Loomis Lake

Integrated Aquatic Vegetation Management Plan

January 2015

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The Loomis Lake Aquatic Plant Management Plan is the result of years of knowledge and persistence contributed by this dedicated group. We want to thank everyone involved: to the county, state, and the Loomis Lake community. We apologize if we have inadvertently missed anyone in the following list:

The Loomis Lake Steering Committee and Community

Al Mandarano, Ann and Steve Smith, Anne Wilson, Bill and Renelle Welch, Bob and Mary Salisbury, Bob Cline, Brenda Hill, Brian and Mary Loos, Charles and Bernice Carlson, Cindy Flood, Clark and Devann Jacobson, Clark Caswell, Dave Armbrust, Dawn Klein, Anne Murray, Dennis Winston, Donn and Amela McPherson, Doug and Janet Schnebly, Evelyn Campion, Fred Munhoven, Gary Ream, Gary Sinkler, Goldie Ward, Gunther and Christina Weiss, Janet Easley, Jerry and Jan Delfel, John and Bonnie Dippold, Jonathan and Shirley King, Judith Macpherson, Lea and Earl Cot'e, Lynda Cangemi, Maggie Bloomgarden, Margaret Smith, Mike and Georgette Mantifel, Mike Campion, Nadine Long, Nick Haldeman, Nina Wolters, Pam Reynolds, Paul and Tammy Libby, Richard and Patricia Gilmore, Robert Hill, Robert and Marianne Prentice, Robert and Patricia Kennedy, Royal and Vickie Waldock, Sarah Jo and Bob Jensen, Shirley Pavolka, Steve and Linda Holmes, Susan Svendsen, The Kellars, Vanessa Kline, Vikki Rennick, and Wayne Frye

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Kim Patten: Washington State University

Consultants

Mike Nordin, Brian Sheldon, Megan Martin, and Jeni Maakad: Pacific Conservation District

We would also like to sincerely thank the Ocean Park Fire Hall and the Sunset Sans Club House for generously providing their facilities for the Loomis Lake Steering Committee meetings.

Executive Summary

Loomis Lake is located on the Long Beach Peninsula in Pacific County. It is a 4.3 long, narrow eutrophic body of water. Fed by rainfall and groundwater, this shallow lake is (mean depth = 1.5 m; max depth = 2.7 m) Surface water exits the lake (surface area = 68 ha) through Loomis Lake Outlet at the far north end, eventually flows into the Pacific Ocean.

Loomis Lake has a history of various recreational activities on the lake for visitors and residents, including boating, fishing, swimming, canoeing and wildlife viewing. The Washington Department of Fish and Wildlife (WDFW) maintain a public access and boat launch located mid-lake on the western shore. Loomis Lake supports an excellent warm water fishery, including largemouth bass, bluegill, black crappie and yellow perch. Rainbow trout are stocked annually. Due to the outbreak in Eurasian water milfoil and Brazilian elodea, a large number of these activities are no longer feasible.

Previously, Long Beach Peninsula residents have expressed concern about the invasion of the lake by Eurasian water milfoil and created the Loomis Lake Group in 1996. Through a private contractor, a plan was developed in 1998 and a draft Loomis Lake Integrated Aquatic Plant Management Plan was developed. Loomis Lake was treated with herbicides Sonar and Rodeo for 1 year. The treatment of the Lake fell short and was not completed through its full course. In 2014, the Loomis Lake Steering Committee was developed in hopes of finishing this project to control the invasive plant species.

This Manual was compiled by the Pacific Conservation District and the Loomis Lake Steering Committee.

