# LOOMIS LAKE
# INTEGRATED AQUATIC PLANT MANAGEMENT PLAN

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## MAY 1998
## FINAL

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**PREPARED BY**
**ENVIROVISION CORP**
**in assication with**
**Resource Management Inc.**

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Loomis Lake integrated aquatic plant management plan
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# ACKNOWLEDGMENTS

A number of lake and local community residents attended the public meetings and provided input to the selection of alternatives and lend support to the project. Glenda Thomas and Sallie West deserve special thanks and recognition for their efforts on behalf of the lake for this and other Loomis Lake projects. Michael Norman, Ph.D., of the Pacific Conservation District was also instrumental in coordinating with lake residents, State agencies, and others. Gretchen Sagen did a great job of recording the meetings and getting the meeting summaries out in a timely fashion and many other project management tasks. Kathleen Sayce provided information on algae and nutrients. Chuck Blight, a member of the State Department of Ecology lake volunteer monitoring program, deserves recognition for his efforts in collecting and maintaining lake water quality data.

This project was largely funded by the Washington State Department of Ecology Aquatic Weeds Program with matching grants from the Pacific Conservation District and in-kind support services from Loomis Lake residents.

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# PROJECT OVERVIEW

Loomis Lake is located on the Long Beach peninsula in Pacific County. It is one of many lakes on the peninsula which formed 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 9 feet. The surface area and volume of the lake are 167 acres and 130 acre-feet, respectively. The watershed is largely rural and much of the eastern shoreline is owned by the Washington State Parks Department. Subsequently the lake is valued for it's abundant natural habitat and wildlife.

Presently the water quality in Loomis Lake may be rated as "eutrophic" in terms of biological activity. Total phosphorus concentrations are relatively high and blue-green algae blooms are a common occurrence in the summer months. Aquatic plant populations have also reached a point where they are limiting use of the lake. This is especially true for the non-native, invasive species Eurasian watermilfoil (*Myriophyllum spicatum*). According to Ecology personnel, an informal survey of the lake in the early 1990's indicated that a narrow leaf pondweed was the dominant plant. If Eurasian watermilfoil was present, it was not abundant at that time. A 1994 survey by Ecology also did not indicate the presence of Eurasian watermilfoil. By 1996, Eurasian watermilfoil was well established in the lake and had expanded rapidly by the 1997 survey results. Another aquatic plant of concern is Burreed (*Sparganium* sp.). Along the shoreline the densely growing Burreed is encroaching and spreading resulting in reduced access to the lake. Due to the shallow depth of the lake, these plants have the potential to expand their communities throughout the entire lake. The Loomis Lake Group was formed to deal with aquatic vegetation concerns, especially the explosive growth of watermilfoil.

The Loomis Lake Group first convened on September 24, 1996. A grant to develop an Integrated Aquatic Vegetation Management Plan (IAVMP) for Loomis Lake was prepared by the Pacific Conservation District and presented to the Loomis Lake Group at an October 22, 1996 meeting. The application was submitted and funding was received from the Washington State Department of Ecology. The contract between Ecology and the Conservation District was presented to the Loomis Lake Group at the May 8, 1997 meeting. The Conservation District coordinated a state-approved competitive bid process and toured the lake on June 18, 1997 with contractors, members of the Loomis Lake Group, and Tim Wilson, Director of Pacific County Vegetation Management. Envirovision Corporation was awarded the contract on July 21, 1997 to develop the IAVMP.

This report provides a description of the aquatic plant control plan developed for Loomis Lake. The basic recommendations selected for aquatic plant control are:

- A whole-lake Sonar® treatment (consisting of multiple applications) for the eradication of Eurasian watermilfoil (*Myriophyllum spicatum*).

- Periodic Rodeo™ treatments (every two to three years) to maintain Burreed (*Sparganium*) within a five foot wide band along the western shoreline. The eastern shoreline would remain the conservancy zone where the plant community would be protected from application.

- Formation of an Aquatic Plant Advisory Committee whose function is to make decisions about controls needed and review aquatic plant management goals.

- Establishment of conservancy zones for long-term protection of natural habitat.

# PUBLIC INVOLVEMENT

Public Involvement and coordination for this project was performed by the Pacific Conservation District. Meeting minutes and attendance records are included in Appendix I. The first meeting for development of the Aquatic Plant Management Plan was held on July 31, 1997 to describe the plan components and provide an overview of aquatic plant benefits and problems. During this meeting the group; developed a list of beneficial uses and a problem statement, identified management goals, and reviewed aquatic plant control alternatives.

On August 11, 1997 a memorandum was sent out to all land owners in the area inviting them to participate in development of the Aquatic Plant Management Plan. Copies of the minutes from the July 31st meeting were sent along with the memorandum.

The Loomis Lake Group met again on September 4, 1997. Information on how to form a lake association was presented and discussed.

Another meeting was held on September 18, 1997 at which time the results of the aquatic plant survey were presented and aquatic plant control alternatives were reviewed. The recommended strategy for managing aquatic vegetation was presented and agreed upon by those present at the meeting. Funding options for the implementation of the plan were also discussed.

A draft management plan was completed in January of 1998 and distributed to agencies and interested public. A final public meeting to discuss the draft plan occurred on April 23, 1998. No substantial comments or changes were requested, and the plan was subsequently finalized. A final step in the public involvement process is a plant identification workshop scheduled for June of 1998.

# LAKE AND WATERSHED CHARACTERISTICS

## PHYSICAL 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 Willapa Bay on the east. The peninsula was formed by ocean and longshore 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 9 feet. The surface area and volume of the lake are 167 acres and 830 acre-feet, respectively. Physical characteristics of the lake are summarized in Table 1. The Loomis Lake watershed is illustrated in Figure 1.

Soil types surrounding Loomis Lake are primarily Yaquina loamy fine sands along the western shoreline and beaches/dune land along the eastern shoreline (USGS 1995). The Yaquina loamy find sands are moderately well drained where the beaches and dune land are well 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 groundwater. 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 (see Figure 1). 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 a few homes located in the immediate vicinity of the lake, however, almost the entire eastern shoreline is owned by Washington State Parks and is undeveloped. A small lot on the western shore is owned by Washington Department of Fish and Wildlife and this is where the public boat launch is located. Cranberry growing is an important economic and cultural activity on the peninsula.


# Loomis Lake
# Pacific County, WA

# Lake Watershed and Bathymetric Contours

Legend

-·-·-·- Lake Watershed (approximate)

——— 3-Foot Countour

Source:
Bathymetric countours from Reconnaissance Data on Lakes in Washington, vol 4, WA DOE, 1976.

Topographic Quadrangle
USGS 1984

N
W E
S

0 1000 2000 3000 4000 5000 feet

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**Table 1. Physical characteristics of Loomis Lake and its watershed.**

| Characteristic | English Units | Metric Units |
|---|---|---|
| Watershed Area | 922 acres | 373 hectares |
| Surface Area | 167 acres | 68 hectares |
| Lake Volume | 830 acre-ft | 102 hectare-meters |
| Maximum Depth | 9 feet | 2.7 meters |
| Mean Depth | 5 feet | 1.5 meters |
| Shoreline Length | 4.3 miles | 6.9 kilometers |

## 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. Results from this monitoring effort are summarized in Table 2. In addition, volunteers began monitoring the lake in the spring of 1997. A summary of the volunteer monitoring is included as Appendix II.

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 changes 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 phosphorus, chlorophyll *a*, and transparency are the three water quality parameters most often used to rate the overall trophic condition of a lake. Phosphorus is one of the essential nutrients for plant and algae growth. Chlorophyll *a* concentration is a measure of the abundance of algae in a lake. Water transparency is a measure of a lakes clarity and can be an indication algal 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 marshland 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 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 a 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 phosphorus. 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.

**Table 2. Trophic State Classification (1)**

| Trophic State | Total Phosphorus (ug/L) | Chlorophyll *a* (ug/L) | Transparency (meters/feet) |
|---|---|---|---|
| Oligotrophic | < 10 | < 4 | > 4 meters<br>> 13 feet |
| Mesotrophic | 10 - 20 | 4 - 10 | 2 - 4 meters<br>6.6 - 13 feet |
| Eutrophic | > 20 | > 10 | < 2 meters<br>< 6.6 feet |
| Loomis Lake | 25 (at 3 ft depth)<br>28 (at 5 ft depth) | -- | > 1.8 meters<br>(> 6 feet) |

(1) Source as modified from Gilliom, R.J. and G.C. Bortleson. 1983.

## FISH AND WILDLIFE COMMUNITY

The Washington Department of Fish and Wildlife has managed Loomis Lake for many years. The lake is stocked annually in mid- April with 12,000 catchable Rainbow trout (*Salmo gairdneri*) ranging 8 to 10 inches in length (Freymund, B. personal communication). Occasionally surplus steelhead trout are released into the lake.

In August 1997 a fish population assessment was conducted in Loomis Lake. According to the study results (WDFW, 1998) Loomis Lake exhibited signs of having an imbalanced fish community. This statement was based on the facts that: 1) Forage fish were either smaller than average, had below average condition (a measure of plumpness or robustness), or both. 2) Few, if any, quality size fish were captured. And 3) early age classes of some species were rarely observed.

Possible explanations for the imbalanced community included, disparate fishing pressure, and or increased aquatic macrophyte cover. Disparate fishing pressure may be causing underfishing of forage fish and overfishing of predators (e.g. largemouth bass and yellow perch). Increased aquatic plant density may be decreasing predator efficiency because their prey has more refuge area (plant habitat). The study concludes that "the fish community at Loomis Lake would probably benefit by reducing macrophyte cover" (WDFW, 1998). However, it also cautions that removing too much plant cover could shift the balance in the lake toward predators and result in a fish community with abundant small predators and few large prey fish.

## AQUATIC PLANT COMMUNITY

### Plant Survey

The aquatic plant community was surveyed on August 11th and 12th, 1997 to document plant coverage. Recent aerial photography was used to develop a diver survey protocol. An extensive algae bloom present in the lake severely limited diver visibility and therefore the majority of the plant survey was performed from the airboat.

The first step of the mapping effort focused on the shoreline emergent vegetation. The airboat was used to follow the outside edge of this plant community along the entire shoreline. The entire emergent community was mapped. Levels of density were noted, as were areas where the plant had been cleared.

The submergent plant communities were mapped using an extensive number of transects across the lake. Samples were collected at five foot intervals along each transect. Divers surveyed where possible and data was radio transmitted back to the boat. If visibility limited the effectiveness of the dive team, samples were collected from the boat for identification. Plant composition, density, and coverage were recorded. (In the spring of 1998, samples of the main aquatic plant species observed will be collected for pressing and archiving on herbarium sheets. So that these can be used by volunteers in the future, to assess changes in the plant community.)

## Plant Characterization

The aquatic plant distribution in Loomis Lake is illustrated in Figure 2. Submerged aquatic plants do not normally occur at depths greater than 15 - 20 feet in Washington lakes 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 relatively diverse population of aquatic plant species. An extensive list of plants observed during a 1994 and 1997 survey by Ecology personnel is provided in Appendix III. The primary plant species observed were:

- Flat stemmed pondweed - *Potomogeton zosterifomis*
- Coontail - *Ceratophyllum demersum*
- Eurasian watermilfoil - *Myriophyllum spicatum*
- Common Water weed - *Elodea canadensis*
- Burreed - *Sparganium sp.*
- Stonewart - *Chara sp.*

Another plant observed in the lake that is of possible significance is Floating Water Pennywort (*Hydrocotyle ranunculoides*). This plant is on the Washington State Department of Natural Resources (WDNR) Group 1 Plant Review List. Essentially this means it is a plant of potential concern, but for which no status for protection has been assigned because not enough information is available.

The dominant submerged aquatic plant in the majority of the lake at the time of this survey is the pondweed *Potomogeton zosteriformis*. This plant covers large areas of the lake and in most cases has an understory of water weed, coontail, and pioneering watermilfoil. These plant communities are present at levels that would classify them as a weed problem throughout most of the lake.

The density of Eurasian watermilfoil appears to be expanding rapidly based upon observations made between 1996 and 1997, and the fact that none were observed in the lake as recently as 1994 (Hamel, K. Written Communication). Portions of the lake where Eurasian watermilfoil has replaced *P. zosteriformis* are included on Figure 2. Eurasian watermilfoil was observed in all transects and is capable of colonizing the entire surface area of the lake within the next two-three years without the implementation of a management program.

Burreed is also a problem in the lake. This plant is an emergent form of vegetation and grows in water up to one to two feet in depth. This plant has developed into a monoculture around the entire south, west, and north shorelines of the lake reducing access to the lake for many of the developed properties. While this plant can only flourish in shallow water, the plant sloughs off considerable amounts of biomass each year, in effect filling-in the deeper waters and enabling it to expand further. Left

unchecked, this plant has the potential to expand across the lake which would further reduce access. Areas infested with Burreed exhibit a very deep layer of organic muck overlaying what were once beach sands.

