

## HORSESHOE LAKE MANAGEMENT COMMITTEE AGENDA

5:00 P.M. - THURSDAY, DECEMBER 10, 2015

Woodland Police Station - Council Chambers  
200 East Scott Avenue  
Woodland, WA 98674

Call to Order

Citizen Communications for items NOT on the Agenda

Citizen Communications for items ON the Agenda

I. Approval of Minutes for **October 8, 2015 and November 12, 2015**

II. Continued Business

A. Lake Update

- WA State Dept of Transportation-Pump
- WA Dept of Fish and Wildlife
- **Lake Tracking**

B. Water Quality

- Milfoil
- Weevils**
- Aquatic Vegetation Management Plan**
- Centennial Grant Update

C. Budget

- 2016 Update

III. New Business

A. None

IV. Other

A. None

V. Adjourn - Next Meeting January 14, 2016 at 5:00 P.M.

**CITY OF WOODLAND**  
**HORSESHOE LAKE COMMITTEE MINUTES**  
**OCTOBER 8, 2015**

The regular meeting of the Horseshoe Lake Management Committee (HSLMC) was held on the above date, at the Woodland Police Station - Council Chambers, 200 East Scott Avenue, Woodland, WA 98674.

Chairman Tom Golik called the meeting to order at approximately 5:02 p.m. Roll call found the following:

**COMMITTEE MEMBERS:**

Tom Golik, Chairman  
Mike Curry  
Bill Dunlap  
Terry Jones (Absent)  
Francis Patnode (Absent)  
Scott Perry  
Pat Rychel  
Neil Van Horn

**MAYOR/COUNCIL/OTHER:**

Grover Laseke, Mayor

**STAFF:**

Jody Bartkowski, Engineering Technician

**MINUTES**

Approval of the August 13, 2015 minute was postponed until November.

**CONTINUED BUSINESS**

- A. Lake Update.** Staff presented e-mails from Mike London, Washington State Department of Transportation (WSDOT) regarding pump updates and debris removal. Open discussion was held regarding garbage at the pump, trash and logs along the newly exposed Horseshoe Lake (HSL) Shoreline, and Make a Difference Day.

Staff discussed a call from the Washington State Department of Fish and Wildlife (WDFW) regarding ownership of the outlet structure and presented pictures of damage. Discussion ensued regarding ownership, responsibility, funding, and current water level.

- B. 2016 Budget Request/Milfoil.** Scott Perry distributed an aerial photo of HSL showing weed growth. Discussion ensued regarding the recent carp delivery, use of chemicals, how long chemical treatments work, the alum treatment, growth due to sunlight, use of grass carp in Oregon, ways to combat milfoil, contacting other agencies for input, other lakes with milfoil problems, the need to take action, and budgeting for the long term.

- C. Water Quality.**

**Centennial Grant - Water Quality Testing** - Staff presented a newly proposed testing map and discussed progress on the Quality Assurance Project Plan (QAPP) and Standard Operating Procedures.

- A. Update Contact List.** Staff requested a review of current contact information. Updated copies will be presented at the next meeting.

**OTHER**

**Committee Membership.** Scott Perry reported that he knows someone interested in joining the Committee. Discussion ensued regarding current activities, the number of committee positions, appointment by Mayor, and contacting Francis Patnode.

**ADJOURNMENT**

The meeting was adjourned at approximately 6:30 p.m. The next regular meeting will be held Thursday, November 12, 2015, at 5:00 p.m. at the Woodland Police Station - Council Chambers, 200 East Scott Avenue, Woodland WA 98674.

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Tom Golik - Chairman

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Date

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Jody Bartkowski - Secretary

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Date

**CITY OF WOODLAND**  
**HORSESHOE LAKE COMMITTEE MINUTES**  
**NOVEMBER 12, 2015**

The regular meeting of the Horseshoe Lake Management Committee (HSLMC) was held on the above date, at the Woodland Police Station - Council Chambers, 200 East Scott Avenue, Woodland, WA 98674.