Problem Statement

The original advisory board was established in 1996, with a plan to eradicate Eurasian Milfoil on Loomis Lake. 19 years later, not only is Eurasian Milfoil a continual problem, but the infestation of Brazilian Elodea has also hindered the natural and recreational aspects of the lake. In 2014, the Loomis Lake Steering Committee was established to ensure these invasive species are controlled and managed in order to restore Loomis Lake back to its natural habitat. The identified problems are two invasive weeds: Brazilian elodea *(Egeria densa)* and Eurasian Milfoil (*Myriophyllum spicatum)*. Brazilian elodea forms dense, monospecific stands in the water restricting flow, trapping sediment, and causing fluctuations in water quality. These dense beds interfere with recreational uses of Loomis Lake by interfering with boating, fishing, and swimming. Eurasian watermilfoil also create monospecific stands providing poor habitat for waterfowl, fish, and other wildlife by shading out native vegetation. At the end of the growing season, Eurasian Milfoil has a high decomposition rate, increasing the internal loading of phosphorus and nitrogen in the water, decreasing the water quality by raising the pH levels and water temperatures and decreasing the oxygen levels. Eurasian watermilfoil interferes with recreational activities such as swimming, boating, fishing and water skiing.

AQUATIC PLANT MANAGEMENT GOALS

The Loomis Lake Steering Committee developed a set of goals for the Loomis Lake Integrated Aquatic Plant Management Plan (IAPMP). These goals were formulated after discussion which took into account the lake and its characteristics, the Long Beach peninsula community, and all associated costs. The goals are outlined as follows:

- Develop and begin implementation of an aquatic survey of all lake vegetation.
- Look at all variations of treatment, long term and short term, keeping into consideration all beneficial uses of the lake.
- Reduce Brazilian elodea and Eurasian watermilfoil to increase recreational uses of the lake, while maintaining adequate fish and wildlife habitat.
- Prevent Eurasian watermilfoil and Brazilian elodea from spreading to nearby lakes.
- Aesthetics of the lake.
- Seek funding mechanisms in order to continue long term control of invasive aquatic plants.
- Keep management program costs affordable.
- Inform and involve all residents and lake users in order to sustain the Eurasian watermilfoil and Brazilian elodea control long term.
- Distribute educational signs at/around boat dock regarding invasive species and control methods

Watershed and Lake Characteristics

Loomis Lake is located on the Long Beach Peninsula on the coast of Washington State. This peninsula is a narrow strip of land between the Pacific Ocean on the West and the Willapa Bay to the East. The peninsula was formed by ocean and long shore currents along the coast of Oregon and Washington transporting and depositing sediment primarily from the Columbia River. Topography on the peninsula is the result of sediment deposition, wind generated dune formation, and stabilization of the dunes by vegetation. Lakes occur on the peninsula where the land surface intercepts the water table in the low lying swales between dune ridges. The Loomis Lake watershed (approximately 922 acres) is long and narrow and lies parallel to the Pacific coast. The lake is shallow with a mean depth of 5 feet and a maximum depth of 9ft. The lake is 167 acres.

Soil types surrounding Loomis Lake are primarily Yaquina loamy fine sands along the western shoreline and beaches/dunes land along the eastern shoreline (USGS 1995). The Yaquina loamy fine sands are moderately well drained where the beaches and dune lands are drained. Along the northeastern shore and the southern end of the lake there are areas of mucky peat associated with wetlands.

Rainfall rapidly infiltrates the permeable soils all along the peninsula and therefore surface runoff is minimal. Most of the natural drainage on the peninsula moves from south to north following swales between dune ridges (USGS 1995). Flow in drainage channels is fed largely by surfacing ground water. Loomis Lake is fed by rainfall, and intersection with the shallow groundwater system via subsurface flows. A large wetland marsh forms the southern portion of the watershed. According to the USGS report this wetland drains into the lake (USGS 1979). However, according to local knowledge the flow in this wetland is to the south, not to Loomis Lake, except during periods of very high water. Surface water exits the lake at the far north end through an unnamed intermittently flowing creek that flows in a north and slightly westerly direction and discharges to the Pacific Ocean near the town of Ocean Park. Water also drains in what is apparently more of a subsurface fashion toward a series of ponds that are located directly north of the lake.

The watershed is quite rural in nature; there are homes located in the immediate vicinity and the rest is owned by Washington State Parks and Washington Department of Fish and Wildlife, where a public boat launch is located.