There are also localized areas where the water lilly *Nuphar polysepalum* may be considered a weed problem. Generally, this plant provides good fish habitat and should not be targeted for management along undeveloped shoreline. Lakeside residents may choose to control the spread of this plant along their shorelines through physical removal.

Without the implementation of an Integrated Aquatic Plant Management Plan, Loomis Lake will change dramatically over both the short and long-term. Due to its shallow depth, all of Loomis Lake is habitat suitable for Eurasian watermilfoil. In addition, Burreed is an aggressive shoreline plant. Both of these aggressive weeds have the potential to expand their communities.

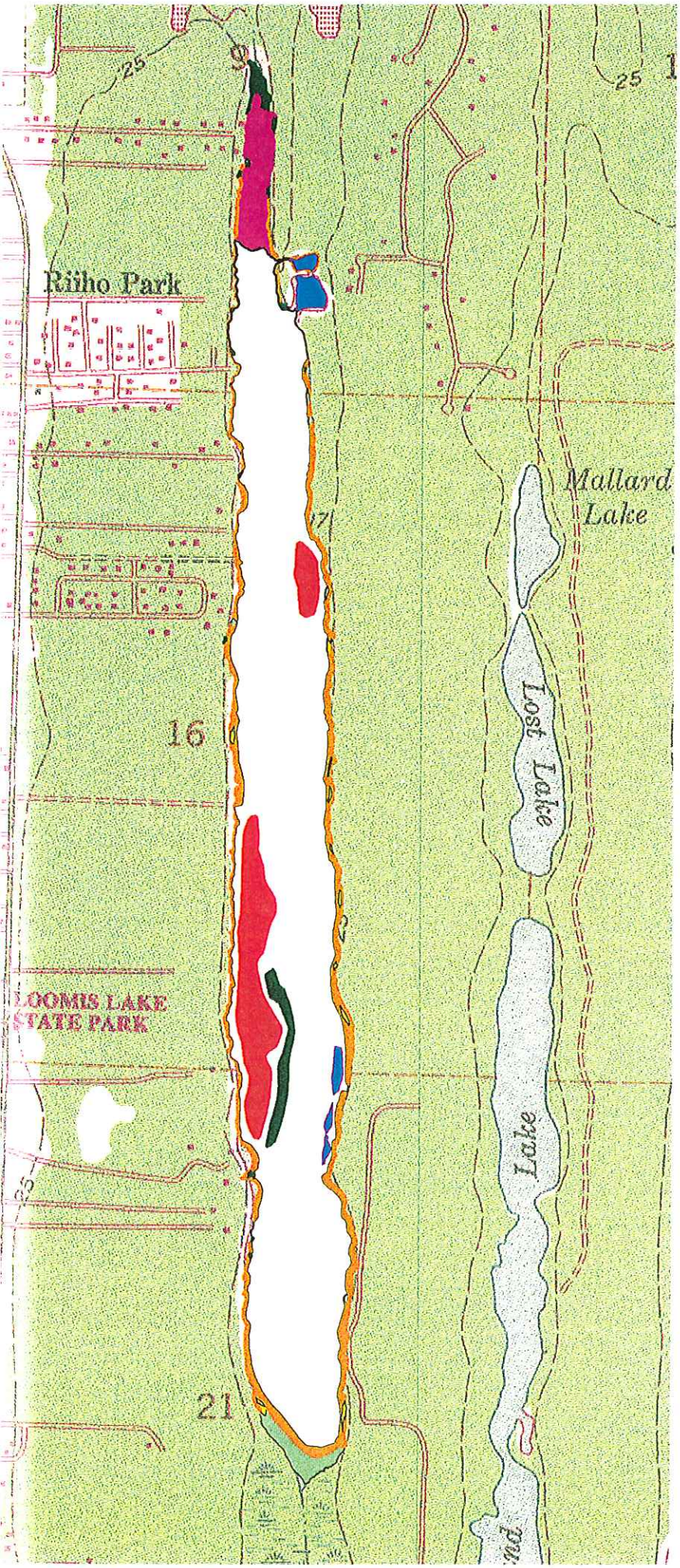
### CHARACTERISTIC USE

During the development of this plan the steering committee was asked to develop a list of beneficial uses the lake provides and identify where those uses occur. Beneficial uses included; fishing, swimming, boating (i.e., water-skiing, canoeing, paddle boating, kayaking), aesthetic enjoyment of wildlife viewing, and fish and wildlife habitat. There are both public and private parks along the shoreline. Public access is provided by a Washington State Department of Fish and Wildlife boat launch located midway along the western shoreline. Some of the wildlife that utilize the lake include frogs, swans, eagles, ducks, Canada geese, osprey, egret, heron, otters, Tundra swans, beaver, muskrat, raccoons, turtles, crawfish, and water snakes.

## PROBLEM STATEMENT FOR LOOMIS LAKE

The following list of problems associated with aquatic plants was developed by the Loomis Lake steering committee.

- Plants foul up boat propellers and reduce the use of the lake.
- Suspect it is hard on the fish population due to oxygen reductions. (Used to have a great trout population, but not anymore. This may be plant related.)
- Swimming through weeds is difficult and subsequently the area where people can swim is reduced.
- Nearshore vegetation (e.g., Burreed) is getting denser, causing the shoreline to extend further into the lake.
- Plants are a maintenance problem.




# Loomis Lake
# Pacific County, WA

## Aquatic Macrophytes
## August 1997

### Legend

**Submergent Plants**

- Eurasian Watermilfoil
- Dense Milfoil with Coontail, Pondweed
- Pondweed
- Coontail

**Wetland/Emergent Plants**

- Sparganium
- Bullrush
- Mixed Emergents

**Floating-Leaved Plants**

- Spatterdock

Mapped from SCUBA Dive Survey, 8/12/97 by RMI.

Topographic Quadrangle
USGS 1984

N W E S

0 500 1000 1500 2000 2500 feet

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- Plants may be clogging the outlet from the lake so that it doesn't drain as well.
- The nearshore plants (e.g., Burreed) are sharp, making them even more difficult to move through or to maintain.
- People are concerned that the plants are so thick nearshore that small children can't be seen and yet could easily get stuck in the muck and not be able to get out.
- Access along the shoreline is reduced due to the dense shoreline plants.
- Watermilfoil is spreading (lower ponds also have watermilfoil).

The list of problems generated by lake residents at the public meeting in July was used to create a problem statement to describe as clearly as possible how the lake and its inhabitants are being impacted by aquatic plants. The following problem statement was developed for the lake:

*Lake Loomis is still relatively pristine. The majority of the shoreline is undeveloped with abundant natural vegetation and wildlife habitat. The residents greatly appreciate the lake for its aesthetic value and the wildlife it attracts. However, the invasion by Eurasian watermilfoil has reduced their ability to enjoy the lake, due to the dense, tall growth pattern of this plant, and residents are concerned that the wildlife they enjoy may also be affected. From a State perspective, this is the first known outbreak of this invasive plant is this area, and there is a desire to prevent its spread to other nearby systems. The nearshore emergent zone is also dominated by an almost monotypic (single-species) stand of Burreed. These plants are causing the emergent zone to expand at a fast rate and are making access to the lake increasingly difficult.*

# AQUATIC PLANT MANAGEMENT GOALS

The final step before beginning development of a plant control plan was to define goals against which the program could be evaluated. Setting project goals is an important step because they are used to determine what control strategies will work, and will ultimately be used to evaluate whether the program has been a success. The following list of management goals for Loomis Lake was developed at the public meeting.

- Fix the inlet and outlet (dredge channels) to re-create a free-flowing system.
- Reduce the "weeds" to the point where the lake is usable, but still has adequate fish and wildlife habitat.

- Reduce the nearshore problem vegetation. Push vegetation back (for example, "5 feet") to regain some of the old lake shoreline and maintain it at that distance.
- Remove the Eurasian watermilfoil.
- Take care of Eurasian watermilfoil first, then wait to see whether there is a problem with native plants.

Through the goals setting discussion, it became clear that the priority goal for lake residents, in terms of aquatic plant management, was to control the Eurasian watermilfoil. Given the nature of this plant, control may equate to eradication, however, lake residents do not desire a "weed free" lake because they recognize the role plants play in the lake.

# RECOMMENDED AQUATIC PLANT CONTROL PLAN

All control alternatives described by Ecology (1994) were considered for use in Loomis Lake. There are two areas of concern associated with the aquatic plant community in the lake; Eurasian watermilfoil eradication, and reduction of nearshore Burreed. The four alternatives listed below were presented to the Loomis Lake steering committee as the most feasible methods to consider for the control of watermilfoil.

- Whole-lake Sonar® treatment - multiple applications
- Whole-lake Sonar® treatment - single application
- Grass Carp as a biological control
- Mechanical harvesting

Detailed descriptions of these alternatives as presented to the committee are provided in Appendix IV. The following section describes the strategy that was selected for control of Eurasian watermilfoil. The use of Rodeo™ for the control of Burreed was also selected.

## EURASIAN WATERMILFOIL ERADICATION

### Whole-Lake Sonar® Treatment - Multiple Applications

At Loomis Lake Eurasian watermilfoil is the primary plant of concern. Left uncontrolled, watermilfoil could rapidly dominate all 167 acres of the lake. Fluridone, 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, its specificity for Eurasian watermilfoil, and its relatively long duration of control. Sonar® is a systemic herbicide which means it is effectively adsorbed 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 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 multiple treatments with Sonar® requires that the entire lake is initially treated with enough of the chemical to reach an in-lake concentration of 20 parts per billion (ppb) and that the concentration of 10 to 20 ppb is held within the lake 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 $54,900 (McNabb, T., September 18, personal communication). 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 if others become approved for use in Washington State (e.g., Trichlopyr). The total cost for the Sonar® treatment including follow-up dives and contingency funds is estimated at $85,900 over 10 years, or $8,590 per year if averaged over a 10 year period. (Note: The cost for Sonar® has

been steadily increasing and may be expected to continue to rise, therefore these estimates are approximate.)

It should be noted that Sonar is not expected to impact the population of Floating Water Pennywort that has been observed in the lake. As described previously, this species is currently listed as a plant of potential concern by the WDNR. Generally, floating plants with waxy cuticles, such as Water Pennywort, are not affected by this herbicide, and in fact a related species *Hydrocotyle undulata* is listed by EPA as a tolerant species. Further evidence of its tolerance comes from work done by SEPRO Corporation in experimenting with use of this herbicide to control this plant where it creates nuisance conditions. They have not been able to successfully use Sonar to control these populations (Koschnick, T. Sepro Corp. Pers. Com.).

## SPARGANIUM CONTROL

### Rodeo Treatments

Burreed or *Sparganium* is the secondary plant of concern in Loomis Lake. This plant, if allowed to expand, will reduce the amount of surface area of the lake available for wildlife and recreational uses, and it will result in access problems as it intensifies along the shoreline. Furthermore, they appear to take over habitat held by other plants and therefore decrease plant and habitat diversity. The use of the herbicide Rodeo™ is recommended for control of this plant.

Rodeo™ is a nonselective systemic product that can be applied by hand gun to vegetation in targeted areas of the lake. This product will provide excellent control of those plants targeted by the application. Plants not targeted by the application will not be impacted. Rodeo™ is a chemical approved by both the US Environmental Protection Agency and the Washington Department of Ecology. There are no restrictions on the use of treated waters. This work also requires a permit from the Washington Department of Ecology.

The strategy for the use of Rodeo™ would be to contain the Burreed within a five foot wide band along the western shoreline. Additional treatment areas may be selected to open up access for shoreline properties. The eastern shoreline would remain a conservancy zone where the plant community would be protected from application. Once boundaries are established, Rodeo™ treatments would maintain these areas.

Burreed will attempt to expand into the treated zones each year. As such, there needs to be an ongoing maintenance application program which would consist of additional treatments every two to three years. The established cost for this program would be $2,700 the first year and approximately $1,700 in successive years of treatment. (Note: Because Burreed is a native plant, costs for this treatment are not eligible to be covered by grant moneys from the Aquatic Weeds Program.)

## HAND CONTROL AND OTHER CONTROL METHODS

This plan does not exclude the use control methods residents might employ around their docks and in swimming areas to bring more immediate relief from milfoil and other plant problems. These methods can include hand removal, use of hand or boat operated cutting tools, bottom barrier, or even use of contact herbicides such as Aquathol® (active ingredient endothall). Information on these methods is described in Appendix III.

## INVASIVE PLANT PREVENTION AND DETECTION PROGRAM

The use of herbicide treatments in Loomis Lake should effectively eliminate Eurasian watermilfoil from the lake for the time being. However, this plant could be reintroduced to the lake from watermilfoil fragments. There are other highly invasive plants of concern. These include; Parrotfeather (*Myriophyllum aquaticum*), Brazilian Elodea (*Egeria densa*), Hydrilla (*Hydrilla verticillata*), Fanwort (*Cabomba caroliniana*), and Water Hyacinth (*Eichhorinia crassipes*). An invasive plant prevention and detection program is required to protect the lake from future invasions.