Chairman Tom Golik called the meeting to order at approximately 5:05 p.m. Roll call found the following:

**COMMITTEE MEMBERS:**

Tom Golik, Chairman  
Mike Curry  
Bill Dunlap (Absent)  
Terry Jones  
Francis Patnode (Absent)  
Scott Perry  
Pat Rychel  
Neil Van Horn

**MAYOR/COUNCIL/OTHER:**

Hilarie Larson, Cowlitz County Health

**STAFF:**

Jody Bartkowski, Engineering Technician

**MINUTES**

The August 13, 2015 minutes were approved as presented. Approval of the October 8, 2015 minutes was postponed until December.

**CONTINUED BUSINESS**

**A. Lake Update.** Discussion was held regarding pump repairs by the Washington State Department of Transportation (WSDOT), increased flow, continued presence of debris, screen repairs, postponement of fish counts due to boat ramp closure, and requesting an update on lake structure repairs from the Washington State Department of Fish and Wildlife.

**B. Water Quality.**

**Centennial Grant - Water Quality Testing** - Hilary Larson, Cowlitz County Health Department, gave an update on acceptance of the Quality Assurance Project Plan (QAPP). Discussion ensued regarding status, testing dates, required training, map changes, testing twice in the summer, hours for testing, and lab use. It was determined that Standard Operating Procedure (SOP) training will be scheduled for 1:30 p.m., December 1, 2015 in Council Chambers and Lake testing will be scheduled for December 7, 2015 at 1:00 p.m. pending final approval of the QAPP.

**Milfoil** - Discussion was held regarding the Committee's main goal, milfoil control methods, draining the Lake, other lakes that are drained annually, separation between the Park and the Lake, what it takes to permanently kill milfoil, milfoil's root system, creation of a workgroup, developing a vegetation management plan, input from other

jurisdictions, getting an updated weed survey, additional grant applications, utilizing Ms. Larson's time, and Silver Lake's latest grant application.

Further discussion was held regarding contacts within other agencies, permitting, historical research, SolarBees, weevils, and what comes next. The December regular meeting will be used as a work session to review the Department of Ecology *"Citizen's Manual for Developing Integrated Aquatic Vegetation Management Plans"*.

**C. Budget.** Discussion ensued regarding the Committee's request and recommended budget cuts.

**NEW BUSINESS**

**A. Contact List Update.** Copies were distributed and this item is to be removed from the agenda.

**OTHER**

**Committee Membership.** Discussion ensued regarding Francis Patnode's status and contact by Tom Golik.

**ADJOURNMENT**

The meeting was adjourned at approximately 6:15 p.m. The next regular meeting will be held Thursday, November 12, 2015, at 5:00 p.m. at the Woodland Police Station - Council Chambers, 200 East Scott Avenue, Woodland WA 98674.

\_\_\_\_\_  
Tom Golik - Chairman

\_\_\_\_\_  
Date

\_\_\_\_\_  
Jody Bartkowski - Secretary

\_\_\_\_\_  
Date

**HORSESHOE LAKE TRACKING  
2015**

Date	River Level 8:00 AM	Days High Temp	24-Hr Rainfall	Lake			Valve Status (Turns Open)	Pump (GPM)	Comments
				Level	Temp	Visibility			
1-Oct-15	8.14	75°	0.00				Closed		Pump on manual override.
2-Oct-15	8.06	64°	0.02				Closed	3,046	Pump on manual override.
3-Oct-15	7.68	72°	0.00				Closed		Pump off for repair, low water level.
4-Oct-15	7.69	79°	0.00	-87	64°	7.5	Closed		Pump off for repair, low water level.
5-Oct-15	7.85	91°	0.00				Closed		Pump off for repair, low water level.
6-Oct-15	8.15	82°	0.00				Closed		Pump float system repaired.
7-Oct-15	8.41	66°	0.23				Closed		
8-Oct-15	8.16	80°	0.00				Closed		
9-Oct-15	7.40	69°	0.01				Closed	3,244	
10-Oct-15	6.96	70°	0.40				Closed		
11-Oct-15	6.97	75°	0.01	-84	66°	7	Closed		
12-Oct-15	6.92	75°	0.00				Closed	3,093	
13-Oct-15	6.92	73°	0.00				Closed		
14-Oct-15	6.95	68°	0.00				Closed		
15-Oct-15	7.07	74°	0.00				Closed		
16-Oct-15		74°	0.00				Closed	2,867	Gauge down.
17-Oct-15	7.50	68°	0.03				Closed		Level projected.
18-Oct-15	7.60	64°	1.04	-81	64°	6	Closed		Level projected.
19-Oct-15	7.81	59°	0.00				Closed	2,560	Level projected.
20-Oct-15	8.09	70°	0.00				Closed		
21-Oct-15	8.05	68°	0.00				Closed		
22-Oct-15	8.35	66°	0.00				Closed		
23-Oct-15	8.36	59°	0.00				Closed	3,238	
24-Oct-15	8.32	72°	0.00				Closed		
25-Oct-15	7.78	59°	0.44				Closed		
26-Oct-15	7.60	69°	0.08				Closed	2,883	
27-Oct-15		62°	0.00				Closed		
28-Oct-15		56°	0.48	-76	61°	5.5	Closed		
29-Oct-15	8.14	65°	0.01				Closed		
30-Oct-15	8.01	60°	0.89				Closed	2,259	
31-Oct-15	8.53	62°	0.92				Closed		

