HORSESHOE LAKE MANAGEMENT COMMITTEE AGENDA

5:00 P.M. - THURSDAY, DECEMBER 13, 2012

**** SPECIAL LOCATION ****
Woodland Community Center
782 Park Street – Woodland, WA 98674

I. Call to Order

II. Minute Approval - November 8, 2012

III. Continued Business
- a. Pump Update
- b. Water Quality and Sampling
  - Updated DRAFT Field Manual
  - HSL Restoration Final Report - Plant Control
- c. Decoys/Wildlife
- d. Budget
- e. Goals & Priorities
  - Pollution Control - Drainage near the Skate Park
- f. Public Education
- g. DOE Aquatic Weeds Management Grant

IV. New Business
- a. None

V. Other
- a. None

VI. Adjourn - Next Meeting January 10, 2013 at 5:00 P.M. in Council Chambers

CITY OF WOODLAND
HORSESHOE LAKE COMMITTEE MINUTES
NOVEMBER 8, 2012

The regular meeting of the Horseshoe Lake Management Committee was held on the above date, at the Woodland City Hall Council Chambers, 100 Davidson Avenue, Woodland, WA 98674.

Acting Chairman Walt Church called the meeting to order at approximately 5:05 p.m. Roll call found the following:

COMMITTEE MEMBERS:

Tom Golik, Chairman (Absent)
Walt Church, Acting Chairman
Mike Curry
Terry Jones (Absent)
Francis Patnode (Absent)
Pat Rychel
Jeff Sullivan
Neil Van Horn

MAYOR/COUNCIL:

Scott Perry, Councilmember

STAFF:

Jody Bartkowski, Secretary
Bart Stepp, Public Works Director

MINUTES

The October 11, 2012 minutes were approved as presented.

CONTINUED BUSINESS

1. **Lake Pump**. Discussion ensued regarding the lake level. It is approximately 4-feet lower that than it typically isthis time of year. Staff reported that the pump is running and at the Washington Department of Fish and Wildlife's (WDFW) request set to turn off for 10-minutes each hour to prevent fish from passing through and to help flush the screens. The float that was installed is not a high float - low float, it works based on water pressure.

2. **Water Quality & Sampling.** Staff reported that volunteers completed the October testing, discussed phosphorus levels, and presented graphs with October numbers. Discussion was held regarding water levels, depth of weeds, and test locations. Mike Curry gave updated Secchi disk numbers.

3. **Decoys/Wildlife.** Committee members reported that there is an eagle present and that they have seen a goose with a broken wing.

4. **Budget.** Staff reported that the proposed 2013 budget for management of Horseshoe Lake is $1,200 and that $1,800 was requested from both Cowlitz and Clark Counties.

5. **Goals & Priorities.** Discussion ensued regarding grant funding (see New Business Item 1).

NEW BUSINESS

1. **Grant Application - DOE Aquatic Weeds Management.**

   Staff distributed draft copies of the proposed grant application and requested comments. The grant is for two-years of aquatic vegetation and water quality monitoring, the City will be the lead agency, and the match will be mostly in-kind between the City and Clark and Cowlitz Counties

   Committee member Walt Church made a motion to recommend the City make the application. Jeff Sullivan seconded the motion.

   Motion seconded and carried unanimously.

   Discussion was held regarding the reason for this testing, potential costs for fixing the weed problem, legislative and congressional districts, the percentage of the Lake in each of the counties, and the possibility of relocating Silver Lake carp.

2. **December 13, 2012 Meeting Location.** Staff reported that both Council Chambers and the Port office have other events scheduled for December 13, 2012. The next regular meeting will be held at the Woodland Community Center, 782 Park Street (next door to the library).

OTHER

Weed Harvesting – Discussion was held regarding various harvesting methods, difficulty in getting permits, root removal, the creation of additional spreading by breakage, soil consistency at the bottom of the Lake, costs, individuals clearing in front of their own property, the outlet structure leak, and excess concrete laying around the structure.

Storm Drainage into the Lake – Discussion ensued regarding runoff south of Woodland Welding during the last heavy rain. Public Works Director Bart Stepp gave information on how the Davidson Avenue storm system works and how it is maintained.

Biodegradable Chemicals. The committee discussed and requested that WDFW provide them with information regarding new types of all-natural, biodegradable chemicals. They would like questions answered regarding cost, successfulness, permitting, and local use.

Open Discussion.

- Scott Perry spoke regarding the need to research grants; creation of a non-city sponsored fund similar to what Kalama has that accepts donations to fund parks, lakes, etc. (people have a desire to contribute money, but not to the City); and using the Park and Recreation District for taxing ability.
- Mike Curry shared a story and pictures of a park he visited in Montana that was built with a donation by one individual.

ADJOURNMENT

The meeting was adjourned at approximately 6:05 p.m. The next regular meeting will be held Thursday, December 13, 2012, at 5:00 p.m. at the Woodland Community Center, 782 Park Street, Woodland WA 98674. Please note special location.