To be effective this program should include both a source control component (a plan for keeping these plants out of the lake) and a detection program. The objective of source control is to prevent non-native submerged plants from entering the lake. In addition to the threats posed by Eurasian watermilfoil and Brazilian Elodea, two now common non-native submerged plants, there is the more serious threat associated with the discovery of Hydrilla in area lakes. The public boat launch represents an area where there is a high potential for introduction or re-introduction of invasive plants. The addition of boat and trailer wash facilities is sometimes recommended to enhance plant fragment removal. However, this can be expensive to install and it is difficult to regulate use and therefore it is not recommended. At a minimum, a sign warning about exotic plant introductions should be placed at the launch with specific instructions on how to properly clean boats and trailers to prevent the spread of plant fragments. The Loomis Lake Group is working with the Conservation District to produce and install signs at the boat launches.

Lake residents should also receive informative brochures on an annual basis reminding them of plant invasion problems and the importance of keeping their own equipment free of plants. It is also recommended that the lake community institute some public information campaign for opening day of the fishing season and a few other key weekends. Simply having volunteers hand out brochures for a few hours and help with boat and trailer checks will emphasize the importance of the effort and remind boaters of their responsibility to check equipment.

Early detection is the next step to protect against new infestations. While an infestation is still relatively small there are options for control that are much less expensive than the whole lake treatment methods required at this point. Early detection if done properly, requires both a trained group of lake volunteers who are responsible for occasional patrol of the lake, and periodic (bi-annual) diver surveys to assess the plant community. The main purpose of these surveys is to search for Eurasian watermilfoil

and any other exotic plants. However, it will also provide a means for monitoring the native submerged plant community and determining where future control efforts should be focused. Volunteers would be trained each year in plant identification and survey techniques and each would be given the responsibility for surveying a certain section of shoreline once a month during the growing season. Their purpose would be to note any substantial changes in the plant community and to look for new invasions of nuisance species. Professional divers would perform a more complete survey every other year. (While divers are surveying the lake they can determine whether new infestations can be handled by handpulling the plants or whether, for example, bottom barrier should be installed in a few places to ensure complete control.)

The primary advantage of controlling small infestations is that it reduces the chance that a large area would need to be controlled by a more intensive technique. A drawback of controlling small infestations are the additional costs associated with diver surveys and hand pulling. A survey of the entire plant habitat would take approximately 1 day and cost approximately $2,000. (Costs for hand pulling by contract divers range from $500 to $2,400 per day depending upon plant type, acreage, and density.) No implementation cost estimate has been included to conduct the volunteer training workshop for aquatic plants, since it has been assumed that this would be covered by the Conservation District.

The exotic plant control plan complements the plan for the eradication of Eurasian watermilfoil. The surveys that occur every two-to-three years would be relied upon to detect new infestations of Eurasian watermilfoil and allow immediate removal of the plants. If Eurasian watermilfoil or another exotic is found, a second dive should be planned for later in the same year to insure there were no surviving colonies. If the area infested is too large to control by handpulling, or if after two follow-up dives the exotic is still found, bottom barriers would be placed in all areas where the plant was detected. Treatment with herbicide is recommended as a final resort if these efforts do not result in eradication of the exotic plant. (Note: If new herbicides that can be used for spot treatments, such as Renovate® (active ingredient trichlopyr), become registered for use in Washington State, they may be more efficient and more cost effective than either bottom barrier or hand pulling. These should be taken into consideration if and when new infestations are discovered.)

These additional diver surveys, bottom barrier installation, and herbicide treatments are contingency elements to the overall aquatic plant control plan for the lake. Since these costs would only accrue in the event of another infestation by Eurasian watermilfoil or another exotic plant, the costs could be covered through an "early infestation grant" by the Department of Ecology. However, due to grant uncertainties, a contingency fund has been included as one of the plan cost elements, to insure protection of the lake

.

## PLANT CONTROL ADVISORY COMMITTEE

Proper implementation of the described plan relies upon formation of a plant control advisory committee. This committee would have the following responsibilities:

- Review annual plant survey information and track potential problem areas, and determine the appropriate control strategy and urgency of control needed.
- Insure permit requirements are met.
- Recruit and direct volunteers for annual surveys.
- Select and hire contractors when necessary for tasks such as providing training, spraying, diving, and etc..
- Provide information and newsletters to lake residents and perform as spokespeople for answering questions on plant control problems and supporting long term implementation of this plan.

# PUBLIC EDUCATION PROGRAM

The public education program for Loomis Lake consists of three parts; the exotic plant prevention plan previously described, educational activities to alert homeowners about lawn, garden, and home keeping best management practices for protecting the lakes' water quality, and annual workshops on the plant survey results and other lake issues.

1) All watershed residents should be sent copies of a Eurasian watermilfoil prevention brochure. A group of lake homeowners should be trained to identify Eurasian watermilfoil and other invasive plants and perform periodic volunteer surveys of the lakeshore. The Pacific Conservation District has offered to train members of the Loomis Lake Group in the identification of aquatic plants (see September 4, 1997 meeting minutes, Appendix I).

2) To protect the lake from future water quality degradation, lakeside residents should also be provided with a series of informational brochures describing how lawn, garden, and housekeeping practices can impact lake water quality. Brochures could cover proper landscaping techniques to deter waterfowl and prevent pollution, maintaining a pollutant free zone within 50 feet of the shoreline, providing shoreline fish habitat and other timely subject matter. (Additional information in reference to lake stewardship can be found as Appendix V.)

3) Public education and involvement will also center around the annual plant survey. In the spring of each year the plant control advisory committee should plan a short workshop to describe plant survey results from the past year and their plant control strategy for that year. During the workshop, a schedule should be agreed upon for volunteer surveys. At this time everyone should be trained or re-trained on plant identification and survey techniques.

Since much lake related public education information is already contained in available brochures, there is little cost associated with developing the information. A $500 cost has been included for reproduction of brochures, with an additional $100 for mailing and postage. It is assumed that the Pacific Conservation District will develop a training and survey program and therefore no costs are included in this budget (see September 4, 1997 meeting minutes, Appendix I).

# PLAN ELEMENTS, COSTS, AND FUNDING

Table 3 provides a summary of each element identified in this plan and the associated costs. Total cost for the plan for the first ten year period is estimated at $85,200, for an average of about $8,520 per year. The majority of the cost occurs during the first year when all the plan components are implemented simultaneously. Some items listed for the first year (e.g., volunteer training, and public education brochures) could be offset to the following year to spread out the costs.

To implement this plan a stable long-term funding source would be a great advantage. Formation of a special taxing district called a "Lake Management District" or LMD has become the most common way of obtaining funding for lake projects. LMD's are similar to Local Improvement District's (LID) and are formed when a capital project is planned that primarily or wholly benefits only a subset of the citizenry. Each property owner is assessed a "tax" based on some equitable plan for valuation. Perhaps the most simple valuation plan for a lake is based on the number of feet of shoreline owned or property size. Rate structures can also be fairly complex taking into account some combination of lakefront footage, property acreage, the extent of improvements, proximity to the lake, and the extent to which the improvement will benefit the property. The development of the rate structure can be critical to approval of an LMD, since balloting is weighted to provide one vote for each dollar of tax paid to the LMD, as required by State law.

The Department of Ecology Aquatic Weed Management Program can be applied to for additional funds to implement this plan once it has been approved by the Department. However, this program is not appropriate for use as a long-term funding source because there would be no guarantee from year-to-year that funding would be received. Furthermore, these fund moneys can not be used to implement native plant control efforts, such as Rodeo treatments of Burreed.

If exotic plants were found in the lake again after Eurasian watermilfoil were eradicated and it was necessary to implement the exotic plant control portion of this plan, the additional diver surveys, purchase of bottom barrier, and future herbicide treatments required to control re-invasion of Eurasian watermilfoil or invasion by another non-native plant, could be funded through an early-infestation grant from the Department of Ecology Aquatic Plants Program. However, due to grant uncertainties, a contingency fund should still be set aside to cover this possibility.

**Table 3. Estimated cost for implementation of the Loomis Lake Aquatic Plant Control Plan.**

| | YEAR 1 | YEAR 2 | YEAR 3 | YEAR 4 | YEAR 5 | 10 YEAR TOTAL |
|---|---|---|---|---|---|---|
| **Watermilfoil Eradication** | | | | | | |
| Multiple Whole-lake Sonar Treatments | 54,900 | | | | | 54,900 |
| Follow-up dives | 0 | 2,000 | 2,000 | 0 | 2,000 | 6,000 |
| Contingency | 5,000 | 5,000 | 5,000 | 0 | 0 | 15,000 |
| **Rodeo Treatments**(1) | 2,700 | 0 | 0 | 1,700 | 0 | 7,800 |
| **Invasive Plant Program** | | | | | | |
| Signage Improvement(2) | 0 | 0 | 0 | 0 | 0 | 0 |
| Volunteer Training(3) | 0 | 0 | 0 | 0 | 0 | 0 |
| Volunteer Surveys | 0 | 0 | 0 | 0 | 0 | 0 |
| **Public Education** | | | | | | |
| Mailings/Postage | 100 | 100 | 100 | 100 | 100 | 1,000 |
| Advisory Comm. | 0 | 0 | 0 | 0 | 0 | 0 |
| Brochures | 250 | 250 | 0 | 0 | 0 | 500 |
| **TOTAL COST** | **62,950** | **7,350** | **7,100** | **1,800** | **2,100** | **85,200** |

(1) This is not a grant eligible cost.
(2) To be performed under the existing aquatic plant grant.
(3) It is assumed this training will be provided by the Pacific Conservation District.

# IMPLEMENTATION AND EVALUATION

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

### Step 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.

### Step 2) Secure a Funding Source

Plan implementation for the first year (the Sonar treatment) will cost an estimated $62,950, and long-term funding will require an additional $22,250 over the first ten year period. The source for this money should be identified and a budget created.

### Step 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 requirement 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.

### Step 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.

### Step 5) 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 good educational products available through the internet. Encourage lake residents to become members of WALPA. Solicit professionals to volunteer to make presentations to the community and set up dates for presentations. Also, develop a newsletter which includes articles describing different lake protection issues.

### Step 6) 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.

### Step 7) Apply Rodeo™

A bid to apply Rodeo™ 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.

### Step 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 established goals, and makes recommendations for the next years 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 watermilfoil? Have any other invasive plant been identified? Is it necessary to implement the back-up or contingency plan? Over the long-term, adequate annual evaluations can make the difference between project success or failure.

## SUMMARY AND CONCLUSIONS

Eurasian watermilfoil infestation in Loomis Lake is currently patchy throughout the lake. However, due to the shallow depth, this invasive plant has the potential to rapidly colonize all 167 acres of the lake. Without some sort of action plan the aerial coverage of the plant is likely to increase and further impede recreational use of the lake. This report details a plan for controlling watermilfoil with the use of a multiple whole-lake Sonar® treatments. Re-invasion by Eurasian watermilfoil or other non-native plants will be closely monitored through annual diver surveys and a contingency plan is included in case invasions do occur.

In addition, Burreed, an emergent plant is growing extensively along the shoreline creating access problems. Left unchecked this plant can expand its community reducing the open surface water area of the lake available for recreational use, create

shoreline access problems, and increase the loading of organic material to the lake sediments. This plan recommends the use of Rodeo™ treatments to control the spread of this plant.

Public education and awareness programs will focus on Eurasian watermilfoil prevention, and providing general pollution prevention and best management practices information to lake residents. Furthermore, lake residents will be involved in development of the yearly plant control strategy and will be responsible for soliciting volunteers for surveys and plant control activities. This will insure long-term involvement of lake residents in lake management decisions and activities. Implementation of this plan is estimated to cost a maximum of $85,200 over ten years, or a maximum average of $ 8,520 per year for the first ten years.

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# APPENDIX I

## LOOMIS LAKE GROUP
## MEETING MINUTES

# MEETING MINUTES
# JULY 31, 1997

**PRESENT:** Nadine Long, Maggie Bloomgarden, Norm Bloomgarden, Charles Blight, Lona Dale, Paul Hawkins, Lawrence Bosch, Glenda Thomas, Michael Norman, Joe Ritter, Allen Moore, Joy Michaud, Kathryn Black, Don Weseman, Robert Crete, Theou Cline, Walt Cline, Goldie and Glenda Ward, Lynn Campion, Robert Kennedy, Patricia Kennedy, Adeline Jacobs, and Frank Hughes.

**START TIME:** 6:00 pm.

**SPECIAL GUEST:** Joy Michaud, Contractor for the development of the Loomis Lake Integrated Aquatic Plant Management Plan.

Note. The first 40 minutes of the meeting was recorded but the tape was hopelessly ruined. The following is Michael Norman's (Pacific Conservation District) best recollection of what transpired during this time.