**HORSESHOE LAKE TRACKING  
2015**

Date	River Level 8:00 AM	Days High Temp	24-Hr Rainfall	Lake			Valve Status (Turns Open)	Pump (GPM)	Comments
				Level	Temp	Visibility			
1-Nov-15	9.62	62°	0.77				Closed		
2-Nov-15	9.35	62°	0.12				Closed	2,146	
3-Nov-15	8.91	57°	0.05	-71	61°	6	Closed		
4-Nov-15	8.33	51°	0.00				Closed		
5-Nov-15	8.39	50°	0.03				Closed		
6-Nov-15		67°	0.00				Closed	2,457	
7-Nov-15		52°	0.71				Closed		
8-Nov-15		55°	0.15	-65	60°	6	Closed		
9-Nov-15		60°	0.00				Closed	2,190	
10-Nov-15	8.53	48°	0.02				Closed		
11-Nov-15	8.35	59°	0.36				Closed		
12-Nov-15	8.29	47°	0.32				Closed		
13-Nov-15		56°	0.36				Closed	2,774	
14-Nov-15	9.31	58°	0.10				Closed		
15-Nov-15	12.30	54°	0.30	-58	55°	5	Closed		
16-Nov-15	14.88	45°	1.29				Closed	2,955	
17-Nov-15	15.09	55°	1.30				Closed		
18-Nov-15	17.96	50°	0.24				Closed	3,932	
19-Nov-15	18.71	50°	0.36				Closed		
20-Nov-15	14.15	54°	0.00				Closed	3,257	
21-Nov-15	12.91	50°	0.00				Closed		
22-Nov-15	12.77	46°	0.00				Closed		Level projected.
23-Nov-15	10.83	47°	0.38	-50	50°	6.5	Closed	3,241	Level projected.
24-Nov-15	9.59	43°	0.17				Closed		Level projected.
25-Nov-15		49°	0.00				Closed	3,240	
26-Nov-15		50°	0.00				Closed		
27-Nov-15		52°	0.01				Closed		
28-Nov-15	10.34	54°	0.01				Closed		
29-Nov-15	11.11	47°	0.00				Closed		
30-Nov-15	11.65	37°	0.04	-43	40°	8	Closed	3,330	Cold weather improved visibility.

**HORSESHOE LAKE TRACKING  
2015**

Date	River Level 8:00 AM	Days High Temp	24-Hr Rainfall	Lake			Valve Status (Turns Open)	Pump (GPM)	Comments
				Level	Temp	Visibility			
1-Dec-15	11.61	45°	0.48				Closed		
2-Dec-15	12.91	39°	0.32				Closed		
3-Dec-15	12.96	46°	0.53				Closed		
4-Dec-15	13.08	49°	0.28				Closed		
5-Dec-15	13.14	47°	0.74				Closed		
6-Dec-15	13.17	55°	0.74	-36	42°	7	Closed		
7-Dec-15	17.97	60°	1.61				Closed		
8-Dec-15	19.30						Closed	Level projected.	
9-Dec-15	19.51						Closed	Level projected.	
10-Dec-15	20.04						Closed	Level projected.	
11-Dec-15	20.05						Closed	Level projected.	
12-Dec-15	19.84						Closed	Level projected.	
13-Dec-15	19.63						Closed		
14-Dec-15							Closed		
15-Dec-15							Closed		
16-Dec-15							Closed		
17-Dec-15							Closed		
18-Dec-15							Closed		
19-Dec-15							Closed		
20-Dec-15							Closed		
21-Dec-15							Closed		
22-Dec-15							Closed		
23-Dec-15							Closed		
24-Dec-15							Closed		
25-Dec-15							Closed		
26-Dec-15							Closed		
27-Dec-15							Closed		
28-Dec-15							Closed		
29-Dec-15							Closed		
30-Dec-15							Closed		
31-Dec-15							Closed		