Water Quality

There is only limited water quality information available for Loomis Lake. The United States Geological Service (USGS) collected data in August 1974 from one site in the lake. In addition, volunteers began monitoring the lake in the spring of 1997.

A common way of evaluating lakes is by their trophic state which defines a lake in relation to the degree of biological productivity that it supports. Lakes with low nutrients, low algae levels, and clear water are classified as nutrient poor or “oligotrophic”. Lakes with high nutrients, high algae levels, and low water clarity are classified as nutrient rich or “eutrophic”. “Mesotrophic” lakes have water quality characteristics between these two classifications.

“Eutrophication” is a term used to describe the physical, chemical, and biological changes associated with enrichment of a lake due to increases in nutrients and sediment over time. Although eutrophication can be a natural process that occurs slowly over time, it can be greatly accelerated by human activities in a watershed. Natural eutrophication processes occur on a time scale of hundreds to thousands of years and are generally not observable in a single human lifetime. Human induced or “cultural” eutrophication can result from activities within the watershed including development, forestry, resource extraction (i.e., peat mining), landscaping, gardening, and animal keeping. All of these activities contribute nutrients and sediment to surface waters. Sediment inputs from watershed activities result in the slow filling-in of lakes which also accelerates the overall eutrophication process. Cultural eutrophication can result in observable chances within a few decades, or less.

Classifying a lake based on its trophic state is a useful way to describe changes in a lakes water quality over time and to assess the potential sensitivity of a lake to additional nutrient loading. Total phosphorous, chlorophyll a, and transparency are the three water quality parameters most often used to rate the overall trophic condition of a lake. Phosphorous is one of the essential nutrients for plant and algae growth. Transparency is also influenced by light absorption characteristics and color of the water as determined by concentrations of dissolved and particulate matter. Loomis Lake is naturally dark due to the influence of bog and marchland within the watershed.

Some phytoplankton (algae) samples were collected from several lakes within the region, including Loomis Lake, on July 16, 1994 by Kathleen Sayce. Loomis Lake was unusual compared to the other lakes and ponds in the region because it was the only body of water that was dominated by blue-green algae (cyanophytes) (Sayce, K. personal communication). Nostoc sp., Anabaena sp., and Oscillatoria sp. Were the most abundant algal types noted. The representation of certain species of freshwater plankton can be sensitive indicator of trophic status (Welch 1992). The dominance of blue-green algae are often an indication of eutrophy.

Based upon the limited data available, it is difficult to classify Loomis Lake. Due to its shallowness, Secchi disk depth cannot be used to classify the lake as the depth does not reach those indicated for the mesotrophic and oligotrophic categories. Additionally, there have been no chlorophyll a samples collected to date. Therefore the only parameter that can be used to classify the lake is the concentration of total phosphorous. Based upon the limited sampling available, Loomis Lake would be classified as eutrophic. In addition, the algal types present in the lake would indicate eutrophic conditions.

Aquatic Plant Characterization

Aquatic plants do not normally occur at depths greater than 15-20 feet in Washington Lake because the plants are limited by the amount of light that can penetrate the water. As such, most lakes have a fringe of plants that occur in this shallow, sunlit portion of the lake that is called the "littoral zone". Generally aquatic plant management targets the littoral zone. Because Loomis Lake is so shallow, the entire surface area (167 acres) of the lake can be considered littoral zone and is potential habitat for aquatic weeds. Therefore the entire lake must be considered in the management plan.

Loomis Lake has a high density of invasive species covering the lake. A list of plants and percent coverage observed during 3/17/2015 survey by Dr. Kim Patten is provided in Appendix C.

The aquatic plant species observed were:

Eurasian watermilfoil
Brazilian elodea

The density of Eurasian water milfoil has been expanding rabidly based upon observations made since 1996, when Loomis Lake was first looking into the eradication of these species.

Eurasian watermilfoil is a perennial, submersed, ornamental aquatic plant that has escaped cultivation. Infestations can alter aquatic ecosystems by forming dense mats that shade out other aquatic plants, degrading water quality, inhibiting water flow and impacting recreational activities. Eurasian watermilfoil control can be difficult since it spreads by stem fragments. The entire plant must be removed in order to eradicate this species.