Walt Church – Acting Chairman _____ Date _____

Jody Bartkowski - Secretary _____ Date _____

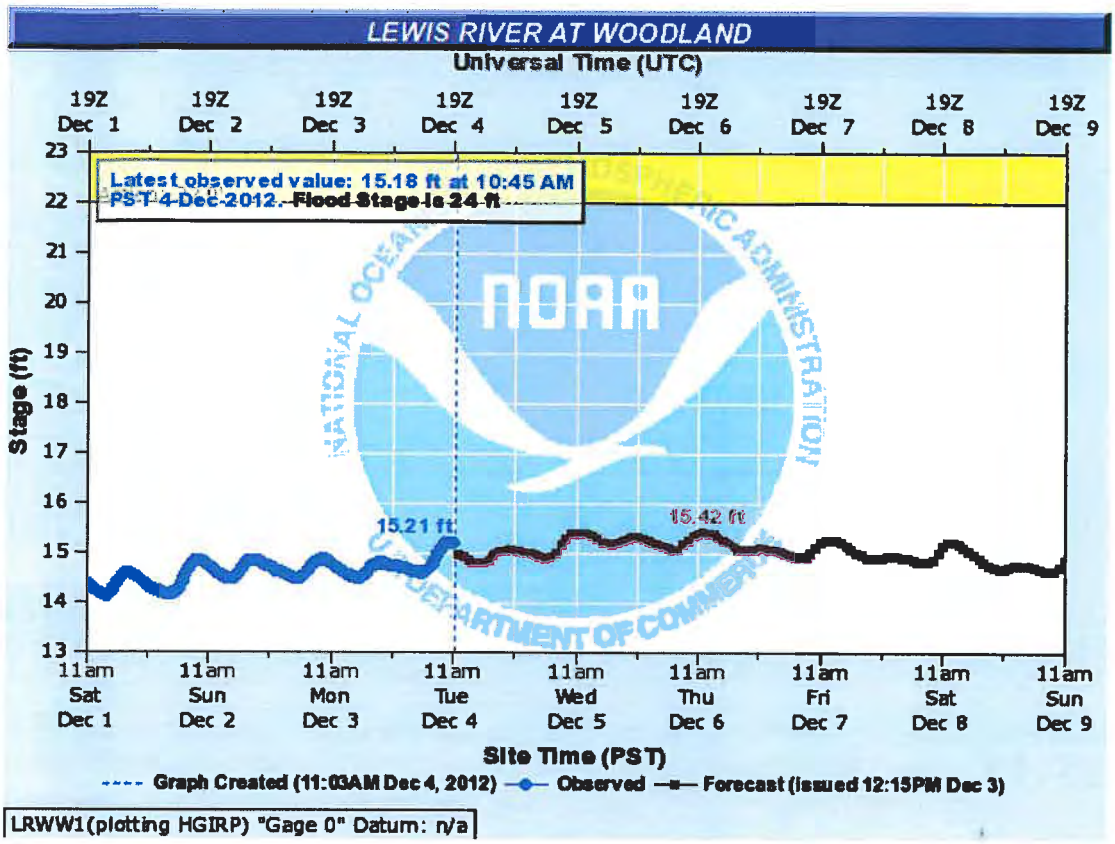
AKE PUMP MAINTENANCE LOG

DATE	TIME	RIVER LEVEL (360) 225-1701	GREASE BEARING (3 Shots Per Month)	OIL ADDED	OIL (5 Drops Per Min)	GPM	TOTAL GALLONS PUMPED	BY (Initials)	COMMENTS
8-3	2:45 pm		✓	✓	✓		192257	M.C.	Pump off
8-10	10:AM		✓	✓	✓	3265	343406	MC	
8-13	2:45PM			✓	✓	3385	459985	M.C.	
8-21	9:40AM			✓	✓	3847	560087	M.C	
8-24	2:40 AM			✓	✓	2941	884444	M.C	
9-4	1:35 PM		✓	✓	✓	2509	295091	M.C.	
9-10	10:15AM			✓	✓	57.5	50.3867	M.C.	
9-11	1. AM			[illegible]				MC	cleand screens
			Breaker was off, Turned it Back on for test AMOK back off!						
10-22	10:30 AM		✓	✓	✓	3326.1	511065	M.C.	
10-26	10:50AM			—	✓	3214	675798	M.C.	
10-29	10:30AM			✓	✓	3280	790107	M.C.	
11-2	11:15AM		✓	✓	✓	4143	969736	M.C.	
11-5	11:30			✓	✓	—326	102146	BO	
11-9	08'03			3/4 gal	✓	3108	247261	MP	
11-13	10:30AM			✓	✓	3687	417376	M.C.	
11-16	2:57 pm			✓	✓	4205	570850	S.S.	
11-19	11: AM			✓	✓	00	706186	MC	
11-21	10:am			✓	✓	4160	810158	M.C.	
11-26	9:30am			✓	✓	3996	877728	M.C.	
11-30	8:45AM			✓	✓	4324	255263	M.C.	

Lewis River Level
As of 8:00 A.M.

1-Oct-12	7.34	1-Nov-12	13.52	1-Dec-12	14.04
2-Oct-12	7.33	2-Nov-12	13.12	2-Dec-12	14.26
3-Oct-12	7.35	3-Nov-12	12.93	3-Dec-12	14.64
4-Oct-12	7.38	4-Nov-12	12.87	4-Dec-12	14.72
5-Oct-12	7.41	5-Nov-12	11.27	5-Dec-12	
6-Oct-12	7.36	6-Nov-12	10.08	6-Dec-12	
7-Oct-12	7.38	7-Nov-12	8.88	7-Dec-12	
8-Oct-12	7.45	8-Nov-12	10.97	8-Dec-12	
9-Oct-12	7.68	9-Nov-12	11.38	9-Dec-12	
10-Oct-12	7.95	10-Nov-12	11.33	10-Dec-12	
11-Oct-12	8.02	11-Nov-12	11.22	11-Dec-12	
12-Oct-12	7.75	12-Nov-12	11.29	12-Dec-12	
13-Oct-12	7.32	13-Nov-12	11.61	13-Dec-12	
14-Oct-12	7.30	14-Nov-12	9.63	14-Dec-12	
15-Oct-12	7.33	15-Nov-12	11.75	15-Dec-12	
16-Oct-12	8.14	16-Nov-12	13.40	16-Dec-12	
17-Oct-12	8.34	17-Nov-12	13.46	17-Dec-12	
18-Oct-12	8.34	18-Nov-12	13.67	18-Dec-12	
19-Oct-12	8.48	19-Nov-12	13.78	19-Dec-12	
20-Oct-12	8.54	20-Nov-12	15.43	20-Dec-12	
21-Oct-12	8.70	21-Nov-12	18.65	21-Dec-12	
22-Oct-12	8.85	22-Nov-12	18.28	22-Dec-12	
23-Oct-12	9.26	23-Nov-12	14.21	23-Dec-12	
24-Oct-12	9.10	24-Nov-12	14.57	24-Dec-12	
25-Oct-12	8.89	25-Nov-12	17.97	25-Dec-12	
26-Oct-12	8.15	26-Nov-12	14.08	26-Dec-12	
27-Oct-12	8.99	27-Nov-12	13.99	27-Dec-12	
28-Oct-12	9.33	28-Nov-12	13.09	28-Dec-12	
29-Oct-12	12.55	29-Nov-12	13.68	29-Dec-12	
30-Oct-12	13.31	30-Nov-12	13.87	30-Dec-12	
31-Oct-12	13.42			31-Dec-12	

National Weather Service
Advanced Hydrologic Prediction Service
water.weather.gov/ahps/



Forecasts for the Lewis River at Woodland are issued routinely year-round.

DRAFT

Field Manual

Horseshoe Lake Water Quality Protocols

Prepared by:

Stacie Kelsey

Washington Department of Fish and Wildlife

Vancouver, WA
2012

For Review by:

Horseshoe Lake Management Committee

Table of Contents

Introduction and Background

Horseshoe Lake is located in the city of Woodland Washington and is a manmade lake encompassing 84 acres with an average depth of four feet. The boundary between Clark and Cowlitz counties runs through the lake. In addition to residents living along the lake, there is a city park with a public boat ramp, industry and agricultural use. Washington Department of Transportation oversees operation of the pump that controls flow into and out of the lake.

Horseshoe Lake is a highly used recreational area with activities including fishing, swimming, boating and nature sightseeing. Water quality issues have intensified over the past few years. Excessive aquatic vegetation has been combated by using a buffered alum treatment in 1998. Algal blooms increased in the lake the last couple of years. Grass carp were first stocked in 2009 with a second stocking occurring in 2011 due to predation issues.

Several studies have been conducted on the lake, most recently in 1999 after the alum treatment. It was considered as a success by the consultant despite a fish kill. Long term monitoring was recommended but not completed. A fish survey was completed in 1997 prior to treatment. A follow up survey was conducted by Washington Department of Fish and Wildlife (WDFW) in 2012 which made the discovery of coho from the Lewis River that had somehow entered into the lake.

Project Description

The overall goal is to have a safe lake for recreation, wildlife and lake residents. The objective of the project is to determine potential causes of declining water quality and health of Horseshoe Lake. Questions to be answered include:

- What type of nutrient overloading is occurring?
- What locations are nutrient overloading occurring?
- How do we address known areas of concern?
- How is the submergent aquatic vegetation community being affected by current nutrient overloading?
- How are the fish communities being affected by current nutrient overloading?
- How is lake recreation and economic factors being affected by current nutrient overloading?

Once areas of concern are located, corrective action will need to take place. The primary objective is to determine where those areas of concern are. The following are goals to be met in the duration of this project:

- sample 10 pre-determined locations monthly
- determination of areas of concern
- determine corrective action for areas of concern
- report to state, county, city agencies on findings
- report to other interested parties on findings

Sampling Design

Laboratory water samples will be taken at three foot increments for Total Phosphorus and analyzed at Addy Labs in Vancouver Washington. Water samples will be taken at one and three foot increments to be analyzed by use of Hach Water Test Kits. The test kits will determine Total Phosphorus and Nitrate/Nitrite.