**HORSESHOE LAKE TRACKING  
2014**

Date	River Level 8:00 AM	Days High Temp	24-Hr Rainfall	Lake			Valve Status (Turns Open)	Pump (GPM)	Comments
				Level	Temp	Visibility			
1-Oct-14		69°					Closed		
2-Oct-14		71°					Closed		
3-Oct-14		80°					Closed		
4-Oct-14	8.38	84°					Closed		
5-Oct-14	8.16	81°		-36	64°	6'6"	Closed		Water is murky, level going down, down....
6-Oct-14	7.52	82°					Closed	3,179	
7-Oct-14	7.28	81°					Closed		
8-Oct-14	7.43	73°					Closed		Level projected.
9-Oct-14	7.20	76°					Closed		Level projected.
10-Oct-14	7.86	70°					Closed	589	Level projected; low GPM is correct.
11-Oct-14	7.95	70°		-30	66°	6'	Closed		Level projected.
12-Oct-14	8.18	64°					Closed		Level projected.
13-Oct-14	7.81	71°					Closed	2,954	Level projected.
14-Oct-14	8.00	62°					Closed		
15-Oct-14	8.27	56°					Closed		
16-Oct-14		69°					Closed		
17-Oct-14		59°					Closed	2,641	Tested water quality.
18-Oct-14		69°		-37	63°	5'	Closed		Level rising.
19-Oct-14		72°					Closed		
20-Oct-14		63°					Closed	2,769	
21-Oct-14		60°					Closed		
22-Oct-14	8.09	58°					Closed		
23-Oct-14	9.83	60°					Closed		
24-Oct-14	10.92	55°					Closed	3,019	
25-Oct-14	11.32	63°					Closed		
26-Oct-14	11.45	54°		-35	58°	5'	Closed		
27-Oct-14	11.60	60°					Closed	2,962	Screens cleaned.
28-Oct-14	11.45	58°					Closed		
29-Oct-14	11.68	62°					Closed		
30-Oct-14	12.61	61°					Closed		
31-Oct-14	12.79	57°					Closed	3,384	

**HORSESHOE LAKE TRACKING  
2014**

Date	River Level 8:00 AM	Days High Temp	24-Hr Rainfall	Lake			Valve Status (Turns Open)	Pump (GPM)	Comments
				Level	Temp	Visibility			
1-Nov-14	13.53	55°		-30	58°	6'	Closed		
2-Nov-14	13.36	53°					Closed		
3-Nov-14	12.04	56°					Closed	3,421	
4-Nov-14	13.64	58°					Closed		
5-Nov-14	13.21	59°					Closed		
6-Nov-14	12.86	61°					Closed		
7-Nov-14	13.06	61°					Closed		
8-Nov-14	11.48	59°					Closed	Level projected.	
9-Nov-14	11.55	59°					Closed	Level projected.	
10-Nov-14	12.84	54°					Closed	3,016	
11-Nov-14	12.68	58°					Closed		
12-Nov-14	12.57	48°					Closed		
13-Nov-14	11.35	43°					Closed		
14-Nov-14	9.74	39°					Closed		
15-Nov-14	9.72	47°					Closed	COLD - low 25.	
16-Nov-14	9.48	48°					Closed	COLD - low 26.	
17-Nov-14	9.47	48°					Closed		
18-Nov-14	9.36	43°					Closed	2,713	
19-Nov-14	9.10	50°					Closed		
20-Nov-14	8.96	46°					Closed		
21-Nov-14	10.73	42°					Closed	2,574	
22-Nov-14	11.06	49°					Closed		
23-Nov-14	11.34	51°		-20	45°	6'	Closed		
24-Nov-14	11.41	51°					Closed	2,830	
25-Nov-14	10.51	59°					Closed		
26-Nov-14	11.29	62°					Closed	2,586	
27-Nov-14	10.63	62°					Closed	Tested water quality (LOTS OF ALGAE). Level projected.	
28-Nov-14	13.67	55°					Closed		
29-Nov-14	16.00	43°					Closed		
30-Nov-14	16.06	42°		-18	43°	6'	Closed	COLD - low 25.	