Brazilian elodea is an ornamental, submersed freshwater perennial herb that is used primarily for fish aquariums. It can alter aquatic ecosystems by trapping sediment and degrading water quality. It forms dense mats that shade out other native aquatic plants, inhibiting water flow, and recreational activities. Brazilian elodea can be found in still and flowing waters such as lakes, ponds, streams and ditches. It reproduces by roots and plant fragments, making it difficult to control. Mechanical methods such as cutting, harvesting and underwater tilling are not advisable because this can increase the infestation if the entire plant is not removed.

Public Involvement

Public involvement and coordination for this project is performed by the Pacific Conservation District. Meeting minutes and attendance records are included in Appendix D. The first meeting for development of the updated Aquatic Plant Management Plan was held June 9 2014, to describe the planning components and provide an overview of the aquatic plant benefits and problems. During these monthly meetings, the group developed a list of beneficial uses and a problem statement, identified management goals, and reviewed aquatic plant control alternatives.

The Loomis Lake Steering Committee sent out informative letters to all of the stakeholders residing on Loomis Lake about upcoming meetings and compiled a contact list to keep everyone updated.

Meetings are scheduled for the 2nd Thursday of each month at 10:30am to discuss this plan.

Aquatic Plant Control Alternatives

The following is a description of the methodologies initially presented to the steering committee for control of aquatic plant problems in Loomis Lake. Essentially three methods were discussed for the control of Eurasian water milfoil and Brazilian elodea. These methods are mechanical, biological and chemical controls.

Mechanical

Mechanical harvesting involves cutting plants below the water surface, conveying them onto the harvester, and offloading them at the boat launch for disposal of composting at a suitable site. Harvesters are manufactured by several companies; various sizes and features are available to meet specific requirements. Maximum cutting depths range from 5-8.2 feet within a cutting width or swath of 6.5 to 12.1 feet.

Harvesting provides immediate control of the problem plants, but the duration of control depends on water depth, the depth of cut, and harvesting coverage. However, harvesting can only be expected to achieve temporary reduction in plant biomass and does not change the areal coverage of the infestation. Significant long-term (year-to-year) harvesting impacts should not be expected. Past experience with harvesting a dense Water milfoil infestation in Seattle's Green Lake indicates that adequate control for recreational use of a lake required several cuts per season depending upon the growth pattern in a particular year (KCM 1995).

Harvesting is usually not recommended for use in lakes where milfoil is not well established since it tends to spread viable fragments around the lake and result in a greater area of infestation.

Hand Pulling

Hand pulling is a manual method of removing the entire plant, including roots. It is typically performed by divers uprooting individual plants, placing them in a mesh bag, and disposing or composting the removed material. Hand pulling is not limited by depth or access problems and in theory all problem areas could be controlled in this manner. However, the labor intensive nature of the work would limit control attained by this method. Adequate control would be achieved by pulling plants once during early summer of each year in designated areas. Continual use of this method should help limit expansion of plant beds and maintain lower overall densities of the problem plants. The plant density and the level of effort should decrease in subsequent years.

Costs for hand pulling by contract divers range from, $500-$2,400 per day. Low to moderate pond weed densities could be controlled at a rate of approximately 0.5 acres per day. The primary advantage of hand pulling is that non-target (beneficial) plants are not removed and may even colonize area inhabited by nuisance plants, due to the large competitive advantage they would be given. The primary drawback is the high cost per unit area controlled due to the high labor cost. A Hydraulic Project Approval permit (HPA) from WDFW is required for large scale hand pulling efforts.

Biological

Grass Carp are plant consuming fish native to China and Siberia. Sterile (triploid) Grass Carp are raised in the southeast US for lake-wide, low intensity control of submerged aquatic plants. Known for their high growth rates and wide range of food preference, these fish can control certain nuisance aquatic plants under the right circumstances. Stocking rates depend on climate, water temperature, type and extent of plant species, and other site-specific conditions. In 1990, Washington State adopted Grass Carp regulations that require the following conditions:

-Only sterile (triploid) fish can be planted.
-Inlets and outlets must be screened to prevent fish from getting into other water bodies.
-To insure sufficient vegetation is retained for fish and wildlife habitat, stocking rates are defined by WDFW based on the current planting model.
-Lakes with public access require a lake restoration study.