The lake will be sampled twice a month during the months of May through August and once a month during September through April.

After discussion about previous testing and input from Washington Department of Ecology staff the following attributes will be tested:

- Total Phosphorus
- nitrate-nitrogen
- pH
- dissolved oxygen
- water/air temperature
- e- coli
- turbidity

Secchi disk will be used in all locations.

Locations

Ten sites were selected based on current probability of nutrient over loading (Figure 1).

Figure 1. Site locations for water sampling on Horseshoe Lake.

Equipment

Hach water monitoring kits will be used for non-Laboratory water samples. These kits are used by various citizen and government study groups across the United States.

Other equipment that will be used:

- Boat for transportation to/from and between each of the locations.
- GPS for marking specific site locations.
- Secchi disk for turbidity analysis.
- HydroLab for pH, DO and water temperature.

Procedures

Test kits will be used per field manual to determine Total Phosphorus and Nitrate/Nitrite. Total Phosphorus requires digestion in the WDFW lab. Both tests will use a Hach Test Kit color wheel for analysis. Use of the test kits are a cost saving measure to allow for sampling more locations. Laboratory testing through Addy Labs will be used for locations pre-determined to be areas of concern.

The boat will be launched and motored to the first location where a GPS point will be recorded. The HydroLab will be deployed and pH, DO and water temperature will be recorded. The Secchi disk will be deployed and data recorded. Water samples for Laboratory analysis will be taken at three feet and placed into a water sample bottle.

Water samples for the Hach Test Kits will be collected at one foot and three foot increments. Notations of any blooms, foam or other water quality observation will be noted for that location. The boat will then move on to the next location and complete the process again. Locations will be documented with a photograph. Data will be entered into a computer database and a report will be generated for the monthly Horseshoe Lake Management Group meetings.

HydroLab calibration will be completed as necessary. Boat will be inspected and cleaned prior to return to the lake as well as all gear used in the water.

Data Sheet

A data sheet will be used to record all data (Figure 2). The data sheet will be on 'Rite in the Rain' paper to allow inclement weather. Data forms will be supplied by WDFW.

Data Management

A database in Microsoft Excel will be developed for entering water quality data. From this database, graphs and other methods of monitoring changes will be produced for monthly reports.

Organization and Schedule

Participants in the sampling will be made of volunteers from the community. It will be overseen by WDFW. Reports from monthly sampling will be made to the Horseshoe Lake Management Group by the head of the sampling team.

Proposed schedule

August 2012 – August 2014	lake sampling
September 2014 - January 2015	Review data, report write up, present findings
2015	Corrective actions addressed or continued sampling

Horseshoe Lake Sampling
Samplers: _____

Date: _____

				HydroLab 1 Ft.			HydroLab 3 Ft.			
	Location	**Lat**	**Long**	**Temp**	**DO**	**pH**	**Temp**	**DO**	**pH**	**Secchi**
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										

Figure 2. Data sheet for HydroLab data collection.

Horseshoe Lake Sampling Budget

Addy Lab Analysis

Five locations on Horseshoe Lake.

Total Phosphorus	$27.00/sample	x5	$135.00 per sampling day
4 months 2 sampling days	$135.00	x6	$810.00
8 months 1 sampling day	$135.00	x8	$1080.00

Addy Lab Total Phosphorus for one year **$1890.00**

Addy Lab E. coli test	$45.00/sample	x5	$225.00 per sampling day
4 months 2 sampling days	$225.00	x6	$1350.00
8 months 1 sampling day	$225.00	x8	$1800.00

Addy Lab E. coli for one year **$3150.00**

Hach Test Kit Analysis

Overview: 10 locations on the lake – 2 sampling dips per location at one and three foot increments = 20 tests/day
8 months – 1 sampling day per month (160 tests); 4 months – 2 sampling days per month (160 tests)
1 year = 320 tests

Total Phosphorus (range 20ppb) –

Potassium reagent 100	25.45	x7	$171.15
Phosphorus reagent 100	31.79	x7	$222.53
Sulfuric Acid reagent mL	10.39	x7	$72.73
Sodium hydroxide100	12.05	x7	$84.35
Heat tabs 21	8.09	x32	$258.88
		Two years	**$609.64 (approx.)**

Nitrate/Nitrite/Nitrogen (to 50mg/L)

Reagent 100	36.09	x7	$252.63
		Two years	**$252.63 (approx.)**
Two year total for phosphorus/nitrogen			**$862.27 (approx.)**

Tests that can be done with the HydroLab: pH; DO. No budgetary requirements. Air/water/turbidity (secchi disk) are also without budgetary requirement.

WDFW Budget

Staff	$225/day	x50 days	$11250.00
Boat	$250/day	x16	$4000.00
Grab Sampler			$309.00
Bottles cs./12			$49.95
Bottles cs./12			$32.95
Data supplies (rite in the rain paper)			$408.00
WDFW approximate one year contribution			**16,499.90 (approx.)**

Final Report

After monitoring has been complete, the data will be summarized and put into a report. Recommended and corrective actions will be included at that time.

Recommendations will include:

- need for further monitoring
- need for specific location testing and lab work
- submission of additional budget
- corrective action depending on hotspot location (i.e., watershed run off, septic home owner area/issue)
- other

APPENDIX N

AQUATIC PLANT CONTROL CONTINGENCY PLAN

INTRODUCTION

Aquatic plants play an important role in lake ecology. They provide hiding, resting, and living space for fish and other organisms (everything from snails and frogs to insects). They also provide food for these organisms, for waterfowl, and for small mammals. Aquatic plants benefit lakeshore residents by providing protection against shoreline erosion, reducing lake turbidity, and providing a counterbalance for lake algal populations during much of the growing season (by competing for light and nutrients).

However, aquatic plants can reach nuisance levels that greatly hinder recreational lake uses, negatively impact fish habitat, and contribute to undesirable algal blooms. Direct impacts include physical impairment to boating, swimming, and fishing. Excessive plant growth can also reduce water circulation and oxygenation in the nearshore zone, adversely impacting fish. At the time of decay and decomposition, aquatic plants may reduce oxygen concentrations, and at the same time, release large quantities of phosphorus into the water column. This decay and release of phosphorus can stimulate undesirable algal growth. The phosphorus release potential of a 30-acre aquatic plant bed could be as much as 40 kgP/year. This in-lake phosphorus recycling potential could offset the estimated 48 kgP/year reduction in sediment release achieved with the buffered alum treatment. Therefore, future control of aquatic plants may be essential for the maintenance of post-restoration water quality conditions at Horseshoe Lake.

EXISTING CONDITIONS

An initial aquatic plant survey of the lake was based on a review of a July 31, 1993 color aerial photograph of the lake. The photograph indicated that the aquatic plant community in Horseshoe Lake is relatively sparse; is limited to the 0 to 2 meter depth contour; and does not impair recreational uses of the lake. In 1993, plant growth consisted entirely of submerged plant species (assumed to be *Elodea candensis* based on the results of the 1998 volunteer monitoring effort) on approximately 5 acres, or 7 percent, of lake surface area (visual estimate from color aerial photograph).