**HORSESHOE LAKE TRACKING  
2014**

Date	River Level 8:00 AM	Days High Temp	24-Hr Rainfall	Lake			Valve Status (Turns Open)	Pump (GPM)	Comments
				Level	Temp	Visibility			
1-Dec-14	14.04	40°					Closed	3,547	
2-Dec-14	13.75	44°					Closed		
3-Dec-14	12.28	49°					Closed		
4-Dec-14	13.18	40°					Closed		
5-Dec-14	13.46	46°					Closed	3,491	
6-Dec-14	13.67	53°					Closed		
7-Dec-14	13.90	51°		-14	42°	8'	Closed		
8-Dec-14	13.83	50°					Closed	3,250	Screens cleaned.
9-Dec-14	13.75	58°					Closed		
10-Dec-14	13.91	63°					Closed		
11-Dec-14	13.10	62°					Closed		
12-Dec-14	14.00	54°					Closed		Level projected; tested water quality.
13-Dec-14	12.00	45°					Closed		
14-Dec-14	11.51	54°					Closed		
15-Dec-14	10.79	52°		-8	42°	8'	Closed	2,921	
16-Dec-14	10.41	51°					Closed		
17-Dec-14	10.28	47°					Closed		
18-Dec-14	10.68	48°					Closed	3,234	
19-Dec-14	9.80	51°					Closed		Level projected.
20-Dec-14	9.77	56°					Closed		Level projected.
21-Dec-14	10.38	56°					Closed		Level projected.
22-Dec-14	11.20	52°		-4	42°	8	Closed		Level projected.
23-Dec-14	12.78	49°					Closed		Level projected.
24-Dec-14		48°					Closed		
25-Dec-14		47°					Closed		
26-Dec-14		45°					Closed	3,712	
27-Dec-14		44°					Closed		
28-Dec-14		45°		2	42°	8	Closed		Time to open the valve!
29-Dec-14		46°					20	3,650	
30-Dec-14		37°					20		
31-Dec-14		39°					20		

<http://enviroscienceinc.com>

☎ 800-940-4025

menu

## ES to Discontinue Milfoil Solution Services

October 1, 2014

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EnviroScience and our Canadian subsidiary Milfoil Solution, LLC have made the difficult decision to suspend milfoil weevil culturing operations indefinitely as of January 1, 2015. Although we still believe that the weevils have a role in management of Eurasian watermilfoil, a combination of increased regulatory requirements, hybridization of the plant and increasingly unpredictable weather patterns over the past few years have dramatically increased costs. Although we are confident in the Milfoil Solution Process, it has proven not to be economically feasible for our company to continue the program.

We have offered this form of ecologically sustainable lake management since 1998, and the decision to discontinue the program is particularly difficult for us. Over the past 16 years, we have had the privilege of working with some of the most forward thinking and motivated volunteers, lake associations, communities, lake management professionals, and researchers across the United States and Canada. These opportunities and experiences have helped build and structure EnviroScience into the ecologically minded company it has become.

EnviroScience continues to believe in the process and feels that it could be a profitable enterprise using a smaller, regional operations. Currently, EnviroScience is fielding offers to interested parties for purchase of the Milfoil Solution<sup>®</sup> process. We are also aware that there a number of volunteer and nonprofit organizations looking into the possibility of culturing milfoil weevils, and we may be able to assist those efforts.

Although we will not be offering Milfoil Solution<sup>®</sup> and our Canadian subsidiary will be closing, EnviroScience, Inc. continues to grow and be leaders in the ecological consulting, ecological restoration, stormwater, bioassay / toxicity and commercial diving industries, with over 80 employees and projects across the United States. We will also continue to provide a full range of lake management services.

We'd like to thank our many clients for the trust and confidence you've shown in us over the years. We've received a great deal of support and satisfaction from offering a sustainable and natural alternative to our clients. While ES will no longer offer the Milfoil Solution<sup>®</sup> process, we look forward to continuing to assist you with our ecological and environmental services.

