.3%	46.3%	16.7%	
<i>Nuphar variegata</i>	0.5%	1.9%	1.0%	1.9%	5.6%	3.7%
<i>Nymphaea odorata</i>	1.5%	1.9%	1.0%	7.4%	22.2%	16.7%
<i>Polygonum amphibium</i>					5.6%	1.9%
<i>Pontederia cordata</i>			1.0%			
<i>Potamogeton amplifolius</i>	10.2%	15.1%	18.1%			
<i>Potamogeton epihydrus</i>	0.5%		1.0%			
<i>Potamogeton gramineus</i>	4.6%	3.8%	5.7%			
<i>Potamogeton illinoensis</i>	12.2%	17.0%	24.8%	37.0%	33.3%	37.0%
<i>Potamogeton praelongus</i>	0.5%	1.9%	1.9%	7.4%	18.5%	9.3%
<i>Potamogeton pusillus</i>	3.1%	4.7%	2.9%	9.3%	5.6%	3.7%
<i>Potamogeton robbinsii</i>	30.1%	29.2%	34.3%			
<i>Potamogeton spirillus</i>				3.7%	1.9%	
<i>Potamogeton sp. 1</i>	2.6%	0.9%	1.9%			
<i>Sagittaria graminea</i>	2.6%	2.8%	8.6%	11.1%	16.7%	11.1%
<i>Sparganium sp.</i>	1.5%		1.9%			
<i>Stuckenia pectinata</i>		0.9%				
<i>Utricularia sp.</i>				0.5%		
<i>Utricularia gibba</i>	1.0%		1.0%			
<i>Utricularia vulgaris</i>	1.5%	0.9%				
<i>Vallisneria americana</i>	18.9%	21.7%	11.4%			
<i>Zosterella dubia</i>	6.1%	6.6%	2.9%	13.0%	1.9%	

Addendum E: Press Release

TOWN OF LEICESTER RECEIVES STATE GRANT TO CONTROL INVASIVE LAKE SPECIES

LEICESTER—June 14, 2016—The Town of Leicester has been awarded a \$50,000 grant from the State of Vermont Department of Environmental Conservation (DEC) to help control invasive species on Lake Dunmore and Fern Lake, located in the towns of Leicester and Salisbury. The control program is coordinated and operated by the Lake Dunmore/Fern Lake Association.

The award from DEC's Watershed Management Division will help the association fund Eurasian Water Milfoil (EWM) control in both lakes during the spring, summer and fall of 2016. The association, a 501c3 non-profit corporation, has a total annual project budget of \$331,057, funded by the Vermont Department of Environmental Conservation grant-in-aid, the Lake Champlain Basin Program, lake residents, friends of the lakes and the towns of Leicester and Salisbury.

The grant supports a control project which incorporates volunteer lake monitoring, the use of diver operated suction harvesting, the hand pulling of milfoil, herbicide application by SOLitude, benthic barriers in approved areas, and a public boat access greeter program. A volunteer program was established in 1994 hand pulling Eurasian Water Milfoil in an effort to control the spread of the invasive species. In 2015, the program harvested approximately 3,776 bushels of EWM and inspected in excess of 1275 boats prior to entering or leaving our lakes for invasive species.

For more information about the DEC grant, contact Julie Delphia, Leicester Town Clerk, at (802) 247-5961 x 3.

For more information about LDFLA and the invasive species control program, contact Jim Meyersburg at (239)272-5459 (jimmeyersburg@gmail.com).