The 1998 volunteer sampling results (refer to Chapter 3) indicate no substantial change in aquatic plant growth in the lake. Future monitoring should include the use of aerial photographs to assist in determining total lake surface coverage. Photographs should be taken in mid-July of each year and should be taken during a period of low algal concentrations, so that algal bloom activity does not obscure plant communities.

PREDICTED FUTURE CONDITIONS

With water clarity improvements following the alum treatment (average Secchi disk visibility increasing from 1.5 to 3.0 meters), the potential exists for aquatic plant growth to increase in both area and density. There is also the possibility that undesirable, noxious plant species such as Eurasian watermilfoil (*Miriophyllum spicatum)*, or the non-native water weed, *Egeria densa*, could colonize the lake.

It is difficult to predict how aquatic plant growth will change as a result of increased water clarity. However, if plant growth extends to the 4-meter (13-foot) contour, as much as 80 percent of the lake surface (about 68 acres) could eventually be colonized. Plant growth should be controlled well before this maximum growth potential is realized (see recommended goals below).

POST RESTORATION PLANT CONTROL OPTIONS

The first step in evaluating post-restoration aquatic plant control options is to determine the goals of control. Entranco recommends the following goals:

- Control excessive plant growth that would interfere with swimming, fishing, and boating;
- Maintain aquatic plants at moderate levels to allow a balance of human and fish and wildlife uses; and
- Prevent colonization of the lake by any new or noxious aquatic plant species.

The first two goals should be quantified by establishing a maximum growth area for desirable species at less than 25 percent of total lake surface area, or approximately 20 acres. The annual monitoring plan includes an assessment of aquatic plant growth area to assist the City of Woodland in determining when aquatic plant control may be needed. Since there could be some delay between the collection of monitoring data and the time of plant control implementation, we assume that the maximum plant growth area would be 30 acres and the maximum plant control area would be 10 acres (30 acres minus 20 acres). Actual conditions may vary from these assumptions.

The evaluation of alternatives includes control options for the two major plant types: emergent/floating-leaved plants and submerged plants. Controls are also sorted between those appropriate for use by individual property owners and those suited to large-area control needs. **Table 1** summarizes the costs associated with each of the control mechanisms evaluated.

Table 1
Aquatic Plant Control Contingency Plan and Estimated Costs

Control	Year 1	Year 2	Year 3	Year 4	Year 5	10-Year Average Annual Cost
	(after initiation of contingency plan)					
Floating Leaved Plants						
Rodeo® Application	$5,000			$5,000		$2,000
Submerged Plants						
Individual Property Owner Controls[1&2]						
Hand Control	$500					$100
Bottom Barrier	$3,000					$600
Weedroller	$2,000					$400
Large Area Control Techniques[3]						
Harvesting	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000
Grass Carp	$3,000				$500	$700
Herbicides						
Sonar	$5,000		$5,000		$5,000	$2,500
Aquathol	$6,000	$6,000	$6,000	$6,000	$6,000	$6,000

1. Costs are for each waterfront lot. Cost-sharing may be possible.
2. Assumes equipment and/or material replacement every five years.
3. Assumes maximum control area of 10 acres.

FLOATING-LEAVED PLANTS

Common floating-leaved plants include the yellow water lily (*Nuphar sp.*), water lily (*Nymphaea sp.*), and water sheild (*Brasenia Schreberi*). Since none of these plant species presently inhabit the shorelines of the lake, control measures should focus on early detection of any new plant populations and short-term eradication efforts. During annual aquatic plant monitoring, a shoreline survey could be made to determine whether any of these plant species is present.

These plants colonize by extension of underground tubers and are best eradicated by removing the entire tuber/leaf system. In shallow areas eradication could be accomplished by hand or with the aid of gardening tools (shovels, rakes, etc.). If necessary, scythes or machetes could also be used as well as the more efficient Water

Weed Cutter® and Lake Shaver®. If new growth occurs in deeper waters (plants typically occur at depths of no more than six feet) SCUBA divers may be needed to uproot and remove the plants.

If floating-leaved plant beds expand too far for hand removal, they can be controlled with a glyphosphate herbicide such as Rodeo®. Glyphosate is recommended due to its effectiveness, duration of control, low cost, and low environmental impact. Glyphosate is a systemic herbicide that is absorbed by foliage and passed throughout the plant. Since it kills plant tubers, it results in long-term control of the plant community. This herbicide has low toxicity to bottom-dwelling organisms, fish, birds, and other mammals. It dissipates quickly; therefore, it is considered to have a low environmental impact. It is assumed that two applications of the herbicide would be required in any treatment year to ensure success.

Treatment of one acre of plants (assumed maximum growth area) two times would cost approximately $500. Treatment may have to be repeated every three to four years.

SUBMERGED PLANTS

Control Methods for Individual Property Owners

The following techniques could be used by private property owners to provide effective control in relatively small areas.

Hand Tools

There are several hand control tools, such as the Waterweeder®, Water Weed Cutter®, and Lake Weed Shaver®, that can be purchased to provide lake residents with effective tools for controlling plants on private waterfronts. The tools range in cost from $100 to $400 each and they could be purchased by individual property owners or by the City and then rented or loaned to private property owners.

Bottom Barriers

Bottom barriers could be used by private property owners. Installation of bottom barriers involves placement and anchoring plastic sheeting over the weed control area, to prevent weed growth by light limitation or physical obstruction. The plastic sheeting must have holes to allow passage of gas produced by decomposing organic material on the lake bottom. Otherwise the sheeting will float to the surface. Rocks, sandbags, bricks or stakes could be used for anchoring. Bottom barrier costs approximately $1 per square foot, installed. To protect a 30-foot by 100-foot area alongside a dock would then cost $3,000.

Private property owners could also use Weedrollers® to control aquatic plants. A Weedroller® is an electrically powered, mechanical device that is attached to a dock or

mounting post. The Weedroller® consists of a long aluminum roller that rolls over the selected control area and prevents weed growth by physical disturbance. The Weedroller® can be set to operate just a few hours during the night once each week, so there is no loss to recreational use, no safety hazard, and minimal power cost. A basic Weedroller with a 30-foot reach costs approximately $2,000. This would control an area of 30 feet in diameter directly in front of a dock or mounting post.

Large-Area Control Techniques

With improved water clarity extending to 4 meters, as much as 80 percent, or 68 acres, of Horseshoe Lake could be colonized by submerged aquatic plants. Since the proposed plant control goal is to limit plant growth to no more than 25 percent of lake surface area (about 20 acres), we assume that large-area plant control techniques would be implemented when total plant area reaches 30 to 35 acres. Therefore, the maximum control area assumed in the following discussion of control options is 10 acres. This assumption is based on the notion that any large-area control technique will be effective and will prevent further colonization at the time of implementation. Nevertheless, the potential growth area is still recognized as 68 acres.

Mechanical Harvesting. Mechanical harvesting is one of the optional large-area control techniques. Mechanical harvesting involves the use of a pontoon-mounted harvester which cuts submerged plants to a depth of 6 to 7 feet and then uses a conveyor system to lift the cut material up onto the deck of the harvester. When fully loaded, the harvester transports the cut plants to a shore conveyor which receives the cut plants from the harvester and loads them into a dump truck. The truck then hauls the plants to a disposal site for composting.