Please contact Cortney Marquette ([cmarquette@enviroscienceinc.com](mailto:cmarquette@enviroscienceinc.com) (<mailto:cmarquette@enviroscienceinc.com>) ) with any questions.

Categorized in: **Uncategorized** (<http://enviroscienceinc.com/category/uncategorized/>)

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**LEAVE A REPLY**



Figure 1. Blue Lake  
Multnomah County,  
Oregon

-  Weevil Stocking Sites
-  Monitoring Site



*Blue Lake 63 acres*

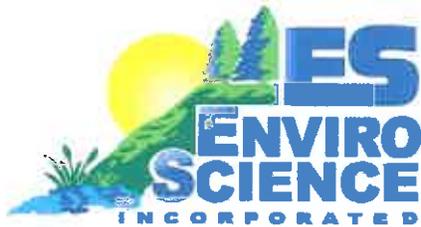
**2012 Progress Report of the  
Milfoil Solution® Program in**

**Blue Lake**

*Prepared for:*

**The Blue Lake Improvement Association**

*Prepared by:*



**EnviroScience, Inc.,**  
3781 Darrow Road, Stow, Ohio 44224  
(800) 940-4025 · [www.enviroscienceinc.com](http://www.enviroscienceinc.com)

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September 11, 2012

**I. Introduction**

Eurasian watermilfoil (*Myriophyllum spicatum*, hereafter referred to as milfoil or EWM) is an exotic aquatic species that tolerates a wide range of growing conditions and out-competes native vegetation. Monocultures of milfoil limit recreational use, reduce biodiversity, and can cause detrimental changes to water temperature and dissolved oxygen in severe infestations. EnviroScience implemented a Milfoil Solution® program in 2010 using the native milfoil weevil to suppress milfoil growth at the request of the Blue Lake Improvement Association.

The North American beetle, the milfoil weevil (*Euhrychiopsis lecontei*), has been augmented in Blue Lake, Multnomah County, Oregon. This weevil is a specialist herbivore of milfoil and damages the plant in multiple ways. The most significant impact is caused by weevil larvae as they damage the meristem, or growing tip, and burrow through the stem. Nutrient flow in the plant is disrupted and the stem loses buoyancy and collapses in the water column. A cascading effect pulls neighboring plants lower into the water column and the rate of photosynthesis is significantly reduced in these stems.

The following is a project outline of Milfoil Solution® at Blue Lake:

Year	Survey Dates	Sites Established	Number of Weevils Stocked
2010	Initial: 8/14 Follow-up: 9/27	S1, S2, M1	12,000
2011	Initial: 7/14 Follow-up: 9/7	***	20,000*
2012	Final Follow-up: 7/23	***	***

\* 8,000 weevils were stocked in addition to the contracted amount of 12,000 at no extra cost due to an excess in the culturing facility and the time-sensitive nature of live organisms.

**II. Survey Methods**

An initial survey is performed prior to weevil stocking and a follow-up survey is conducted six to eight weeks later. These surveys are integral in monitoring changes that occur in both the augmented weevil population and the health of the milfoil over the course of the program in order to make informed management decisions. Qualitative observations in these surveys include the overall density and health of milfoil, identification of native plant species present, and the presence of weevils and weevil-induced damage. Quantitative measurements include milfoil density and weevil population density. Milfoil density is determined by randomly collecting stems throughout the milfoil bed using a quadrat. This sample is then converted to the number of stems per square meter (stems/m<sup>2</sup>). Weevil population density (number of weevils per stem) is determined through lab analysis of stems sampled from three transect lines at each site. Identical survey methods are implemented for the final follow-up survey.

3781 DARROW ROAD, STOW, OHIO 44224  
330-688-0111 / TOLL FREE: 800-940-4025 / FAX: 330-688-3858



### III. 2010 and 2011 Summary

EnviroScience biologists established two stocking sites in Blue Lake in 2010 (S1 and S2) (Figure 1). 6,000 weevils were stocked in each site for a total of 12,000. A monitoring site (M1) was established to compare conditions throughout the duration of the project. Prior to stocking weevils, an initial survey was performed at all three sites, gathering both qualitative and quantitative data to provide baseline information. All three sites contained little native plant diversity, with dense beds of EWM comprising most of the plant community. Only one adult weevil was found in 2010 and little weevil-induced damage was observed, indicating a small existing population. In 2011 20,000 weevils were stocked at S1 and S2 (10,000 at each site). An increase in the weevil population was observed from 2010 to 2011 after just one season of augmentation.