The meeting was begun by Glenda Thomas who is on the Steering Committee for the Loomis Lake Group. Glenda introduced Michael Norman of the Pacific Conservation District. Michael gave a brief overview of the events to date. Basically, the Pacific Conservation District submitted a grant on behalf of the Loomis Lake Group to control Eurasian milfoil. The grant was funded and Joy Michaud of Envirovision Corporation was awarded a contract to develop a Loomis Lake Aquatic Plant Management Plan. Michael Norman then introduced Joy Michaud.

Joy Michaud started with a general overview of aquatic plants and the basic tenets of an integrated control plan.

Some components of a plan are:

- Uses the best combination of plant control methods.
- Maximizes beneficial uses.
- Minimized environmental impacts.
- Optimizes overall costs.

The reasons for developing a plan are:

- A means to make informed decisions about managing aquatic plants.
- Ensures that those with an interest in the lake have a chance to provide input to the plan.

Note. The rest of these minutes are based on a taped recording.

Joy then began a full group participation process to learn local knowledge about the lake. Some benefits that the lake has according to the attendants include: fishing, canoeing, swimming, water skiing, natural wildlife habitat (don't hear the frogs as much as they used to) - Canada geese, swans, ducks, osprey, eagles, otters, Blue heron, beaver, otter, fish, possum, deer, bear, and muskrats.

Joy tells the group that they have a very nice lake that has a lot of wildlife and natural habitat and it's a quiet lake.

Joy wants input from the group on Goals of the plan, what they would like the lake to be in 2 years after the plan is implemented?

- Get the weeds out to maintain a free flowing lake, clean out outlets to ocean

Nadine Long. Clean enough to swim and boat in it - plant life at least controllable enough to have access to swim and boat on lake. Boating - make sure that there was no plants within the top 2 feet of the water, where the prop is.

Fishing - reduce population of plants in and around the lake.

Nadine Long. Reducing near shore vegetation.

Joy. What would be satisfactory? If vegetation grew 5 feet from out from shore, hard to define shore, because shore is moving. What would make you happy? To remove near shore vegetation back to where it was, 5 or 10 years ago and not allowed to encroach any more than 4 to 5 ft.

Some of the wildlife use the shoreline vegetation for habitat. So some is needed just not as much as is currently present.

- Glenda Thomas: Milfoil is the real problem. Can't fish, go boating, and less wildlife.
- Joy. How long has milfoil been a problem?
- It is a worse problem on the south end. The group thinks milfoil has been a problem for the last 5 to 20 years.
- Joy. If we (Envirovision) eradicate milfoil or control it greatly, would you still have a plant problem?
- Are there other plants that could take over if milfoil is controlled.
- Joy. Divers will determine will the milfoil and other weeds are at. If milfoil is controlled, the other native species wil come in take over the newly available habitat.
- If we put carp in our lake will it eat the milfoil?
- Yes, research has shown that carp does eat milfoil.
- Allen Moore. They introduced a small amount of carp into Black Lake to control Elodea.
- Take care of the milfoil first, and have follow-up contingency plan for the rest of the vegetation problems.

- Joy. What are some acceptable control strategies?

Hand pulling or equipment you can attach to boat props to cut plants in the water are options for a small scale. These are a few ways on how to control vegetation around the lake and dock area. The effectiveness, amount of control and the duration, varies on how much effort one puts into it. Harvesting is for larger acreage. It is a big machine that works like a lawn mower that moves across the lake cutting down the plants as far as 6-8 feet deep. They cut the weeds off and take them out of the lake. How effective harvesting is depends on what plant your are dealing with, some grow back faster than others. Joy did not suggest harvesting on Loomis Lake for milfoil because fragments create other plants. Harvesting is just cutting off the plants, the roots are still there.

- Michael Norman. Does harvesting work on any aquatic weed?
- Joy. Yes, it does. Does it work to the satisfaction of the lake owners? Not really. It's not inexpensive and it needs to be done at least twice a summer. Generally people haven't been very happy with it.
- How many acres is Loomis Lake? 170 acres.
- Joy. Diver Dredge - Divers operate a dredge that vacuums the bottom of the lake, gets roots, special permits to handle this operation, can be expensive.
- Joy. Sediment removal - it is a mechanical method that vacuums the bottom of the lake that takes the muck and roots out. This method is known for deepening lakes and can cause algae blooms that gives the plants a place to grow. It can be very effective because your removing the plant habitat, however, it can cost millions of dollars.
- Joy. Draw down - take water out of the lake and let plants dry up and die. It is not a technique that has been known to work in this part of the country.
- Joy. Bottom barrier - something you put down to the sediments to keep the plants from growing up through it. Barrier that water and air pass through but not plants. It costs $35,000 an acre.
- Joy. Chemical methods. Sonar - used for submersed plants in water like milfoil.
- Nadine Long. Does Sonar have any guarantees that the weed will not come back in so many years.
- Michael Norman. Only death and taxes are guaranteed.
- Joy. Other chemical methods.
- What effects do this chemicals have on people.
- Joy. The chemicals are cleared for use by the EPA. Sonar has no treatment restrictions.
- Allen Moore. There are no restrictions except at some locations.
- Joy. You can't use Sonar treated water on your lawn. Sonar is expensive.
- Joy. Biological control option are grass carp. Carp can be stocked at a certain density but it is important not to overstock or understock the carp. Carp are inexpensive. It is difficult to get the stocking rate just right. Washington Dept. of Fish and Wildlife are reluctant to issue permits for carp because to many carp will eat all the vegetation in a lake. Carp are sterile but difficult to catch if you overstock the lake.
- The data will be on a GIS system
- Nadine Long. Can the group form a Lake Association.
- Michael Norman. The Pacific Conservation District will help the Loomis Lake Group form an Association.
- Are brochures available on hand-held control equipment?
- Joy. I brought aquatic plant control information, Washington State Lake Protection, and a flier on milfoil.

- **MEETING ADJOURN:** 7:50 pm.

Prepared by: Michael Norman 8/11/97

I Gretchen Sagen 8/11/97

# FORM F: RECORD OF MEETING ATTENDANCE

Agreement No: _____ Recipient: _____ Payment Request _____ Page 2 of 2

Purpose of Meeting: _____ Date of Meeting: Sept. 4, 1997

| Name (please print) | Representing | No. of Hours at Meeting | Signature (required) |
|---|---|---|---|
| Lois Blanchard | Archie | 2 | Lois S. Blanchard |
| Joyce Johnson | Lyle + Lynda Coughlin | 2 | Joyce Johnson |
| David Pfeifer | Janet R Pfeifer | 2 | David Pfeifer |
| Janet R Pfeifer | Janet R Pfeifer | 2 | Janet R Pfeifer 665-6574 |
| Kathleen Sayce | self | 2 | Kath Sayce |
| Walt + Theon Cline | " | 2 | Walt + Cline |
| ELAINE & ELMER RAMSEY | SELF | 2 | Elmer & Ramsey |
| Fred Anne Munhoven | self Munhoven | 2 | Fred Munhoven |
| | self | | Anne Munhoven |
| ~~Tom~~ Michael Norman | Par CD | 2 | Michael Norman |
| Allen Moore | DOE | 2 | allen Moore M.D. |

ELEMENT NUMBER _____ TOTAL VOLUNTEER HOURS: _____ x $12.50 = $ X

Enter the value computed in the lower right hand box on Form C1 for the appropriate element.

# FORM F: RECORD OF MEETING ATTENDANCE

Agreement No: G9700208 Recipient: PACIFIC CONSERVATION ~~DIST~~ Payment Request ____ Page 1 of 2

Purpose of Meeting: Jay Michaud presentation to Loomis Lake Group Date of Meeting: July 31, 1997

| Name (please print) | Representing | No. of Hours at Meeting | Signature (required) |
|---|---|---|---|
| Kathryn Black | Loomis Lake Group | | KATHRYN BLACK |
| Don Weseman | " | | DON WESEMAN |
| Robert Carter | " | | ROBERT CRETE |
| Thron Cline | " | | Thron Cline |
| Walt Cline | " | | |
| Goldie & Linda Ward | | | |
| Lynn Campion | " | | LYNN CAMPION |
| ROBERT KENNEDY | " | | Robert Kennedy |
| PATRICIA KENNEDY | " | | Patricia Kennedy |
| Adeline L Jacobs | " | | Adeline Jacobs |
| Frank Hughes | " | | Frank Hughes |

ELEMENT NUMBER ____ TOTAL VOLUNTEER HOURS: ____ x $12.50 = $ 0

Enter the value computed in the lower right hand box on Form C1 for the appropriate element.

## FORM F: RECORD OF MEETING ATTENDANCE

Agreement No: 69700208 Recipient: Pacific Conservation District Payment Request 1 Page 2 of 2

Purpose of Meeting: Joy Michaud presentation to Loomis Lake Group Date of Meeting: July 31, 1997

| Name (please print) | Representing | No. of Hours at Meeting | Signature (required) |
|---|---|---|---|
| Nadine Long | Loomis Lake Group | | Nadine Long |
| MAGGIE BLOOMGARDEN | " | | Maggie Bloomgarden |
| NORM BLOOMGARDEN | " | | Norm Bloomgarden |
| Charles Blight | SELF " | | Charles Blight |
| LONA DALE & PAUL HAWKINS | SELF " | | Lona Dale Paul Hawkins |
| LAWRENCE G BOSCH | SELF | | Lawrence G. Bosch |
| GLENDA THOMAS | LOOMIS LAKE GROUP | | Glenda Thomas |
| Michael Norman | Pacific Conservation District | | Michael Norman |
| JOE RUTTER | SELF | | Joe Rutter |
| Allen Moore | Ecology | | Allen D. Moore |
| Jay Michaud | ENVIROVISION | 2 | Jay Michaud |

ELEMENT NUMBER _____ TOTAL VOLUNTEER HOURS: _____ x $12.50 = $ 0

Enter the value computed in the lower right hand box on Form C1 for the appropriate element.

LOOMIS LAKE GROUP MEETING
MEETING MINUTES
September 4, 1997

**PRESENT:** Glenda Thomas, Barbara Baker, Walter Kowal, Nadine Long, Kathryn Black, Michael Black, Lynn Campion, Mike Campion, Chuck Blight, Goldie Ward, Glenda Ward, Lois Blanchard, Joyce Johnson, David Pfeifer, Janet Pfeifer, Kathleen Sayce, Walt Cline, Theoa Cline, Elaine Ramsey, Elmer Ramsey, Fred Munhoven, Anne Munhoven, Michael Norman, and Allen Moore

**START TIME:** 6:00 pm.

**SPECIAL GUEST:** Michael Norman, Presented information on how to form a lake association.

- The meeting was begun by Glenda Thomas who is on the Steering Committee for the Loomis Lake Group. Glenda introduced Michael Norman of the Pacific Conservation District.
- Michael Norman began the meeting by announcing the Sept 18 meeting with Joy Michaud and Terry McNabb at the WSU Research Station in Long Beach.
- Michael reviewed the contractual obligations of the Loomis Lake Group. Install interpretive signs at Loomis Lake is the responsibility of Pacific CD and Loomis Lake. Individuals from the Loomis Lake Group will need to learn how to identify aquatic plant species. A collection of plant species is supposed to be preserved as part of the planning process. A plant identification workshop will then be held. Michael could show the group how to identify the aquatic plants in Loomis Lake.
- Michael gathered information and about how to form a lake association and presented it to the group.

Some people expressed concerns that a Lake Association would have rules and regulations and fees, that an association is not necessary because Loomis is a public lake and a government agency should take care of milfoil and drainage problems. Mike explained as Manager of the Pacific Conservation District, a subsidiary of state government, that he could not speak for the county. In developing a Lake Association the following would need to be addressed: 1. Develop a comprehensive mailing list, 2. Adoption of a constitution and bylaws, 3. Elect a board of directors, 4. Register the Association with Washington Secretary of State, 5. Form a 501(c)3 with the IRS, 6. Obtain a minimal amount of liability insurance, and 7. Join the Washington State Lake Protection Association. Michael provided a copy of the information outlined in numbers 2, 4, 5, and 7 to the Loomis Lake Group. Glenda mentioned that number 1, a mailing list had already been developed.

- Michael then read a DRAFT Constitution and Bylaws and allowed the group to comment on each section. A copy was provided to the group on disk. Some specific changes are as follows:

<u>Constitution.</u>
Article 1. Accepted by the group as is.
Article 2. Accepted by the group as is.
Article 3. Accepted by the group as is.
Article 4. Group wanted "and improvements" and "and surrounding area" deleted from line 3.