While mechanical harvesting has the advantage of removing plant material and associated nutrients from the lake, some plant fragments are left in the lake. These plant fragments often wash up on shore and are considered a nuisance by lakeshore residents. If plant fragments find their way to uncolonized areas, they could establish new plant communities. Therefore, if any noxious weeds show up in the lake, mechanical harvesting should be stopped until the noxious plants are eradicated. Finally, plant harvesting may not be effective in controlling aquatic plants in and around nearshore private properties because of poor maneuverability and/or because the equipment is unable to operate at depths less than 2 to 3 feet. This limitation could lead to citizen complaints if citizens are assessed for plant-harvesting costs under a Lake Management District (LMD).

Since this work could be performed by a contractor, the City of Woodland could implement this technique on a trial basis. The city could begin with one cut per summer and move to two cuts per summer if desired.

Assuming ten acres maximum control areas, harvesting costs are estimated at $4,000 per summer for a single cut ($400 per acre per cut) and $8,000 per summer for two cuts. Costs shown in **table 1** are based on two cuts per summer.

Grass Carp. Stocking the lake with grass carp is another large-area control method. Grass carp are plant-eating fish native to China and Siberia. They are raised commercially in the southeast U.S. for use in lake and pond plant-control projects. The carp don't compete with game fish for either food or spawning habitat and are therefore considered to be a good biological control agent. The carp can reach 50 to 60 pounds and can eat twice their weight in plant matter each day. They can be very efficient grazers.

The greatest advantage in using grass carp is their low cost—especially considering the efficiency and duration of control achieved. In fact, the biggest problem with grass carp is that they can be far too effective and can virtually eliminate submerged plant populations, leaving no plants to provide desirable ecological functions.

The solution to this problem is to stock the fish at an appropriate rate. A great deal of research has gone into determining appropriate stocking rates, yet there is still no definitive answer. There is a chance that either too few would be stocked with little or no control or that too many would be stocked and almost all plants would be removed. Removal of too many of the plants could reduce existing fish and waterfowl populations by reducing cover and food. Removal of all aquatic plants may also cause shoreline erosion and suspension of nearshore sediments, resulting in impaired water quality through increased turbidity.

Another concern with the use of grass carp is that the plant material they consume is returned to the lake (via feces) in a soluble form that can then supply algae with nutrients. Therefore, unlike harvesting, carp do not support other lake restoration activities aimed at reducing nutrient loads. It should be noted that carp do not increase the overall nutrient load since the plant material would naturally decay and be released to the lake under normal conditions. However, they may promote increased algal growth during summer months by recycling plant nutrients prior to the normal fall plant decomposition time frame.

The Washington Department of Fish and Wildlife (WDFW) has placed two important restrictions on grass carp projects:

- A Phase I lake restoration study is required.
- Inlets and outlets must be screened to ensure that grass carp do not escape.

Since Horseshoe Lake has a completed Phase I study and the inlets and outlets are already screened, these requirements are already met. The fact that there is no migratory fish use of the lake (i.e. no salmonid use) also reduces potential fish screening concerns. Thus, WDFW, the permitting agency, might look more favorably on use of grass carp in Horseshoe Lake.

Assuming a maximum cost of $15 per fish, a stocking rate of 20 fish per vegetated acre, and control of 10 acres of plants, the cost for stocking would be $3,000. An estimated $500 would also be required every five years to replenish carp lost to mortality.

If grass carp were stocked in the lake in appropriate numbers, it would take three to five years before any measureable plant control occurred. However, once control was initiated, it would likely continue for another five to ten years, or indefinitely, if the carp were re-stocked every few years. There is a concern that during the three-to-five-year interval, before the carp take full control, increased plant and/or carp nutrient recycling could reduce the longevity of the alum treatment due to the large amount of nutrients that could be added over this time period if plant biomass increases dramatically or if the grass carp stir up sediment. If grass carp are selected as the preferred aquatic plant-control method, other control methods could be used during the intervening three-to-five-year period.

The feasibility of this alternative is entirely dependent upon WDFW policy at the time of application. New information developed in the next few years may result in changes to WDFW policy and the overall acceptability of this control technique. The WDFW policy and approach should be reviewed in the future to determine feasibility.

Herbicide Applications. There are a number of herbicides that might be appropriate for use on Horseshoe Lake. Each has advantages and disadvantages and different application procedures and restrictions. Probably the greatest disadvantage to using any herbicide is the risk associated with the use of chemicals or toxins in natural environments. Although all herbicides approved for use in aquatic environments must pass stringent toxicity tests and have been approved by both the EPA and Ecology, their use still concerns many.

Possibly the most common herbicide for use on submerged plants is Sonar®, which contains fluridone as the active ingredient. Sonar® was specially formulated to kill Eurasian watermilfoil and is not as effective on other plants. Native plants may die back the first year, but because they leave a seed bank in the sediments, some regrowth typically occurs the following year. Sonar® has at least two advantages over other herbicides: (1) it kills both the plant and its roots, so it has greater longevity; and (2) Sonar® has no lake use restrictions due to its low toxicity. The only use restriction is on using treated water to water plants for the obvious reason that it could kill the plants.

Other than general chemical use concerns, the largest disadvantage to using Sonar is the cost. The product itself is expensive, and the application can be expensive as well. Sonar® comes in both a liquid form (for treating large volumes of water) and a pellet form for treating smaller areas. In Horseshoe Lake, the liquid form would probably be used to treat large areas of plants in the main body of the lake.

It is difficult to estimate cost because use of the liquid is based on volume, not surface acres. Based on estimates from other lakes, it would cost approximately $5,000 each treatment year to treat 10 acres. Treatments may be needed as frequently as every other

year, or as infrequently as every third year. Thus, the average annual cost is expected to be no more than $2,500 per year if averaged over a 10-year period.

A second option is to use an herbicide such as Aquathol® that contains endothall as the active ingredient. Aquathol® is a contact herbicide that works rapidly to kill the leaf and stem portions of plants. It does not kill the roots and root crowns; therefore, control lasts for one season at most. Treatment is required at least annually to achieve desired control. Aquathol® affects a broad spectrum of plants, including those found in Horseshoe Lake. Aquathol® does have some label restrictions. In Washington State, there is an eight-day swimming restriction, a three-day fish consumption restriction, and a 35-day irrigation or potable water use restriction. The largest advantage to using Aquathol® is the lower chemical cost and the ability to spot treat problem areas. It would cost approximately $600 per acre each year to treat with Aquathol®. In Horseshoe Lake, therefore, the total annual cost would be about $6,000, assuming a maximum treatment area of 10 acres.

Diquat is another herbicide which could be used to control nuisance growths of common waterweed (*Elodea spp.*). This herbicide is less expensive and generally effective; however, Diquat is not currently approved for aquatic use in the State of Washington.

SUMMARY AND RECOMMENDATION

With increased water clarity (up to 4.0 meters) following the buffered alum treatment there is increased potential for aquatic plant growth and in-lake phosphorus cycling which could adversely impact long-term lake water quality. A preliminary goal (subject to the review and approval of the City of Woodland) of 20 acres maximum aquatic plant coverage has been set as a control threshold. If annual monitoring indicates plant growth area exceeding 20 acres, an aquatic plant control program should be implemented.

The most cost-effective approach would be to use grass carp as the primary control option. Using grass carp would require an initial stocking cost of approximately $3,000, with supplemental stocking costs of $500 every five years. Since maximum grass carp control may be delayed by three to five years following the introduction of the fish, interim plant control could be accomplished by harvesting ($4,000 to $8,000 per year) or by Sonar® treatment ($5,000 every other year).