### IV. 2012 Follow-up Survey

**S1** – This bed of milfoil was patchy to moderately dense from the central area to the east side (towards the channel). Most stems were low growing and damaged. Multiple weevils were observed during the survey and during lab analysis (Table 1).

**S2** – This bed of milfoil contains relatively sparse clusters of stems containing extensive weevil-induced damage. An adult weevil was observed during the survey and many weevil life stages were identified during stem sample analysis in the lab. While the milfoil at this site is sparse and damaged, outer lying beds were observed to the west of the stocking zone.

**M1** – Moderately dense milfoil composes the majority of the plant community at this site. Milfoil here is noticeably healthier than at the stocking sites. A small weevil presence was detected from the analysis of samples.

In addition to Eurasian watermilfoil, plant species observed in the survey sites in 2012 included Curly leaf pondweed (*Potamogeton crispus*), Elodea (*Elodea canadensis*), Nitella (*Nitella spp.*), Sago pondweed (*P. pectinatus*), Small pondweed (*P. capillaceus*), Water Lily (*Nymphaea spp.*), Flat-stem pondweed (*P. zosteriformis*), and Chara (*Chara spp.*).

### V. Discussion

Based on positive results from the 2012 survey, it appears that the Milfoil Solution® program at Blue Lake has significantly reduced the milfoil infestation after just two years of stocking (Table 2). Signs of milfoil suppression include reduction in density of the milfoil, maintenance of the stems below the lake surface at a non-nuisance level, and open areas within the stocking site.

Stem samples from the stocking sites included weevil life stages and exhibited indicators unique to a weevil population such as holes in the stems, damage to the growing tip (meristem), and extensively damaged areas where larvae have burrowed down the stems. Since few weevils were found prior to stocking, this indicates that the weevil population is successfully overwintering and returning to the lake. The weevil population at the untreated monitoring site (M1) increased in 2011, but a decrease was noted in 2012. This may be explained by the increase in stem density at this site.

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The measured stem density of milfoil has decreased at both stocking sites (Table 2) and is expected to continue this trend as the weevil population grows. Many large, open areas were occupied by native aquatic plant species. Over the course of the program, areas of milfoil infestation have transitioned to a more natural distribution that supports a healthier ecosystem while improving recreational and aesthetic value.

#### IV. Future Recommendations

It is the recommendation of EnviroScience that annual monitoring is implemented as part of the milfoil management program when considering factors such as seasonal variability and the ability of milfoil to grow much faster than native species. Should the milfoil infestation rebound in the near future, a supplemental weevil stocking event should occur to deter future growth.

Please contact EnviroScience at (800) 940-4025 or [slomske@enviroscienceinc.com](mailto:slomske@enviroscienceinc.com) with questions regarding this report.

*Sarah - Scientist*

Lake Management Division  
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**Table 1. Weevil population analysis (weevils/stem), 2010-2012.**

Site	Parameter measured	August 14, 2010	September 27, 2010	July 14, 2011	September 7, 2011	July 23, 2012
S1	Total weevils	0.00	0.00	1.00	9.00	3.00
	Total stems	27.00	30.00	30.00	30.00	28.00
	Avg. weevils/stem	0.00	0.00	0.03	0.30	0.11
S2	Total weevils	1.00	0.00	3.00	9.00	12.00
	Total stems	30.00	30.00	30.00	30.00	30.00
	Avg. weevils/stem	0.03	0.00	0.10	0.30	0.40
M1	Total weevils	0.00	0.00	2.00	30.00	1.00
	Total stems	30.00	30.00	30.00	30.00	30.00
	Avg. weevils/stem	0.00	0.00	0.07	1.00	0.03

**Table 2. Densities of Eurasian watermilfoil (stems/m<sup>2</sup>), 2010-2012.**

Site	August 14, 2010	September 27, 2010	July 14, 2011	September 7, 2011	July 23, 2012
S1	114.4	91.7	307.4	96.3	36.1
S2	111.1	102.8	107.4	100.0	44.4
M1	125.0	129.7	188.9	107.4	150.0