Effectiveness of Grass Carp in controlling aquatic plants depends on feeding preferences and metabolism. Recent laboratory and field studies in Washington State indicate that thinleaved Pondweeds and Elodea Canadensis are highly preferred, broad leaf Pondweed and Eurasian water milfoil are less preferred, and that Water lilies are generally not eaten. The primary advantage of Grass Carp is the low cost (if a lake restoration study has been performed). An additional advantage is that there are none of the concerns associated with the use of chemicals in natural environments.

Primary drawbacks are that effects are unpredictable and that all beneficial plants may be removed, resulting in serious impacts to fish and wildlife. It takes a number of years for the Grass Carp population to reach the size where they can effectively reduce the plant population, thus they do not achieve immediate control as chemicals do. Lake residents would need to be willing to accept existing plant populations for a 3-5 year period to allow the carp to grow. The main disadvantage from a management viewpoint, is that the carp represent an unknown level of control. Results from stocking projects have been mixed. If the stocking rate is too low, the carp, the carp are not able to effectively control the plants. Conversely, if stocked too high they can completely eradicate aquatic plant populations. If the latter occurs, there can be serious long-term effects on fish, waterfowl, and other wildlife. In addition, it can be difficult to obtain a stocking permit from Washington Department of Fish and Wildlife (WDFW) due to the potential impacts to fish and wildlife.

The cost range from $50-$2,000 per acre, at stocking rates ranging from 5 to 200 fish per acre and average cost of $15 per fish. However, additional cost would likely include more than $200,000 for an environmental checklist, Phase 1 lake restoration study, and outlet screening required by the fish planting permit. In addition to a game fish planting permit, hydraulic project approval permit (HPA) is required by WDFW for installation of screens.

Chemical

<u>Floridone</u>

At Loomis Lake, Eurasian watermilfoil is the primary plant of concern. Left uncontrolled, watermilfoil could rapidly dominate all 167 acres of the lake. Floridone, formulated as Sonar for aquatic application, was chosen as the preferred method for Eurasian watermilfoil eradication because of its effectiveness in other Washington State lakes, it's specifically for Eurasian watermilfoil, and its relatively long duration of control. Sonar is a systemic herbicide which means it is effectively absorbed by plants and translocated by both roots and shoots. It then inhibits carotenoid synthesis, killing the entire plant. Effects of Sonar treatment become noticeable within 7 to 10 days of application, with complete control often requiring 60 to 90 days.

This herbicide is considered to have very low toxicity to humans and aquatic organisms and comes with no swimming or fishing use restrictions. The only water use restriction for Sonar is a 'precaution' against using the water for irrigation. It is recommended that treated water should not be used for irrigation of turf or plants for a period of 14 days. With multiple applications of Sonar occurring every two weeks for at least six weeks in the summer, this eliminates the availability of lake water for the use in gardens. Sonar also impacts submerged plant species other than Eurasian watermilfoil. However, due to physiological differences between them, native plants are generally less affected and recolonize treated areas by the following year. Since Sonar is a chemical control method there are implied concerns associated with the use of chemicals in natural environments. Other than chemical use concerns, the primary drawback of Sonar use is the cost and possible water quality impact from the release of nutrients by decaying vegetation.

The recommended application strategy for the whole-lake is multiple treatments with Sonar requires that the entire lake is initially treated with enough of the chemical to reach and in-lake concentration of 20 parts per billion (ppb) and that the concentration of 10 to 20 ppb is held for at least a ten week period. This requires close monitoring of the lake, and four additional herbicide applications at approximately two weeks. Sonar when applied in this fashion has been proven to be highly effective against Eurasian watermilfoil. In some lakes milfoil has been totally eradicated using this chemical, while in others, Sonar has provided excellent control, but not total eradication. Follow up surveys are essential to the success of the project, since eradication is the goal. (The surveys are also critical to identifying new infestations of this or other invasive plants).