Individual property owners may want to provide enhanced plant control by hand pulling, hand cutting (several commercially available tools are available), use of bottom barriers, or use of Weedrollers®.

Jody Bartkowski

From: Scott Perry [ScottPerry@CNI.Net]
Sent: Monday, December 03, 2012 4:19 PM
To: Stacie Kelsey; Jody Bartkowski; Francis and Char Patnode; Jeff & Monique Sullivan; Jody Bartkowski; Mike & Marcia Curry; Niel Vanhorn ; Pat Rychel; Terry & Karen Jones; Tom Golik; Walt Church; Susan Humbyrd; Al Swindell; Benjamin Fredricks; JJ Burke; Councilman Marshall Allan; Marilee McCall; Grover B. Laseke
Subject: Run off from the lot into the lake
Attachments: #1 Run off.jpg; # 2 Run off.jpg; # 3 Run off.jpg; # 4 Run off.jpg

FYI – Please do not reply

As part of my lake report...

When I talk of run off from the skate parking area into the lake this is a small part. These pictures were taken after the first rain we also noted a large stream west of the Welding shop. Bart indicated that was for storm runoff from at least Bozarth south, meaning most of the old town area. The committee has ask public works to do what they can to make suggestions to reduce or eliminate as much pollution as possible.

Scott Perry

City of WOODLAND
WASHINGTON
Lewis River Valley

P.O. Box 9
Woodland, WA. 98674
www.ci.woodland.wa.us

100 Davidson Avenue
FAX: (360) 225-1201

Fire
(360) 225-7076

Police
(360) 225-6965

300 East Scott Avenue
FAX: (360) 225-7467

Public Works
(360) 225-7999

230 Davidson Avenue
FAX: (360) 225-7336

Building
(360) 225-7299

Clerk-Treasurer
(360) 225-8281

Planning
(360) 225-1048

November 14, 2012

Department of Ecology
Water Quality Program
Attn: Lizbeth Seebacher
300 Desmond Drive
Lacey, WA 98503

Re: City of Woodland Aquatic Weeds Management Fund Grant Application

Dear Ms. Seebacher,

Attached is a completed grant application, map, and draft testing protocol for the Horseshoe Lake Aquatic Monitoring Project.

If you have an y questions regarding the application please call me at (360) 225-7999 or you can contact me at steppb@ci.woodland.wa.us.

Sincerely,

Bart Stepp

Bart Stepp, PE
City of Woodland
Public Works Director

c: Grover B. Laseke, Mayor

DEPARTMENT OF ECOLOGY
State of Washington

Aquatic Weeds Management Fund Grant Application

FOR ECOLOGY USE
Application Number

_____

_____

- PART 1 -

1. PROJECT TITLE (five words or less):

Horseshoe Lake Aquatic Monitoring Project

2. APPLICANT NAME

Name: Bart Stepp, City of Woodland Public Works Director

Address (If different from Signatory): (same)

Federal Identification Number: 916001533

3. AUTHORIZED SIGNATORY (The person whose name is listed here must sign Box 9 of this application)

Name: Grover Laseke **Title**: Mayor

Address: 230 Davidson Ave., PO Box 9, Woodland, WA 98674

4. APPLICANT STAFF CONTACT

Name: Bart Stepp **Title**: Public Works Director

Address: 230 Davidson Ave., PO Box 9, Woodland, WA 98674

Telephone number: (360) 225-7999 **Fax number**: (360) 225-7467

E-mail address: SteppB@ci.woodland.wa.us

5. PROJECT DATA (Actual PROJECT data, not data of applicant)

If the project is not a statewide project, please indicate the county(s), the water resource inventory area(s), legislative districts, and congressional districts where at least five percent of the PROJECT will be accomplished. The total of each separate designation must equal 100 percent.

Counties		Water Resource Areas		Legislative Districts		Congressional Districts	
Name	Percent	Number	Percent	Number	Percent	Number	Percent
Cowlitz	65%	27	65%	20th	65%	3rd	65%
Clark	35%	27	35%	20th	65%	3rd	35%

6. PROJECT DURATION

Project Length (2 years max): 22 months

Anticipated Start Date: May 2013 (when agreement has been finalized)

Anticipated Project Completion Date: March 2015

7. PROJECT TYPE

Has an integrated aquatic vegetation management plan been developed for this project? Yes ☐ **No** ☒

If yes, please provide the plan title and date that it was submitted to Ecology n/a

n/a

8. BRIEF PROJECT DESCRIPTION ***(to appear in the funding list, 50 words or less)***

The "Horseshoe Lake Aquatic Monitoring Project" will conduct baseline mapping of aquatic vegetation and water quality monitoring. This data will be utilized to develop an integrated Horseshoe Lake Management Plan that identifies opportunities to improve lake functions and quality as well as develop a public outreach plan for lake education.

9. COST BREAKDOWN

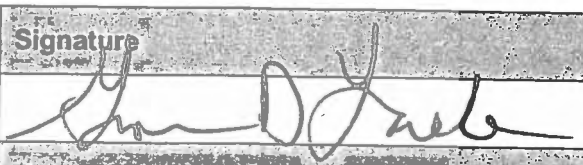
Total Project Cost
This amount is the total cost of the project and includes state and local costs **$** $55,739.00

Ecology Grant Amount
This amount represents the Ecology grant request, at 75 percent of the total project cost for an implementation or planning project or 87.5 percent of the maximum eligible project cost for a pilot project. Planning grants are capped at $30,000 state share. Implementation grants are capped at $75,000 state share. **$** $29,200.00

Applicant Share
This amount is 25 percent of the total project cost for planning or implementation projects and 12.5 percent of the total project cost for pilot projects. **$** $26,539.00

10. SIGNATURE BOX

I CERTIFY TO THE BEST OF MY KNOWLEDGE THAT THE INFORMATION IN THIS APPLICATION IS TRUE AND CORRECT AND THAT I AM LEGALLY AUTHORIZED TO SUBMIT THIS INFORMATION ON BEHALF OF THE APPLICANT.

Printed Name	Signature
Grover Laseke	
Title	**Date**
Mayor, City of Woodland	11-14-12

11. APPLICATION SUBMITTAL	
Send one copy with an original signature, and one electronic copy to:	
U.S. Postal Mailing Address:	Overnight Mail or Hand Delivery Address:
Department of Ecology Water Quality Program P.O. Box 47600 Olympia, WA 98504-7600 Lizbeth.Seebacher@ecy.wa.gov	Department of Ecology Water Quality Program 300 Desmond Drive Lacey, WA 98503 Lizbeth.Seebacher@ecy.wa.gov
NOTE: APPLICATIONS MUST BE RECEIVED AT THE DEPARTMENT OF ECOLOGY BY 5:00 P.M. ON THE CLOSING DATE. NO FACSIMILE OR ELECTRONIC APPLICATIONS WILL BE ACCEPTED. TO ENSURE DELIVERY OF APPLICATION BY THE DEADLINE, YOU MAY WISH TO CONSIDER USING RETURN RECEIPT MAIL.	

To ask about the availability of this document in a version for the visually impaired, call the Water Quality Program at 360-407-6502. Persons with hearing loss, call 711 for Washington Relay Service. Persons with a speech disability, call 877-833-6341.