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The weeds in Blue Lake, Eurasian milfoil, curly leaf pond and the lilly pads have been mostly in the past controlled by herbicides, raking and pulling. That has changed in the past few years with the 2010 addition of microscopic weevils (little beetles), that in early summer through early fall feed on the Eurasian milfoil and cause them to die off. We are still in the early stages of testing these little creatures, but with the last survey in July 2011 showing the start of some progress towards slowing down the weeds especially on the west end with the east end also showing spotty results. We also added around 14,000 more weevil this summer along with the original 12,000 last year. The weevil were introduced to us by Sue Ellen Dollan one of our home owners and Enviro Science the contractor who put them in the lake. The solar-bees are also designed when adjusted to different tube intake levels to help kill the weeds. At this time the solar bees are adjusted for algae growth, only the east solar-bee is set for some weed control in shallower water than the other three. There still is some raking going on by home owners in certain areas and this practice will continue as residents see fit to clear small areas, until the weevil take control. This biological control is a new and exciting option to the previous herbicide practice that is not preferred by our local government and environmentalists.

The algae problem in middle to late summer of the past years is partially due to the weed problem and lack of circulation, high PH and temperature control of our lake. To combat the different types of algae, some toxic that shuts down our lake and other non-toxic that makes the water quality poor and stagnate, BLIA introduced the 3 solar bees (water circulators) to the lake in 2007 on a trial basis and were purchased in 2009 by BLIA donations and Metro with Metro having the ownership. BLIA still maintains a strong control along with Metro's staff in pursuing the solar bees maintenance and supervision of the units. DEQ along with Metro has been an integral partner to BLIA in maintaining Blue Lake. Metro yearly has a water quality intern on Blue Lake monitoring the lakes temperature, ph, clarity and overall quality that aides BLIA in pursuing the overall quality and performance of the lake. In 2011 BLIA with the help from Solar bee added a fourth unit in hopes of gaining better results of the water quality, mainly the algae problems. Solar bee has given us a two summer trial until October 2012 to test this fourth unit. At this time BLIA is responsible for the cost of the unit, but it is hopeful that Metro or another grant would help pay for the fourth unit. So far the summer of 2011's lake quality looks very good, with excellent clarity( SECHY LEVELS), good ph numbers and an overall quality of the lake that we haven't seen in 5 or 6 years. Let's hope and pray that this continues through the summer and early fall. Upcoming updates can be seen in following this web site in the months and years ahead.

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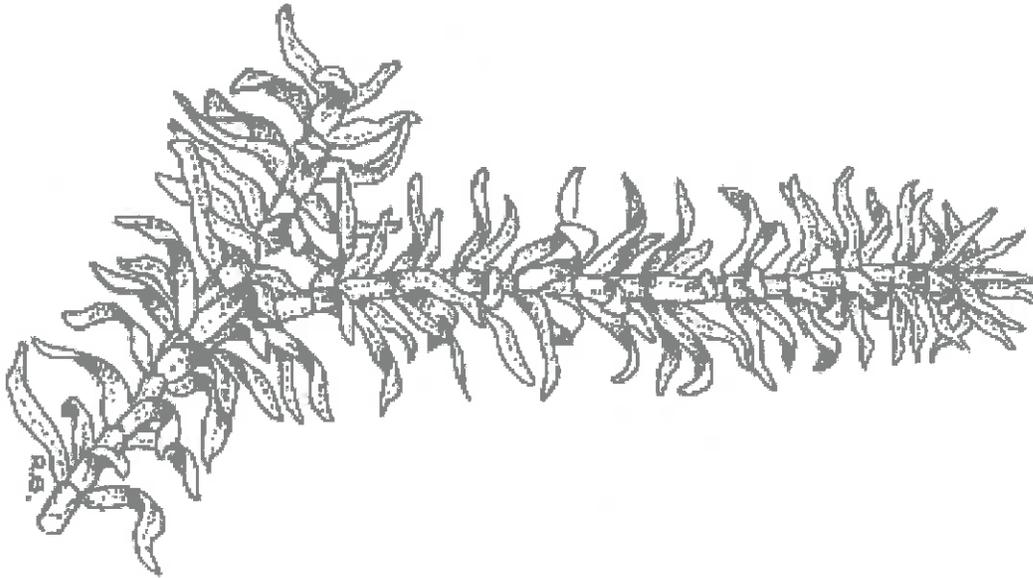
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