Cost for the treatment, including the initial and follow-up applications, has been estimated at ________________. This cost includes all permits, required public notice, materials, application, sampling, and other scientific services necessary to accomplish this program. Because the purpose of the Sonar treatment is to eliminate Eurasian watermilfoil from the system, follow up diver surveys should be scheduled for at least the following three years to insure any remaining plants are quickly removed before they can again colonize the entire lake. A cost of $2,000 per year has been included in final cost estimates to cover the diver surveys. The Sonar application should also include setting aside contingency money to remove any new infestations found during the surveys. A contingency fund of $5,000 per year should be set aside for the first five years to allow for this. Contingency actions (and associated costs) will be dependent upon the extent and location of infestations. A few plants spread out over a small area can be pulled by divers. Larger infestations that are found in one or two areas may be best controlled by bottom barrier, while larger areas that are spread throughout the lake may require spot treatments with Sonar in pellet form (Sonar SRP) or another chemical in others become approved for use in Washington State. The total cost for the Sonar treatment including follow-up divers and contingency funds are estimated at $__________ over ten years or ___________ per year if averaged over a 10 year period. (These estimates are approximate).

Diquate dibromide

Diquate dibromide is a fast-acting, non-selective contact aquatic herbicide which destroys the vegetative part of the plant, but not the roots. It is used for short term (one season) control of a variety of submersed aquatic plants. The chemical appearance is white to yellow crystals that are fast-acting and is suitable for spot treatment. It should be applied in calm, clear waters because turbidity or dense algal blooms can interfere with its effectiveness. This product had great success on Battle Ground Lake, which struggled with Brazilian elodea.

This chemical is rapidly absorbed by green plant tissues, which is effective upon the exposure to sunlight. It possesses some systemic properties, using photosynthesis to spread the chemical throughout the plant. This results in rapid disruption of cell membranes and high mortality rates (Emmett 2002). Wilting and loss of foliage occur within a few days (Reward 2015).

Reward is considered to have a low toxicity to humans and aquatic organisms. There are few restrictions when it comes to swimming or fishing use. The only water use restriction for Reward is to wait 1-5 days for recreational use.

Treatment should begin its application in spring when water temperatures are 50º F and above. Treatment of dense weed areas may result in a decrease in oxygen levels from the decomposition of weeds, which in turn, may cause fish mortality. Treatment should consist of dividing the lake for treatment, only treating 1/3 to 1/2 of the water body area at one time with a waiting period of 14 days between treatments (Reward 2014).Follow up surveys are essential to the success of the project, since eradication is the goal.

Cost for the treatment, including the initial and follow-up applications, has been estimated at ________________. This cost includes all permits, required public notice, materials, application, sampling, and other scientific services necessary to accomplish this program.

The total cost for the Reward treatment, including follow-up divers and contingency funds, are approximately $__________ over ten years or ___________ per year if averaged over a 10 year period.

Integrated Treatment Action Plan

The following is a step-by-step approach to implementation of this plan:

1) Set up a Plan Implementation Committee
   The first step to implementing the plan is to set up an organization or committee that will take responsibility for it. The lake community will control how and whether the plan is implemented. Many of the tasks this committee will need to carry out are described in the plan under the "Plant Control Advisory Committee" section.

2) Secure a Funding Source
   Plan implementation for the first year (Sonar treatment) will cost an estimated ______ and long-term funding will require an additional ________ over the first ten year period. The source for this money should be identified and a budget created.

3) Apply for a Plan Implementation Grant
   Grants for up to $75,000 are available through the WDOE Aquatic Weeds Program for implementation of approved Aquatic Plant Management Plans. There is a 25 percent match required for Aquatic Weeds grant funds, although only 12.5 percent need to be in cash contributions. Lake residents should work through the Pacific Conservation District to apply for these grant funds. Applications are due in the fall. To insure adequate time for preparation of applications, this step should begin by mid-summer.