Article 5. Group said Ocean Park is not incorporated and cannot be called a "City". Another member suggested moving Article 5 out of the Constitution and into the Bylaws.
Article 6. Change "supervisors" to "members-at-large" and "officers " to "board members" for Article 6 and throughout the document.
Article 7. Accept as is.
Article 8. Accept as is.
Bylaws.
Article 1. Accept as is.
Article 2. Accept as is.
Article 3. Include the word "count" after the word "Voting" in line 2, paragraph 5. Change "supervisor" to "board of directors" in line 3 of paragraph 1. Change "President" to "Chairman" in line 2 of paragraph 5.
Article 4. Delete "applied to the following year" and insert "prorated". Delete the third paragraph.
Article 5. Accept as is.
Article 6. Delete "of employee" in line 2. Include "written" after "without" in line 4. Something should be included about minimum liability and bonding of the five board members.
Article 7. Delete paragraph 2. End with "Mail in votes are accepted".

Mike said the Pacific Conservation District will assist in incorporating the changes into the constitution and aid the steering committee in holding a public hearing to adopt the constitution. Steering committee will accept dues and memberships, and have a nomination committee that sets up a slate, and hold a public election. Nominations will be accepted from the floor at the public election. Majority vote rules at all public meetings.

After a board is elected, a constitution and bylaws ratified, and a membership recruited the following steps need to be completed:

- fill out an IRS "SS4 Application for Employer Identification Number" form
- develop a 501(c)3 status, start by filling out an IRS form "8718 User Fee for Exempt Organization Determination Letter of Request" , then use IRS package 1023 "Application for Recognition of Exemption" to fill out Forms 1023 and 872-C.
- fill out a "Washington Application to Form Nonprofit Corporation" form and file with the Secretary of State.
- obtain liability insurance for the board of directors.

- **MEETING ADJOURN:** 7:50 pm.

Prepared by: Michael Nomura Sept. 10, 1997

sep4min

# FORM F: RECORD OF MEETING ATTENDANCE

Agreement No: 69700208 Recipient: Pacific Coast Dist Payment Request 1 Page 1 of 2

Purpose of Meeting: Discuss Task 4 and move the Group toward an Association Date of Meeting: SEPT. 4, 1997

| Name (please print) | Representing | No. of Hours at Meeting | Signature (required) |
|---|---|---|---|
| GLENDA THOMAS | LOOMIS LAKE | 2 | Glenda Thomas |
| Barbara G Baker | Self " " | 2 | Barbara G Baker |
| Walter Kowal | | 2 | |
| Nadine Long | " | 2 | Nadine Long |
| Kathryn Black | " | 2 | Kathryn Black |
| Michael J. Black | " | 2 | Michael J. Black |
| Lynn Compton | " | 2 | Lynn Compton |
| Michael Compton | " | 2 | Michael Compton |
| Chuck Bright | Self | 2 | Chuck Bright |
| Goldie & Glenda Ward | " | 2 | Goldie & Glenda Ward |
| | | | |

ELEMENT NUMBER _____ TOTAL VOLUNTEER HOURS: _____ x $12.50 = $ X 0

Enter the value computed in the lower right hand box on Form C1 for the appropriate element.

# Loomis Lake Meeting Minutes
# September 18, 1997

Present - Glenda Thomas, Gretchen Sagen, Tim Wilson, Janet Pfeifer, Nadine Long, Theon Cline, Walter Cline, Larry Bosch, Paul Barber, Mike Campion, Lynn Campion, James McNamee, Don Wolters, Fred & Anne Munhoven, David Pfeifer, Bernice Carlson, Charles Carlson, Walter Kowal, Robert Crete, Allen Moore, Bud Cuffel, Mike Norman, Terry McNabb, Charles Blight, J.R. Tidd, Joy Michaud, Elaine & Elmer Ramsey, Jess & Kathi Woottiscraft, Kathleen Sayce.

Mike Norman, Manager of the Pacific Conservation District, gave a brief introduction and talked to the group about becoming an Association. One process is as follows: the Loomis Lake Group (a steering committee and meeting attendees) will hold a public hearing to accept constitution and bylaws, the Loomis Lake Group accepts members and fees and appoints a nomination committee, the nomination committee sets a slate and holds a public election. The elected board, membership, and constitution completes the basic frame work for the Loomis Lake Association

Mike gave other materials to Glenda and Sally regarding insurance, registration with IRS for non-profit status and tax identification number. The Loomis Lake Group has everything necessary to formally become a Lake Association.

Mike turned the floor over to Terry McNabb. Terry used slides and overheads for the recommendations or best options they've proposed for Loomis Lakes Aquatic Management Plan.

Terry assured the Loomis Lake Group that their lake was not totally dominated by Eurasian milfoil although there is a dense stand of bur-reed (*Sparganium*) around the periphery of the lake. The north end of the lake has coontail, which is similar to Eurasian milfoil. There is a lot of American Elodea, and water lilly on the lake. The water lilly is great habitat for fish but the Loomis Lake Group needs to monitor the spread as water lilly can reach problematic levels.

Terry discussed 2 practical methods for treatment of Eurasian milfoil that are legal, they are:
1) A herbicide named Sonar, and
2) grass carp
-Based on previous research on Eurasian milfoil in lakes, Envirovision has recommended Sonar. Some characteristics of Sonar include: 1) selective and systematic, 2) has no water use restrictions except for irrigation, and 3) negligible fish toxicity. Sonar is mixed with liquid that can be injected in a boom off the back of a boat.

Rodeo is needed for the control of plants above the water line and could be used for the control of bur-reed. Characteristics of Rodeo include: 1) non-selective, contact, and systemic, 2) requires the addition of a surfactant, and 3) has no water use restrictions. Rodeo is sprayed from a hand gun.

Terry did not recommend grass carp because, 1) they are selective eaters that would eat beneficial native species first and milfoil last, 2) it's hard to get a permit from Washington State Department of Fish and Wildlife, 3) stocking rates are difficult to determine, and 4) they are quite expensive.

Terry also did not recommend harvesting because it only cuts 3/4 of the plant and it does not take the roots out. Little fragments are spread throughout the lake and can attach themselves to boats and trailers.

Terry and his crew surveyed the lake and took aerial photos on August 11 and 12th. Terry presented the group with a species distribution map that was created from a vegetation survey he conducted. The conclusion from this map is that Eurasian milfoil is the major aquatic plant problem that has not yet dominated the lake, but can colonize all 167 acres.

Terry McNabb and Joy Michaud shared with the group their strategies for Eurasian milfoil control. They are: 1) Whole lake multiple Sonar treatment strategy, 2) Single Sonar treatment strategy, 3) Biological control - grass carp, and 4) Mechanical - not recommended because of ineffectiveness.

Joy Michaud asked the group, to indicate by a show of hands, which of the four strategies they preferred. One individual showed an interest in grass carp. The Loomis Lake Group overwhelmingly supported the multiple Sonar treatment strategy. The next issue that was brought up was the cost the various plans.
#1 - Whole lake multiple Sonar treatments over an 8 week period maintaining 20 parts per billion - $54,900
#2 - Single Sonar treatment strategy - $22,500
#3 - Rodeo treatments program for year one - $2,700
#4 - Rodeo treatments program following years - $1,700

The Loomis Lake Group was concerned about the cost because there isn't any money from DOE for 1998. Terry seems to think that we would have no problem getting funding in 1999 because we are the only lake in the area that has milfoil and we pose a threat to the surrounding bodies of water. He thinks that we would be high on a priority list for funding because they would want to eradicate milfoil in Loomis Lake so it does not spread to other bodies of water. Money has been approved for the Aquatic Management Plan, the next step is to procure implementation grant money to control milfoil on Loomis Lake.

The meeting was adjourned at 9:00 p.m.

Prepared by:

Gretchen Sager 10/8/97 Michael Norman 10-8-97

**FORM F:** RECORD OF MEETING ATTENDANCE

Agreement No: 69700208 Recipient: Pacific Conservation District Payment Request 1 Page 1 of 3

Purpose of Meeting: Terry McNabb, Jay Michaud presentation of Lake survey info Date of Meeting: 9-18-97

| Name (please print) | Representing | No. of Hours at Meeting | Signature (required) |
|---|---|---|---|
| GLENDA THOMAS | LOOMIS LAKE GROUP | | Glenda Thomas |
| Gretchen Sagen | Pacific Cons. District | | Gretchen Sagen |
| Tim Wilson | Pacific County Weed Board | | Tim Wilson |
| Janet R Reiter | | | |
| Nadine Long | Loomis Lake Group | | Nadine Long |
| Theon Cline | " " | | Theon M Cline |
| Walter L. Cline | SELF | | Walter L Cline |
| LARRY BOSCH | SELF | | Larry Bosch |
| Paul Barbera | SELF | | Paul Barbera |
| Mike Campion | Loomis Lake Group | | Mike Campion |
| Lynn Campion | " " " | | |
| JAMES R MCNAMEE | SELF LOOMIS LAKE GROUP | | James R McNamee |

ELEMENT NUMBER _____ TOTAL VOLUNTEER HOURS: _____ x $12.50 = $ -0-

Enter the value computed in the lower right hand box on Form C1 for the appropriate element.

ECY 060-13 (6/95)

DON WOLTERS LOOMIS LAKE GROUP Don Wolters

FRED & ANNE Self Fred C Winchowen

LINDA WINCHOWEN

## FORM F: RECORD OF MEETING ATTENDANCE

Agreement No: _____ Recipient: _____ Payment Request _____ Page 2 of 3

Purpose of Meeting: _____ Date of Meeting: 9-18-97

| Name (please print) | Representing | No. of Hours at Meeting | Signature (required) |
|---|---|---|---|
| David Pfeifer | Self | | David Pfeifer |
| BERNICE CARLSON | self | | Bernice Carlson |
| CHARLES H. CARLSON | " | | Charles H Carlson |
| Walter Koval | SELF | | Walter Koval |
| ROBERT CRETE | SELF | | Robert A Crete |
| Allen Moore | Ecology | | Allen W. Moore |
| Bud Cuffel | Pacific Co | | Bud Cuffel |
| Michael Norman | Pacific Conservation District | | Michael Norman |
| Terry McNabb | PMT. | | Terry McNabb |
| Charles Bishop | Self | | Charles C Bishop |
| JR Tidd | " " | | JR Tidd |

ELEMENT NUMBER _____ TOTAL VOLUNTEER HOURS: _____ x $12.50 = $ 0

Enter the value computed in the lower right hand box on Form C1 for the appropriate element.

## FORM F: RECORD OF MEETING ATTENDANCE

Agreement No: _____ Recipient: _____ Payment Request _____ Page 3 of 3

Purpose of Meeting: _____ Date of Meeting: 9-18-97

| Name (please print) | Representing SELF: | No. of Hours at Meeting | Signature (required) |
|---|---|---|---|
| ELAINE + ELMER RAMSEY | RESIDENT ON LOOMIS | 2 | Elmer H Ramsey |
| Jess & Kathi Wooltscroft | Loomis Resident | 2 | |
| Kathleen Joyce | Village Alliance | 2 | Kathleen Joyce |
| | | | |
| | | | |
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ELEMENT NUMBER _____ TOTAL VOLUNTEER HOURS: _____ x $12.50 = $ -0-

Enter the value computed in the lower right hand box on Form C1 for the appropriate element.

**Minutes of the April 23, 1998 Loomis Lake Meeting**
**Seaview Fire Station, 7:00 pm**

-Mike Norman gave an introduction talk for about 5 minutes, then turned the floor over to Joy Michaud.
-Joy explained to the Loomis Lake Group the process we have taken to secure funding from DOE (Department of Ecology). The draft plan was completed in January, she would like to review public comment tonight, and give a brief overview of the plan.
-Joy explained the problem we have with Loomis Lake is Eurasian milfoil. It is a non-native, invasive plant that is taking over Loomis Lake. Eurasian water milfoil (EWM) can easily colonize the entire lake bottom. Burred is also a problem in nearshore area.
-Joy then went on to explain the Basic Plan Elements that the plan describes:

- Use Sonar to eradicate milfoil
- Use Rodeo to control burred
- Detection and prevention program
- Public education
- Plant control advisory committee

-Joy explained to the group about milfoil control

- Sonar treatment - most effective, no known toxicity, and approvable.
- 3 applications over one summer (6-8week period) to maintain appropriate concentration 20 mg/L - (Don't use water for lawn and garden plants during control) - follow up diving surveys for 2 years, and a contingency plan.

-Joy then explained about burred control

- Use Rodeo to hold plants to a 5ft. wide band around the shoreline.
- No treatment of the eastern shoreline which is designated a "conservancy zone".
- Requires ongoing program of retreating every 2 to 3 years, it can be individual or group cost, not grant eligible.

-Joy explained the funding needs for full implementation of the plan

- Approximately $85,000 over ten years to implement this plan:
  - -Sonar @ $55,000
  - -$6,000 for diver surveys
  - -$15,000 contingency
  - -$8,000 for Rodeo (every 3rd year)
  - -Misc. (Prevention Detection and Public Education)

-Many people were concerned why there is no money in DOE's budget for lakes for 1998-99? Joy's answer was that the money was spent somewhere else, and she has no control over where the money is spent. Competition for grants will be very competitive the following year. There might be some possible funding through EPA 319 etc. Mike has a few contacts, he's going to keep looking for possible funding for implementation of the plan.