Aquatic Weeds Management Fund
Grant Application
Part 2
Project Proposal

This is the section of your application in which you describe your project. The information that you provide here will be used to evaluate the merit of your project and will provide the basis for our evaluation. Before describing your project, please carefully review the information in Chapter IV of the Aquatic Weeds Management Fund Program Guidelines.

Contact Lizbeth Seebacher of the Department of Ecology if you have specific questions: by e-mail at Lizbeth.Seebacher@ecy.wa.gov or by telephone at 360-407-6938. ONLY INFORMATION SUBMITTED BEFORE THE APPLICATION DEADLINE WILL BE USED IN THE EVALUATION PROCESS.

Project Proposal

If your project implements an Integrated Aquatic Plant Management Plan, please enclose or forward via email a digital copy of the plan or a plan approval letter from Ecology.

1. EXECUTIVE SUMMARY

Please provide an overview of the proposed project. Limit your answer to 250 words.

- State the aquatic plant species (scientific name and common name) targeted for action. ***Invasive, non-native freshwater aquatic plants are given priority for grant funding.***
- Identify the water body or water bodies that will be involved and its relation to other infestations of the target plant species.
- **Please include a map of the targeted water body or water bodies with the application.**

The city of Woodland is at the gateway to Mt. St. Helens and the Lewis River recreational areas located off of Interstate 5 (mile marker 21). Horseshoe Lake is a landmark feature in Woodland. It is an old oxbow of the North Fork of the Lewis River at the border of Cowlitz and Clark counties. The lake covers approximately 84 acres with an average depth of four feet. The lake is surrounded by a mix of residential, roadways, commercial, agriculture, and a city park (with a boat ramp). Horseshoe Park provides access to the lake for boaters, swimmers, anglers and the general public for active and passive recreation.

The ecological functions of the lake were impacted by the construction of Interstate 5 several decades ago, therefore man-made modifications were installed to maintain hydrologic functions and connections to the Lewis River (including an inlet, pump, gate valves, etc.). These functions are managed by the Washington Department of Transportation in coordination with the city of Woodland and the counties.

Given the dynamics of the surrounding land uses, impacts to the lake health have increased over time. The relative shallow water is suitable to significant aquatic plant growth. The city hosts a volunteer advisory committee, the Horseshoe Lake Committee, works to identify impacts, recreational issues and potential solutions for lake management. Past efforts have been attempted to monitor (as noted on Ecology website, 2007), assess and manage aquatic vegetation. Updated information is necessary to develop a full management plan for control of the noxious weeds, primarily Eurasian watermilfoil (Myrophillum spicatum).

This species is listed as a Class B weed on the 2012 Washington State Noxious Weed list. The information will also provide insight into other impacts, such as the presence of pollutants, and other invasive species like nutria and aquatic inverabrates. One of the goals of this effort will be to identify impacts on the lake from the Lewis River and vise versa.

(See map attached)

2. SCOPE OF WORK

Provide a scope of work for your project. List the tasks that you will undertake to complete the project, including details. For example, if education is a component of the project, when describing that task, say "we will produce and distribute two educational newsletters to the Lake X residents. In addition, we will hold at least one public meeting to talk about the project, etc." Describe how the project goals will be achieved. Discuss specific methods to be used or describe how the project will be accomplished.

Task 1 is standard for all grant projects. Follow the format provided below for the additional tasks in your scope of work:

Task 1- Project Administration/Management:

A. The RECIPIENT will administer and manage the project. Responsibilities will include, but not be limited to: maintenance of project records; submittal of payment vouchers, fiscal forms, and progress reports; compliance with applicable procurement and interlocal agreement requirements; attainment of all required permits, licenses, easements, or property rights necessary for the project; conducting, coordinating, and scheduling of all project activities; quality control; and submittal of required performance items.

B. The RECIPIENT will ensure that every effort is made to maintain effective communication with the RECIPIENT's designees, the DEPARTMENT, all affected local, state, or federal jurisdictions, and any interested individuals or groups. The RECIPIENT will carry out this project in accordance with completion dates outlined in this Agreement.

C. The RECIPIENT shall submit all invoice requests and supportive documentation to the Financial Manager of the DEPARTMENT.

Required Performance:

1. Effective administration and management of this grant project.
2. Maintenance of all project records.
3. Submittal of all required performance items, including the Post Project Assessment Plan, progress reports, financial vouchers, and maintenance of all project records.

Total Task Cost $$3,240.00

Task 2: Aquatic vegetation mapping and monitoring - subtasks include develop mapping/monitoring plan (Woodland, partners); set transects/plots for mapping (contractor); mapping/monitoring of lake 2013(contractor); mapping/monitoring lake 2014 (contractor); compile field data report (contractor) - $25,500

Task 3: Water quality monitoring (WDFW) - sample 10 locations (Total phosphorus, Nitrate/Nitrite/Nitrogen, pH, DO, water/air temperatures, e coli/coli form, turbidity); determination of areas of concern, determine corrective actions; compile field data report and recommended actions. Sample two years - $16,499

Task 4: Final report and recommendations with outreach - Data compilation into one final report (contractor); develop preliminary lake management recommendations (partners); develop an integrated aquatic management plan (that could be approved by Ecology) for implementation (partners); prepare and distribute preliminary public outreach about the issues and actions. - $10,500

3. PROPOSED BUDGET

Please provide a budget broken down by state fiscal year (July 1 through June 30), using one of the following formats. Provide the total cost of the project, not just the state share. Projects are limited to four years.

Budget by Task

	FY1	FY2	**Totals**
Task 1. Project Management	$1,700.00	$1,540.00	$3,240.00
Task 2.	$13,500.00	$12,000.00	$25,500.00
Task 3	$10,000.00	$6,499.00	$16,499.00
Task 4	$0.00	$10,500.00	$10,500.00
Total	$25,200.00	$30,539	$55,739.00

-- OR --

Budget by Budget Object

	FY1	FY2	**Totals**
Salaries, wages, and benefits (SWB):			
Indirect cost up to 25% of SWB:			
Material, supplies			
Equipment			
Contracts			
Other			
In-kind contributions			
Total			

4. WATER QUALITY AND PUBLIC HEALTH IMPROVEMENTS

At a minimum, your response should answer these questions:

- Do the plants in this water body pose a threat of infestation to other nearby water bodies? ***Include a map of the targeted water body with your application.***
- How is this aquatic plant or plants affecting the targeted water body or water bodies? What is the potential of the plant to impact the targeted water body or water bodies, and how will this project benefit the public?
- What are the project goals? What will you accomplish by undertaking this project?
- Does this project have statewide or regional significance?

Horseshoe Lake is hydrologically connected the North Fork of the Lewis River. This river basin provides critical habitat for a number of state protected species including steelhead trout and salmon. Controlling noxious weeds is an important tool in maintaining a healthy habitat for protected and other regional wildlife species. Refer to the attached map for the location of Horseshoe Lake and the connections to the Lewis River.

The presence of weeds in the lake varies throughout the system but has reached a level of dense patches in certain areas of the lake (as noted in the 2007 survey). Recent visual observations have suggested the spread of the weed beds which cause multiple issues for the lake: weeds limit access to safe boating in the lake, reduced habitat for native aquatic species, change the ecology of the lake and produces unpleasant conditions for swimming.

The goals for this effort include:

- Gain a better understanding of the type of aquatic vegetation in the lake, the quantity of plants in the lake and potential areas of concerns with the plants (i.e. filling in near the inlets, boat ramp, etc.).

- Gain a better understanding of the water chemistry of the lake to gauge overall health of the lake, potential pollutants and their sources.