4) Apply Sonar
   A bid to apply Sonar should be prepared for release by April of the year of application, allowing two weeks for bidders to respond. The bid should include application costs, permitting, and follow-up monitoring to characterize the success of the application. Application should be scheduled to occur by late June.

5) Apply Reward
   A bid to apply Reward should be prepared for release by April of the year of treatment. The bid should allow two weeks for bidders to respond and should include application costs and permitting. Application should be scheduled to occur during the growing season.

6) Prepare a Public Education Plan
   Contact the Washington Lake Protection Association (WALPA) or Washington State Department of Ecology to get information about available brochures. There are also many educational products available online. Encourage lake residents to become members of WAPLA. Solicit professionals to volunteer to make presentations to the community and set up dates for presentations if needed. Also, develop a newsletter which includes articles describing different lake protection issues.

7) Institute a Long-Term Plant Monitoring Program

Develop a list of lake volunteers interested on conducting annual aquatic plant surveys. Develop a plan for training volunteers, doing the surveys, and handling and reviewing information. Contact professional aquatic plant experts for conducting bi-annual surveys.

8) Conduct Annual Evaluation
Complete a written annual evaluation that describes what elements of the plan have been implemented, relates the existing plant community to establish goals, and makes recommendations for the next year's activities.

As implied in Step 8, it is important that there is some mechanism in place for periodic evaluation of this plan and determination of whether it is meeting stated goals or whether the goals have changed. This evaluation should be done on a yearly basis. It should begin with a description of which elements of the plan have been fully implemented, which have not, and why. It should also include a summary of the aquatic plant monitoring results, both those obtained by volunteers and those by professionals. These results should be used to aid in the determination of whether goals have been met. The community should also be asked for input on their satisfaction with plant conditions. (It is possible that the goals will be met, but that some people will still be dissatisfied. Although it is unlikely that everyone's needs will be met, an effort should be made to track concerns, especially if they are widespread.) This information should be used to decide on the following years activities; does a herbicide treatment need to be scheduled? Has there been a re-infestation of Eurasian implement the back-up or contingency plan? Over the long-term, adequate annual evaluations can make the difference between project success or failure.