-One question that was asked is "Where is the money going for boat and trailer taxes? Joy's response was she didn't know. Mike stepped in to say, you need to call your local representative, Brian Hatfield, Mike Doumit, or Senator Sid Snyder. Mike also suggested that at the next meeting, the district would provide stamped envelopes to mail letters to our congressman.

-Another concern that the group had was that they had not had any responses from the Department of Fish and Wildlife. Brett Dumbald was in attendance to the meeting. and he is a director of the Nahcotta WDFW Shellfish Station. He will pass on the information to John Linth of WDFW.

-Joy also explained the minimum funding needs for Loomis Lake
-$55,000 for Sonar treatment
-$2,000 follow-up dives (or volunteer)
-Volunteer training (?)

-Joy's last and final step to this process is to explain the steps in this plan to completion, they are:

- Set up a Plan Imp. Committee
- Secure a funding source
- Apply Sonar
- Institute long-term plant monitoring program
- Apply Rodeo
- Conduct annual evaluation

-Kathy Hamel, DOE, and Joy discussed with the group that a herbicide, like sonar, called Renovate is going to come on the market. It is a herbicide that is like sonar, but you don't have to treat the whole lake, you can do spot treatments. It can save you money by performing less applications of the herbicide. It is supposed to be approved by the federal government by October.
-Kathy also explained to the group that Joy will submit a final Milfoil Management Plan to DOE, and DOE will have to approve the plan to fulfill contractual agreements.
- Mike wanted to thank Joy for all her hard work, and we couldn't have contracted with a better company.
-Mike also talked to the group about signs. Everyone was very interested in putting up signs at each boat approach. Gretchen will look into more information on signs.
-Mike discussed with the group about in-kind match. We are $2829 short of in-kind match. The group has some ideas how to make the match before June 30 ,1999. Kathy Hamel has volunteered to have a 2 hour plant identification workshop at our next meeting, all participants in the class will have to sign a sheet that can be used for in-kind. On April 25, 1998, fishing season opened. Kathy told the group if someone was to monitor the boat launches at Loomis Lake for milfoil on boats or trailers, the hours that the group spends at the boat launch could be used as in-kind also.
-There were no more questions from the group, the meeting was adjourned at 8:45 p.m.

Prepared by:

Gretchen Sagen 5/4/98
Gretchen Sagen, Admin. Asst. Date

Michael Norman May 4 1998
Mike Norman, Manager Date

# APPENDIX II

## VOLUNTEER MONITORING DATA

# Loomis Lake Volunteer Monitoring Data

| LAKE | County | Station | Sampler | Date | Time | Color | Clouds (pct) | Rain | Wind | Secchi | WTube1 | Status | Temp | TUnits |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Loomis | Pacific | 1 | Chuck Blight | 5/26/97 | 10:11 | 7 | | 2 | 1 | 5.25 | 1 | N | 19 | C |
| Loomis | Pacific | 1 | Chuck Blight | 6/9/97 | 11:12 | 2 | 0 | 1 | 2 | 5.5 | 1 | N | 19 | C |
| Loomis | Pacific | 1 | Chuck Blight | 6/23/97 | 11:06 | 7 | 50 | 5 | 2 | 5.5 | 0 | N | 19 | C |
| Loomis | Pacific | 1 | Chuck Blight | 7/7/97 | 10:23 | 4 | 25 | 4 | 2 | 5 | 0 | N | 23 | C |
| Loomis | Pacific | 1 | Chuck Blight | 8/4/97 | 11:24 | 2 | | 1 | 1 | 3.25 | 0 | N | 24 | C |
| Loomis | Pacific | 1 | Chuck Blight | 7/21/97 | 11:51 | 2 | 75 | 2 | 0 | 4 | | N | 21 | C |

# APPENDIX III

## AQUATIC PLANT SPECIES LIST FOR LOOMIS LAKE

Provided by Jennifer Parsons WDOE

# Species Summary

**Loomis Lake** **County: Pacific**

| Date | Scientific name | Common name | Distribution Value | Comments |
|---|---|---|---|---|
| 8/25/97 | | | | |
| | *Ceratophyllum demersum* | Coontail; hornwort | 2 | more prevalent at north end |
| | *Eleocharis sp.* | spike-rush | 2 | shoreline |
| | *Elodea canadensis* | common elodea | 2 | |
| | *Equisetum sp.* | horse tail | 2 | in shallows |
| | *Hydrocotyle ranunculoides* | water-pennywort | 1 | only observed near boatlaunch, but did not search the shoreline for it |
| | *Ludwigia palustris* | water-purslane | 1 | shallow water |
| | *Myriophyllum spicatum* | Eurasian water-milfoil | 3 | some dense patches at the north end, scattered or not present in the rest |
| | *Najas flexilis* | common naiad | 1 | only saw a couple of times |
| | *Nuphar polysepala* | spatter-dock, yellow water-lily | 2 | |
| | *Nymphaea odorata* | fragrant waterlily | 2 | several small patches at north end |
| | *Phalaris arundinacia* | reed canarygrass | 2 | shoreline |
| | *Polygonum sp.* | smartweed | 2 | possibly P. hydropiperoides |
| | *Potamogeton amplifolius* | large-leaf pondweed | 1 | only saw a couple of small patches |
| | *Potamogeton epihydrus* | ribbonleaf pondweed | 2 | |
| | *Potamogeton richardsonii* | Richardson's pondweed | 2 | |
| | *Potamogeton zosteriformis* | eel-grass pondweed | 3 | some dense patches observed |
| | *Sparganium eurycarpum* | broadfruited bur-reed | 3 | shoreline and shallows, more dense in north half of lake |

Distribution Value
1 = rare
5 = dense monoculture

| Date | Scientific name | Common name | Distribution Value | Comments |
|---|---|---|---|---|
| 8-25-97 CONT. | *Spirodela polyrhiza* | great duckweed | 1 | among emergent plants |
| | *Tolypella intricata* | macro algae | 4 | dense in deeper water |
| | *Zizania aquatica* | wild rice | 3 | shoreline and shallows, more prevalent at south end where it is growing across the lake |

**Comments:**

Eurasian milfoil scattered along developed shoreline - didn't see any at the south or SE end of the lake, some dense patches at north end. Much more Zizania than I remember in 1994 at South end. Observed Bryozoans, mussels, FW sponge, osprey nest with birds, several duck species. Very windy and cloudy therefore could have missed some things - did not sample deep water much due to waves.

Species Summary

**Loomis Lake** **County: Pacific**

| Date | Scientific name | Common name | Distribution Value | Comments |
|---|---|---|---|---|
| 7/13/94 | | | | |
| | *Azolla mexicana* | mexican water-fern | 1 | Only seen once near the south end |
| | *Callitriche sp.* | water-starwort | 1 | only seen NW of boat launch |
| | *Carex sp.* | sedge | | along shore |
| | *Ceratophyllum demersum* | Coontail; hornwort | 2 | dense patch at north end, rare in the rest of the lake |
| really Tolypella? | *Chara sp.* | muskwort | 3 | dense in deeper water, except at south end |
| | *Eleocharis sp.* | spike-rush | 2 | along shore |
| | *Elodea canadensis* | common elodea | 4 | patchy, some dense patches along W shore near houses |
| | *Glyceria borealis* | northern mannagrass | 2 | few patches, mostly on NE shore |
| | *Hydrocotyle ranunculoides* | water-pennywort | 2 | listed rare plant, shallow water at south end of lake |
| | *Najas flexilis* | common naiad | 2 | in deeper water throughout the lake |
| | *Nuphar sp.* | yellow water-lily | 3 | mostly growing at far north and south ends |
| | *Nymphaea sp.* | water lily | 1 | 1 patch at north end by homes |
| | *Potamogeton amplifolius* | large-leaf pondweed | 1 | few patches at north end |
| | *Potamogeton epihydrus* | ribbonleaf pondweed | 1 | few small patches at north end |
| | *Potamogeton pusillus* | slender pondweed | 1 | few scattered plants |
| | *Potamogeton richardsonii* | Richardson's pondweed | 2 | patches mostly at north end of lake |
| | *Potamogeton zosteriformis* | eel-grass pondweed | 3 | in patches throughout lake |

| | | | | |
|---|---|---|---|---|
| 7/3/96 cont. | *Potentilla palustris* | purple (marsh) cinquefoil | 3 | along shore, shallow water |
| | *Sparganium eurycarpum* | broadfruited bur-reed | 4 | prevalent along entire lake margin |
| | *Spirodela polyrhiza* | great duckweed | 1 | only seen near south end |
| | *Typha sp.* | cat-tail | 2 | margins |
| | *unknown plant* | unknown | 3 | probably Cicuta sp. on shoreline |
| | *Utricularia vulgaris* | common bladderwort | 2 | in deeper water |
| | *Zizania aquatica* | wild rice | 3 | prevalent on east shore |
| 9/1/96 | | | | |
| | *Myriophyllum spicatum* | Eurasian water-milfoil | | reported by a consultant |

# APPENDIX IV

## AQUATIC PLANT CONTROL ALTERNATIVES CONSIDERED FOR LOOMIS LAKE

# AQUATIC PLANT CONTROL ALTERNATIVES CONSIDERED FOR LOOMIS LAKE

The following is a description of the methodologies initially presented to the steering committee for control of aquatic plant problems in Loomis Lake. Essentially four methods were discussed for control of milfoil; use of the herbicide Sonar® (either multiple or single application), stocking with Grass Carp, and mechanical harvesting. Grass carp was eliminated as a viable option due to permitting problems and the unreliability of control. Mechanical harvesting was also discussed but determined to be unacceptable because of the potential for watermilfoil fragments to create more plants.

Currently, the emergent plant Burreed is a concern along the shoreline. The use of Rodeo™ is recommended to control the boundaries of this plant community. This appendix also includes description and comparison of control methods available to lake residents to use along their shorelines to bring more immediate and specific relief for their plant problems.

## EURASIAN WATERMILFOIL ERADICATION

### Herbicides - Sonar Treatment

At Loomis Lake, Eurasian watermilfoil is found growing at varying densities throughout the entire lake. Once Eurasian watermilfoil has infested a lake it will continue to proliferate until it becomes the dominant submerged plant. Of the herbicides currently approved for use in Washington State, fluridone is the preferred herbicide for submerged plant control. Fluridone formulated as Sonar® for aquatic application.

Fluridone is effectively adsorbed by plants and translocated by both roots and shoots and then inhibits carotenoid synthesis. Carotenoids (yellow pigments) are an important part of the plant's photosynthetic (food making) system. The carotenoids protect the chlorophyll (green pigments) from decomposition by sunlight (photodegradation). When carotenoid synthesis is inhibited, the plant is exposed to photodegradation and is gradually destroyed. Effects of fluridone treatment become noticeable within 7 to 10 days of application, with complete control often requiring 60 to 90 days. Within one to two weeks after the first treatment, Eurasian watermilfoil will start to show signs of chlorosis, the tips of the plants and leaves will start to bleach out. It takes approximately 10 weeks for the plant to fall out of the water column. Because it kills the plant and roots it has a relatively long control duration; four to five years. Many of the local native pondweeds may survive exposure to fluridone at moderate to low concentrations.

Advantages of fluridone are that the treatments are low cost coupled with relatively long-term control of the plants. It is considered to have very low toxicity to aquatic animals and comes with no swimming or fishing use restrictions. The only water use restriction for Sonar® applications 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 use in gardens. It is a chemical control method and therefore there are implied concerns associated with the use of toxins in natural environments. Other than chemical use concerns, a primary drawback of fluridone use is temporary loss of habitat in the year of treatment. The water quality impact from the release of nutrients by decaying vegetation is also a concern.

Sonar® is applied to the water surface either as a liquid or slow-release pellets. Application of the liquid form of the herbicide is most appropriate for whole-lake treatments and is recommended for shallow lakes where watermilfoil infestation is or has the potential to spread throughout the lake. The slow-release pellet form of Sonar® was developed to provide greater exposure to plants where currents keep water moving. However, the use of the granular form is also applicable in lakes where colonization is patchy and the infestation potential is limited by a narrow littoral region. These two application strategies are discussed below.

### *Whole-lake Liquid Sonar® Treatment*

Fluridone has been found to be effective at eradicating Eurasian watermilfoil in Washington State lakes through whole-lake treatments. The use of liquid fluridone is most applicable to lake-wide treatments. When used for spot treatments liquid fluridone has a tendency to become dilute resulting in an ineffective treatment. Therefore, the control zone typically includes the entire open water area of the lake. In whole-lake applications fluridone concentrations should be applied and maintained for several weeks to obtain sufficient plant/herbicide contact time to kill targeted plants. A drawback of liquid fluridone is that it requires a whole-lake treatment to be effective and therefore cannot be used to target specific zones and impacts beneficial submerged plants as well as nuisance plants.