- Compile baseline data and correlate information to best understand opportunities to reduce noxious and invasive vegetation in the lake. The report will address recommendations and action items for removal and future maintenance to keep the weeds controlled and eventually eradicated.

- Use information collected to create public education outreach materials about the current status of the lake's health and potential action items. Information will be delivered in a variety of means, such as web page, press release or fact sheets. Given the popularity of the lake, it will be important to inform citizens of monitoring activities and results of the information gathered.

- Engage the community by encouraging and holding volunteer events at the lake to raise awareness about invasive species, water quality and pollution.

To ensure that the lake minimizes the impact to the river, a management plan will provide guidance into its current health and future management. The site is the primary recreation area for the city of Woodland and attracts visitors and tourists from the southwest Washington region (especially for special events such as Planter's Day and fishing derby).

5. PROJECT TEAM

Please list the key people who will make this project a success. List the people who will actually lead or work on the project. Note their commitment to the project and any special skills they bring.

A team of local, regional partners and experts will guide this project through to recommended action items for the lake's management:
City of Woodland - Bart Stepp - will oversee the project for the City of Woodland. Bart (and his staff) will provide project management, oversight, grant coordination, communications, and contractor/consultant management. Bart has been with the city for 0.8 years and has 12 years experience in project coordination and management. Staff participating in the project will be tracking their time as in-kind match to the grant.
Clark County Clean Water Program - Ron Wierenga (manager) and Jeff Schnabel (Program Coordinator) will be the primary contacts for Clark County Department of Environmental Services. Both Ron and Jeff have extensive stormwater and river/lake management experience in Clark County. Staff participating in the project will be tracking their time as in-kind match to the grant.
Clark County Noxious Weed Coordination - Mike Monfort (NW Coordinator) and Casey Gozart (vegetation specialist) will be primary contacts for noxious weed control for Clark County. Mike and Casey have extensive knowledge of weed control in the county as well as coordination with other agencies, including the

state for weed control. Staff participating in the project will be tracking their time as in-kind match to the grant
Cowlitz County Noxious Weed Coordination - Angelica Velazquez (NW Coordinator) has been with Cowlitz County for over 4 years and has extensive knowledge of west coast ecology and habitat management. She will be the primary contact for Noxious weed control in Cowlitz County.
Washington Department of Fish and Wildlife - Stacie Kelsey will be conducting the water quality monitoring on Horseshoe Lake. Stacie has extensive fisheries experience in Oregon and Washington for over 15 years. She will be able to help correlate her data with the data collected from the vegetation survey.

6. PROJECT DEVELOPMENT AND LOCAL SUPPORT

At a minimum, your response should answer these questions:

- Do you have local citizen support for the project--especially support of those citizens who live on, use, or have an interest in managing the aquatic plants in the targeted water body?
- What is your long-term commitment to this project? Are you prepared to continue implementation of long-term objectives without grant support?

The project is sponsored by the City of Woodland and has support from a number of entities and groups including Washington Department of Fish and Wildlife, Clark County, Cowlitz County, the Horseshoe Lake Committee, and local neighbors/stakeholders (residents and businesses) of the lake.

The city of Woodland and its partner agencies are committed to a long-term project to identify key problems with the lake and development of a lake management plan. Given the proximity of the lake to the North Fork of the Lewis River and the significant role that the lake plays in the city, it is to everyone's benefit to ensure the long-term health of the river. A long-term management plan will identify key opportunities for its ecological health, including public education, maintaining safe recreational access, management of invasive species (vegetation, fish and wildlife), hydrologic management recommendations and other key issues.

Funding for long-term action items will continue to be identified through grants, partnerships, donations, and volunteer support. Research has suggested that eradication of watermilfoil is challenging so there will need to be an on-going effort by the city and its partners to control this and other aquatic noxious weeds.

To ask about the availability of this document in a version for the visually impaired, call the Water Quality Program at 360-407-6502. Persons with hearing loss, call 711 for Washington Relay Service. Persons with a speech disability, call 877-833-6341.

Horseshoe Lake Woodland

Inlet
- Unspecified
- Catch Basin
- Curb Inlet
- Combination Inlet
- Field Inlet
- Area Drain
- Downspout
- Linear Inlet

DischargePoint
- DischargePoint

FlowControl
- Manhole
- Inlet
- Weir
- Orifice Plate
- Diversion Point

Treatment and Flow Control
- Energy Dissipater
- Sediment Trap
- Oil/Water Separator
- Debris Barrier
- Detention Pond
- Infiltration Basin
- Treatment Wetland
- Wet Pond
- PreSettling Cell
- Buried Wet Vault
- Closed Detention
- Drywell
- Open Top Drywell
- Sand Filter Vault
- Infiltration Trench
- Open Filter
- Porous Pavement
- Dispersion
- Amended Soils
- Preserved Natural Vegetation
- Vegetated Roof

Manhole
- not specified
- Locked
- Locked with gasket
- Unlocked

Connections
- Private - Public
- Municipal - Jurisdictional
- Unknown Connection
- All other values

Fitting
- Cleanout
- Plug
- Pump
- Reducer
- Tee
- Valve
- Unknown Connection

Filter Systems
- Vault
- Manhole
- Inlet

Channel
- Ditch
- Swale
- Filter Strip
- Stream
- Dummy Connection

GravityMain
- other
- Stormline, Culvert
- Stormline (perf)
- Inline Storage
- Inline Storage (perf)
- Overflow
- Dummy Connection

Facilities
- <all other values>
- Private
- Public
- City
- State
- Other
- Unknown

- County Boundary
- Woodland
- Taxlots
- County Lands

Information shown on this map was collected from several sources. Clark County accepts no responsibility for any inaccuracies that may be present.

schattehAug2012

CLARK COUNTY
WASHINGTON

proud past, promising future

DEPARTMENT OF ENVIRONMENTAL SERVICES

November 13, 2012

Lizbeth Seebacher
Financial Management Section
Water Quality Program
Department of Ecology
P.O. Box 47600
Olympia, WA 98504-7600

Re: Aquatic Weeds Management Grant, City of Woodland – Horseshoe Lake
Letter of Support

Dear Ms. Seebacher:

On behalf of Clark County, we are pleased to submit this letter of support for the City of Woodland's grant application for Horseshoe Lake. As the Environmental Services Director, I support our partner agencies in their efforts to control and eradicate noxious weeds in our local waterways.

Horseshoe Lake plays an important role in the City of Woodland and in Clark County. It is a favorite destination for the local community to enjoy passive recreation, and it is a regional tourist destination for fishing, boating and swimming. The lake provides valuable wildlife habitat for local species and is an important section of the North Fork of the Lewis River greenway.

As a partner on the grant application, Clark County will provide staff time and expertise in lake management and noxious weed control in collaboration with staff from the City of Woodland, Cowlitz County and the Washington Department of Fish and Wildlife. Agencies will work together to gather data, analyze the results and formulate an action plan for the lake management. The process will also include the public as active users and caretakers of the lake.

Please do not hesitate to contact Ron Wierenga at (360) 397-2121, Ext. 4264, with any additional questions or comments you have regarding this project.

Regards,

Kevin J. Gray, P.E.
Director of Environmental Services

1300 Franklin Street • P.O. Box 9810 • Vancouver, Washington 98666-9810 • http://www.clark.wa.gov
tel: (360) 397-2121 • fax: (360) 397-2062