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Appendix A

ciBIOBASE
Loomis Lake
3/17/2015
Latitude: 46.4405162
Longitude: -124.0430933
Gathered By: Scott Norelius
Map Type: Vegetation
www.cibiobase.com
100
50
0
208th Pl
212th Pl
Birch Pl
Birch Ln
Crane Pl
204th Ln
203rd Ln
202nd Ln
201st Ln
201st St
200th Ln
199th Pl
198th Pl
198th St
197th St
196th St
194th St
N Pl
U Pl
S Pl
P Pl
Q Pl
T St
103
189th Pl
188th Pl
State Game
184th Pl
Lake State Park
State Park
Loomis Lake
Lost Lake
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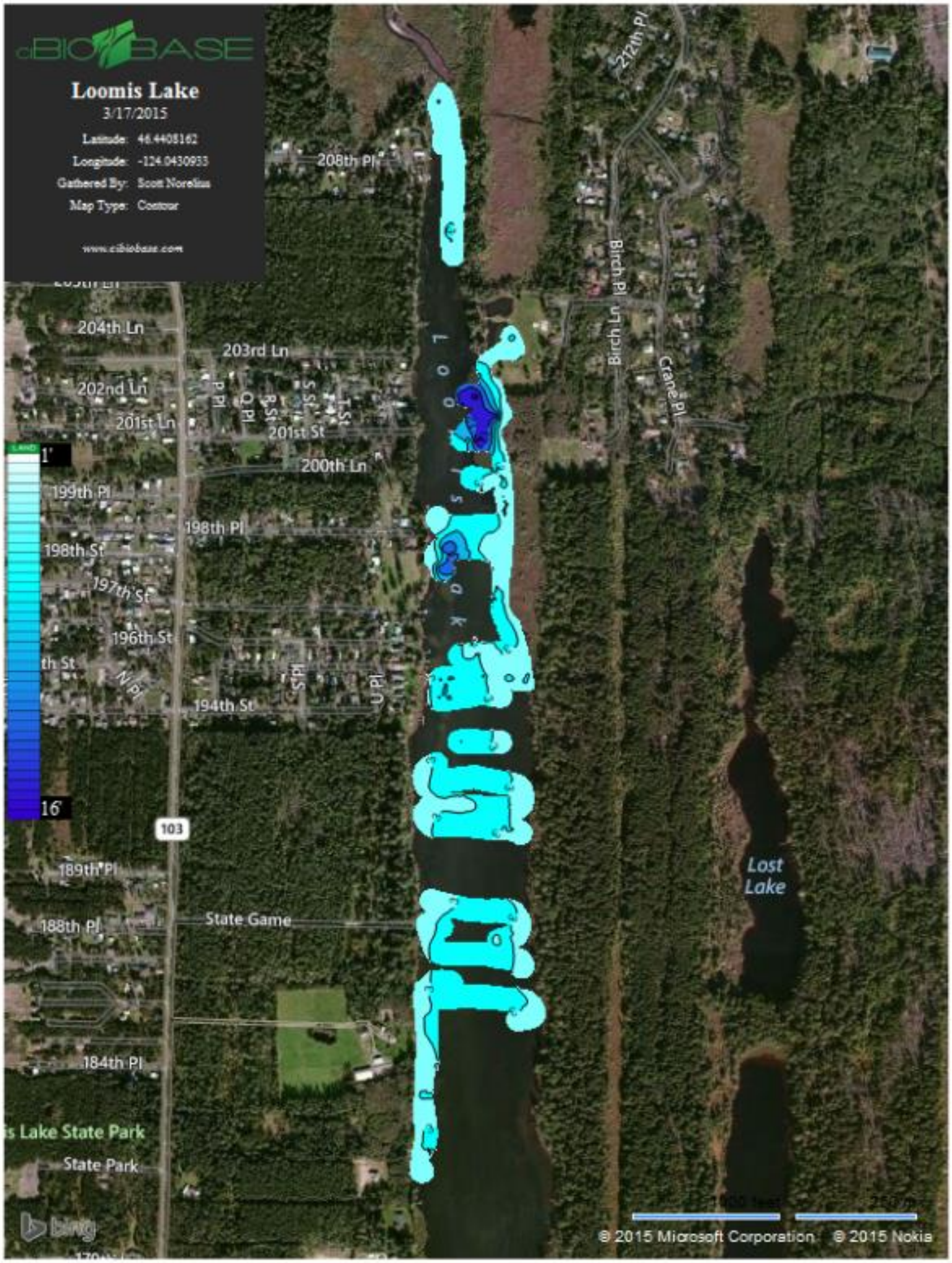
Appendix B



BIOBASE
Loomis Lake
3/17/2015
Latitude: 46.4408162
Longitude: -124.0430933
Gathered By: Scott Norelius
Map Type: Contour
www.cibiobase.com
1'
16'
208th Pl
204th Ln
203rd Ln
202nd Ln
201st Ln
201st St
200th Ln
199th Pl
198th Pl
198th St
197th St
196th St
194th St
189th Pl
188th Pl
State Game
184th Pl
State Park
212th Pl
Birch Pl
Birch Ln
Crane Pl
103
Lost Lake
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Appendix C

Survey By: Kim Patten
3/17/2015

Sample	Way	% of sample	% of sample	
#	Point	Milfoil	Elodea	
1		0	100	
2	47	0	100	
3	46	0	100	
4	43	0	100	
5	42	0	100	
6	41	20	80	
7	38	0	100	
8	37	0	100	
9	35	0	100	
10	34	5	95	
11	31	0	100	
12	29	0	100	
13	25	0	100	
14	26	0	100	
15	32	0	100	
16	33	0	100	
17	51	0	100	
18	36	0	100	
19	50	10	90	
20	39	15	85	
21	40	20	80	
22	43	5	95	
23	49	0	100	
24	46	0	100	

Appendix D

Meeting Minutes