### *Granular Sonar® Treatment*

Sonar® granular treatments can be effective in controlling Eurasian watermilfoil growth along the shore. The herbicide is saturated in clay pellets and the pellets are applied to plant control zones where they fall to the lake bottom and the herbicide is slowly released. Application of the granular form of the herbicide at the base of the plant beds where water movement is obstructed helps to maintain herbicide concentrations over time. The more intense labor involved in spreading the pellet form makes its use more expensive than the liquid for whole-lake treatments.

One factor influencing the effectiveness of Sonar® granular treatments is the type of sediment upon which the granules will fall. In highly aqueous (watery) sediments, or sediments with a high level of organic material, the granules may sink into the sediment to far and become inactive.

### *Treatment Protocols*

To control Eurasian watermilfoil in a lake system, 10 parts per billion of fluridone must be maintained in the vicinity of the weed for eight to ten weeks. An initial treatment

would be made in the early summer at 20 parts per billion. This application rate accounts for the entire volume of the lake where fluridone will mix. Fluridone will begin photodegrading soon after application. Subsequent treatments would be scheduled at two, four, six, and if necessary, eight week intervals. Prior to follow-up treatments, water samples are collected in the vicinity of the target vegetation and analyzed for fluridone concentrations. This data is then used to determine the quantity of herbicide needed to maintain 10 to 20 parts per billion.

Multiple treatments have become the standard application protocol for both liquid and granular formulations of Sonar. This methodology has been used with liquid fluridone to eradicate Eurasian watermilfoil from a number of Washington Lakes including Steel and Killarney Lakes in Federal Way. Sonar granule treatments at Clear Lake, Pierce County were successful at controlling excessive watermilfoil growth along the shore.

Permits are required from Ecology prior to any aquatic herbicide treatment. Once a permit has been granted, a number of public notification requirements must be fulfilled prior to the application.

*Treatment Costs*

Treatment costs by private contractor range from $700 to $1,000 per acre. It should be noted that the cost per acre used here is taken from an Ecology reference manual for developing aquatic plant management plans. The actual cost of the most recent fluridone (as Sonar®) treatment of Steel Lake (46 acre lake) was $15,000 for two applications (one treatment), for a cost of $326/acre. The higher cost estimate was used to provide the most conservative estimate of the expected cost for implementation of this alternative. (Sonar costs have been steadily rising over the years and can be expected to continue to do so.)

## Grass Carp

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 thin-leaved Pondweeds and *Elodea canadensis* are highly preferred, broad leaf Pondweed and Eurasian watermilfoil are less preferred, and that Waterlilies 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 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 affects 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.

Costs range from $50 to $2,000 per acre, at stocking rates ranging from 5 to 200 fish per acre and average cost of $15 per fish. However, additional costs would likely include more than $200,000 for an environmental checklist, Phase I 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.

## Mechanical Harvesting

Mechanical harvesting involves cutting plants below the water surface, conveying them onto the harvester, and offloading them at the boat launch for disposal or 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 to 8.2 feet with 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 (Perkins and Sytsma 1987). Past experience with harvesting a dense Watermilfoil 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).

Unit costs for harvesting are roughly $1,500 per acre per year for floating-leaved plants and $375 per acre per year for submerged plant control. The primary advantages of harvesting are the immediacy of the control and the fact that plant material that would normally add to the lakes nutrient load and cause increased sedimentation is removed from the lake. (However, some small plant fragments may escape the conveyance system and reestablish the plant in another part of the lake.) The primary drawback of harvesting is the shorter duration of control and therefore the need for repeated cuts. Mechanical harvesting requires hydraulic approval from Washington Department of Fish and Wildlife.

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.

## BURREED CONTROL

Burreed or *Sparganium* is the secondary plant of concern in Loomis Lake. This plant, if allowed to expand, will reduce the amount of surface area of the lake available for wildlife and recreational uses, and it will result in access problems as it intensifies along the shoreline. The use of Rodeo™ herbicide in recommended for control of this plant.

### Rodeo Treatments

Rodeo™ herbicide is a nonselective systemic product that can be applied by hand gun to vegetation in targeted areas of the lake. This product will provide excellent control of those plants targeted by the application. Plants not targeted by the application will not be impacted. Rodeo™ is a material approved by both the US Environmental Protection Agency and the Washington Department of Ecology. There are no restrictions on the use of treated waters. This work is conducted under permit from the Washington Department of Ecology.

The strategy for the use of Rodeo™ would be to contain the Burreed within designated boundaries along the shoreline. Conservancy zones can be established where the plant community would be protected from application. Once boundaries are established, Rodeo™ treatments would maintain these areas.

Burreed will attempt to expand into the treated zones each year. As such, there needs to be an ongoing maintenance application program which would consist of additional treatments every two to three years. The established cost for this program would be $2,700 the first year and approximately $1,700 in successive years of treatment.

## HAND CONTROL AND OTHER METHODS AVAILABLE

The methods for aquatic plant control in this section are intended to be used in conjunction with other methods described above. These contingency methods may be used to enhance the effectiveness of the Eurasian watermilfoil eradication strategy or as part of the long-term native plant control. Most of the methods listed below are intended for small area control and may be suitable for lakeshore residents to use along their personal property.

### 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. Handpulling 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 hand 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 to $2,400 per day. Low to moderate pondweed 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 handpulling efforts.

### Hand Cutting

Hand cutting tools are available for controlling submerged plants. For example, the Water-Weeder® is a battery-powered, hand-held cutter that cuts a 4-foot swath down to 12-feet deep, and can be purchased for approximately $500.

Hand cutting tools should allow adequate control within small problem areas. The control zone would primarily be limited by the amount of labor available. Acreage located near private property could be controlled by individual property owners. Approximately two cuts per year should be adequate to maintain native plants to an acceptable level.

Plant fragments should be removed to prevent aesthetic impacts from floating debris and onshore decay of the plant material as well as the re-rooting of plant fragments. Cut fragments float and are best removed with a modified fish seine that encircles small working areas or is positioned down-wind of the working area. The modified fish seine costs $500. The net should have at least a 1-inch mesh so that it will not trap small fish.

There are no depth limitations for these tools and therefore the control zone for this method could include any portion of the lake. However, since it requires manual labor it is best suited for small patches of plants that may be hindering lake access. Because plant roots and/or

tubers are not removed using these tools, the duration of control is comparatively low. The frequency of application is dependent on water depth; monthly cuts will maintain deep areas, but more frequent cuts may be necessary for areas less than 3 feet deep.

The primary advantage of hand cutting is the low cost and the ability to be selective about the area controlled. The primary drawback is the high amount of labor required to provide adequate control. It has been estimated to require about one hour to cut a 50'x100' area when using a boat to assist the effort.

## Weed Rolling

The Weed Roller is a relatively new product that controls aquatic plant growth by periodically disturbing the lake bottom. The drive head is typically mounted to the end of a dock in water depths of up to 8 feet. It slowly rotates a string of three aluminum tubes which repeatedly roll over a broad arc on the lake bottom. Each 6-inch by 10-foot tube is connected with a flexible coupler to follow the bottom contour. The Weed Roller converts 110-volt household current to 24-volt direct current (DC) and covers up to a 270° sweep in 15 minutes. Adequate control is typically achieved by operating the Weed Roller continuously overnight once every week or two during the growing season.

Since a power source and structural support is required to operate the weed roller, the control zone is limited to area directly adjacent to docks. King County Surface Water Management Division tested the use of these Weedrollers at three lake sites during 1995. The Weedroller was found to effectively decrease waterlily and Eurasian watermilfoil stands from 50-90% coverage to less than 25% coverage with fewer than 12 hours of operation a month. Some temporary indirect affects were noted for increased water turbidity and possibly affects on bottom dwelling organisms.

A complete unit with accessories sells for approximately $2,500. This cost does not include installation and electricity. This tool would not be considered for use on the large lily bed due to lack of a power source, installation , and ineffectiveness for controlling large areas. Advantages of the Weed Roller include the high degree of control, low amount of labor, and the fact that it will control all plant types within its path. The main drawback is the limited area of control. Also, the plant fragments that are formed can cause problems for nearby residents if not removed. The Weed Roller requires hydraulic approval from the Washington Department of Fish and Wildlife.

## Bottom Barriers

Bottom barriers are manufactured sheets of material that are anchored to the lake bottom to prevent plants from growing, similar to weed barriers commonly used in lawn and garden activities. Several bottom covering materials have been used with varying degrees of success. A woven polyester material such as Texel® ( is one of the most effective bottom barriers because it is durable and it provides efficient exchange of gas produced from decaying organic matter (roots). It is typically installed in the winter by unrolling sections and anchoring them with sand bags spaced 10 feet apart. Generally, the material is in a 15 foot wide roll that is rolled out to the selected length. Bottom barriers should be maintained on an annual basis to ensure adequate coverage and anchoring. Bottom barriers can be relocated to other areas after

2 years if sediment accumulation is not excessive. Re-installation may be necessary to control encroachment of plants in areas adjacent to dense growth.

There are no limits to the control zone for bottom barriers. They are effective in deep as well as shallow water and do not have special requirements that eliminate their use in different areas. The control zone would be defined by the square footage of material installed. Control intensity and duration varies depending upon sediment accumulation and encroachment from adjacent area. If properly installed and maintained annually, bottom barriers can provide a high level of control for five years or more.

The cost of applying bottom barriers is approximately $0.80 per square foot ($35,000 per acre). Annual maintenance costs are estimated to be $3,750 per acre. The primary advantage of bottom barriers is the intense level of control and the ability to be very selective about the control area. The main disadvantage is the high cost per acre controlled. Bottom barriers require hydraulic approval from the Washington Department of Fish and Wildlife.

### Aquathol®

Aquathol® is a contact herbicide; it affects many types of plants but does not impact the root system. This means it does not kill plants entirely but "knocks them back" for the year. Because of this it requires annual applications. Aquathol® has a number of use restrictions for treated waters. The Federal label on this product places no restriction on the use of treated waters for swimming, but has a 3 day fish consumption restriction of fish caught in the treatment area, and a 7 to 21 day restriction on irrigation or water supply use that is dependent upon application rate. In Washington State, there are additional restrictions: applicators must post a swimming restriction of 8 days, a 3 day fish consumption restriction, and a 35 day irrigation or portable water use restriction.

One of the benefits to using Aquathol® is that it can be used to spot treat specific areas, thereby keeping the costs lower relative to whole-lake herbicide treatments. As with most chemicals, one of the advantages of their use is that aquatic plants will begin to die back within 7 to 14 days. The main disadvantage of using Aquathol®, other than general concerns always associated with the use of chemicals in aquatic environments, is that it can be expensive and requires an annual effort to maintain aquatic plant control. Unit costs for an Aquathol® treatment is roughly $610 per acre per year for submerged plant control.

# APPENDIX V

## LAKESIDE STEWARDSHIP

# LAKESIDE STEWARDSHIP

In addition to monitoring watershed activities, each lakeside resident should be educated about how to reduce the amount of pollutants entering the lake from their property, as well as about things they should do to help retain a complex, diverse, and therefore healthier lake environment. The properties located directly adjacent to the lake have great potential for adversely impacting the lake since pollutants generated on these properties have direct access to the water.

Typically lakeside property owners plant turf grass and ornamental landscapes right to the waters edge. Next, they remove shoreline or riparian vegetation, logs, rocks, and other natural structures to create a large expanse of unobstructed shoreline. The ornamental turf and plants require watering, fertilizing, and herbicide treatment. This in combination with the removal of shoreline and riparian vegetation means that these fertilizers and poisons have direct and immediate access to the water. The removal of structures (i.e., logs, rocks, etc.) reduces the utility of the area to fish and other aquatic organisms; from turtles and salamanders to dragonflies and butterflies. With the exception of the Canada goose, these unobstructed lawns and shorelines are to fish and wildlife what an asphalt parking lot might be to humans; they lack food, habitat, hiding places, or interest.

Lakeside property owners should be provided with information about problems associated with typical landscapes around lake shorelines and riparian areas. This should include information on the drawbacks of using ornamental turf (lawns), and the benefits of adding shoreline plants and diversified lawn plantings which create habitat structure for birds and wildlife. Since much of the shoreline and watershed are currently undeveloped, Loomis Lake residents are in a unique position to begin this process of education before lake conditions deteriorate from poor planning as future lots are developed.

Some considerations for proper stewardship of lakeside property are described here. An informative brochure or newsletter articles should be used to educate lakeside property owners about these BMP's:

- If turf and landscaped areas are desired, this area should be limited to no closer than 25 feet to the shoreline. Native plants and grasses should be considered for landscaped areas to decrease the amount of fertilizers, pesticides, and other pollutants used.

- Establish a "pollutant free zone" within 50 feet of the shoreline. Try to keep all pollutants; gas for boats, painting projects, landscape fertilizers and poisons, etc. away from this zone.

- Plant a shoreline buffer of shrubs and tall grasses, preferably native species. This one small activity will cause multiple environmental benefits. If properly designed it will keep geese and other waterfowl from moving onto lawn areas. The vegetation will help filter out pollutants from landscaped areas before they reach the lake. It will provide protection from shoreline erosion, and it will provide habitat for the many wildlife species that utilize nearshore areas.

- Do not remove natural "structure" that exists along the shoreline, or if necessary clean up only a narrow strip alongside the dock area. If a tree along the shoreline finally falls in, leave it. Add structure in the form of tree tops, twig bundles, and rocks to diversify and naturalize your waterfront area and attract more fish and wildlife.

- Allow some emergent vegetation, and other plants to colonize some portion of your waterfront area.

# APPENDIX VI

## HERBICIDE INFORMATION SHEETS

Health

Environmental Health

# Office of Toxic Substances Fact Sheet

**May 1994**

# FLURIDONE (SONAR$^{R}$)

## WHAT IS FLURIDONE?

Fluridone (1-methyl-3-phenyl-5-[3-(trifluoromethyl)phenyl]-4(1H)-pyridinone) is a fluorinated pyridinone-based aquatic herbicide (Trade name: Sonar$^{R}$). Fluridone is a systemic herbicide that is absorbed from water by plant shoots and from hydrosoil by roots. Fluridone controls aquatic plants by inhibition of carotenoid synthesis.

Fluridone has a water solubility of 12 ppm. It was initially registered with the U.S. Environmental Protection Agency in 1986 and is sold in granular or liquid form.

## PUBLIC HEALTH

**Drinking water.** Fluridone cannot be used within 1/4 mile of a drinking water intake. Potential routes of exposure to the general public are: 1) drinking treated water, 2) swimming in treated water, and 3) eating aquatic organisms from treated water. Washington State Departments of Ecology (Ecology) and Health (DOH) reviewed these three routes of exposure and concluded that no adverse heatlth effects are anticipated from exposure to fluridone if used according to label instructions.

**Ground Water.** No direct ground water contamination issue is associated with the application of fluridone to aquatic sites. There are no label restrictions for drinking (with the exception of 1/4 mile buffer for a potable water intake), swimming, or fishing in water treated with fluridone. Fluridone is degraded primarily by photolysis, biodegradation, and volatilization.

## RESTRICTIONS

**Recreation.** There are no swimming restrictions associated with fluridone treatment.

**Agricultural Crops.** There is no evidence that ingestion of treated agricultural crops would be of human health concern. Plants irrigated with fluridone-treated water would likely be injured or killed.

**Fish.** Fluridone has no fishing restrictions and fish are not significantly affected at treatment concentrations. According to Ecology documents reviewed by DOH, ingestion of aquatic organisms does not pose a threat to human health (as calculated from a daily fish ingestion rate multiplied by a bioconcentration factor). The bioconcentration factor of fluridone in fish ranges from 0.9 to 15.5 (a value of 100 is usually regarded as significant). Thus, there is a very low probability that fluridone will bioaccumulate or biomagnify in fish.

## TOXIC SPILLS

There have been no reports of significant exposure to fluridone through spills. In case of a large spill, material should be prevented from flowing into streams, ponds, or lakes.

## OTHER POTENTIAL CONCERNS

**Other Potential Concerns.** Fluridone itself has not been shown to be teratogenic, mutagenic, or carcinogenic. However, NMF (N-methyl formamide), a photolytic breakdown product of fluridone under artificial conditions but an unlikely breakdown product under natural conditions, is a potential teratogen, fetotoxin, liver toxin, and cell toxin in animals exposed to elevated levels. NMF has never been observed under natural conditions where fluridone was applied at label amounts. Using data from animal studies and worst-case exposure estimates, Ecology and DOH agree it is unlikely for fluridone and/or NMF to cause harmful effects to humans.

Little research has been conducted on synergistic effects of fluridone with other aquatic herbicides.

Inert ingredients included in the formulation of fluridone are confidential and under control of the parent company. Consequently, DOH requested and received a list of inert ingredients which were then reviewed for toxicity. DOH concluded that these chemicals are not of human health concern at applied concentrations.

## FOR MORE INFORMATION

Please contact:

- Your Local County Health Agency
- Washington State Department of Health
  Office of Toxic Substances - (206) 586-5403
- Washington State Department of Ecology
  Water Quality Program - (206) 407-6400
- Washington State Department of Agriculture
  General Information - (206) 902-2010

Copies of this fact sheet may be obtained from your Local County Health Agency, or:

- Washington State Department of Health
  Office of Toxic Substances
  P.O. Box 47825
  Olympia, Washington 98504-7825
  (206) 586-5403

# Material Safety Data Sheet

SePRO

Emergency Phone: 317-580-8282
General Phone: 1-317-580-8282

EPA Reg. Number: 67690-4
Effective Date: August 25, 1994

# SONAR* A.S. Herbicide

SePRO Corporation • Carmel, IN

## 1. INGREDIENTS: (% w/w, unless otherwise noted)

1-Methyl-3-phenyl-5-(3-(trifluoro-methyl)phenyl)-4 (1H)-pyridinone (Fluridone)
CAS# 059756-60-4.....41.7%

Other Ingredients, total, including: .....58.3%
Proprietary surfactants
Propylene glycol . . . CAS# 000057-55-6
Water . . . CAS# 007732-18-5

This document is prepared pursuant to the OSHA Hazard ommunication Standard (29 CFR 1910.1200). In addition, other substances not 'Hazardous' per this OSHA Standard may be listed. Where proprietary ingredient shows, the identity may be made available as provided in this standard.

## 2. PHYSICAL DATA:

**BOILING POINT:** (@ 1 atmosphere) 212°F, 100°C

**VAP. PRESS:** 2.3 mm Hg at 25°C

**VAP. DENSITY:** 1.178 relative to air at 25°C

**SOL. IN WATER:** Disperses in water

**SP. GRAVITY:** 1.15 at 25°C

**APPEARANCE:** Light tan to gray opaque liquid

**ODOR:** Slight odor

**pH:** (aqueous 50/50) 8.45

## 3. FIRE AND EXPLOSION HAZARD DATA:

**FLASH POINT:** Greater than 200°F, 93.3°C

**METHOD USED:** SCC

**FLAMMABLE LIMITS:**
**LFL:** Not applicable
**UFL:** Not applicable

**AUTO-IGNITION TEMPERATURE:** Not applicable

**EXTINGUISHING MEDIA:** SONAR A.S. is a water based suspension and will not burn. If product is involved in fire and water has evaporated, use water fog, CO2, dry chemical, or foam.

**FIRE AND EXPLOSION HAZARDS:** This product will not burn until a sufficient amount of water has evaporated. At this point, the product will exhibit the flammability characteristics of the organic portion of this formulation. Keep unnecessary people away; isolate hazard area and deny unnecessary entry. Highly toxic fumes are released in fire situations.

**FIRE-FIGHTING EQUIPMENT:** Wear positive-pressure, self-contained breathing apparatus and full protective equipment.

## 4. REACTIVITY DATA:

**STABILITY:** (CONDITIONS TO AVOID) None known

**INCOMPATIBILITY:** (SPECIFIC MATERIALS TO AVOID) None known

**HAZARDOUS DECOMPOSITION PRODUCTS:** If product is allowed to dry, will emit toxic vapors as it burns.

**HAZARDOUS POLYMERIZATION:** Does not occur.

## 5. ENVIRONMENTAL AND DISPOSAL INFORMATION:

**ENVIRONMENTAL DATA:** Follow use directions carefully so as to avoid adverse effects on nontarget organisms. In order to avoid impact on threatened or endangered aquatic plant or animal species, users must consult their state fish and game agency or the U.S. Fish and Wildlife Service before making applications. Do not contaminate water when disposing of equipment washwaters. Trees and shrubs growing in water treated with Sonar A.S. may occasionally develop chlorosis. Do not apply in tidewater or brackish waters. Lowest rates should be used in shallow areas where the water depth is considerably less than the average depth of the entire treatment site, for example, shallow shoreline areas.

**ACTION TO TAKE FOR SPILLS:** Use absorbent material to contain and clean up small spills and dispose as waste. Large spills report to CHEMTREC and SePro Corporation for assistance. Prevent runoff.

**DISPOSAL METHOD:** Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.

## 6. HEALTH HAZARD DATA:

**EYE:** May cause slight transient (temporary) eye irritation. Corneal injury is unlikely.

**SKIN CONTACT:** Prolonged exposure may cause slight skin irritation. Did not cause allergic skin reactions when tested in guinea pigs.

**SKIN ABSORPTION:** A single prolonged exposure is not likely to result in the material being absorbed through skin in harmful amounts. The LD50 for skin absorption in rabbits is greater than 2000 mg/kg.

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**INGESTION:** Single dose oral toxicity is low. The oral LD50 for rats is greater than 500 mg/kg. Small amounts swallowed incidental to normal handling operations are not likely to cause injury; swallowing amounts larger than that may cause injury.

**INHALATION:** At room temperature, vapors are minimal due to physical properties; a single exposure is not likely to be hazardous.

**SYSTEMIC (OTHER TARGET ORGAN) EFFECTS:** In chronic toxicity studies in animals, fluridone has been shown to cause liver and kidney effects.

**CANCER INFORMATION:** The components did not cause cancer in long-term animal studies.

**TERATOLOGY (BIRTH DEFECTS):** In animal studies on some of the components (including fluridone), this product did not cause birth defects; for fluridone, other fetal effects occurred only at doses toxic to the mother.

**MUTAGENICITY (EFFECTS ON GENETIC MATERIAL):** For fluridone, results of mutagenicity tests in animals have been negative; results of a battery of in-vitro mutagenicity tests, except for one, have also been negative. Based on these results and the lack of carcinogenic response in long term studies, fluridone is not considered to be mutagenic.

## 7. FIRST AID:

**EYES:** Flush eyes with plenty of water. Get medical attention if irritation persists.

**SKIN:** Flush skin with plenty of water. Get medical attention if irritation persists.

**INGESTION:** Call a physician or poison control center. Drink one or two glasses of water and induce vomiting by touching back of throat with finger. Do not induce vomiting or give anything by mouth to an unconscious person.

**INHALATION:** Move victim to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. Get medical attention.

**NOTE TO PHYSICIAN:** No specific antidote. Supportive care. Treatment based on judgment of the physician in response to reactions of the patient.

## 8. HANDLING PRECAUTIONS:

**EXPOSURE GUIDELINE(S):** Propylene glycol: AIHA WEEL is 50 ppm total, 10 mg/m3 aerosol only.

**VENTILATION:** Provide general and/or local exhaust ventilation to control airborne levels below the exposure guidelines.

**RESPIRATORY PROTECTION:** Atmospheric levels should be maintained below the exposure guideline. If respiratory irritation is experienced, use an approved air-purifying respirator.

**SKIN PROTECTION:** For brief contact, no precautions other than clean body-covering clothing should be needed. Use chemically-resistant gloves when prolonged or frequently-repeated contact could occur. Wash thoroughly with soap and water after handling. Wash exposed clothing before reuse.

**EYE PROTECTION:** Use safety glasses.

## 9. ADDITIONAL INFORMATION:

**SPECIAL PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE:** Keep out of reach of children. Harmful if swallowed, absorbed through skin, or if inhaled. Avoid breathing of spray mist or contact with skin, eyes, or clothing.

**MSDS STATUS:** Revised sections 1, 3, 5, 6, 7, 8, 9, and reg sheet.

## REGULATORY INFORMATION:

(Not meant to be all-inclusive—selected regulations represented).

NOTICE: The information herein is presented in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ from one location to another; it is the buyer's responsibility to ensure that its activities comply with federal, state or provincial, and local laws. The following specific information is made for the purpose of complying with numerous federal, state or provincial, and local laws and regulations. See MSD Sheet for health and safety information.

**SARA HAZARD CATEGORY:** This product has been reviewed according to the EPA "Hazard Categories" promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:
An immediate health hazard

**TOXIC SUBSTANCES CONTROL ACT (TSCA):** All ingredients are on the TSCA inventory or are not required to be listed on the TSCA inventory.

**STATE RIGHT-TO-KNOW:** The following product components are cited on certain state lists as mentioned. Non-listed components may be shown in Section 1 of the MSDS.

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# SONAR* A.S. Herbicide

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| CHEMICAL NAME | CAS NUMBER | LIST |
|---|---|---|
| 1,2-PROPANEDIOL | 000057-55-6 | PA1 |

PA1=Pennsylvania Hazardous Substance
(present at greater than or equal to 1.0%).

**OSHA HAZARD COMMUNICATION STANDARD:**
This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

**NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) RATINGS:**

| Category | Rating |
|---|---|
| Health | 1 |
| Flammability | 0 |
| Reactivity | 0 |