

## **PUBLIC EDUCATION PROGRAM**

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The public education program for Lake Lawrence consists of three parts; the exotic plant prevention plan previously described, lakeside stewardship education, and watershed protection/pollution prevention for protecting the lakes' water quality.

### **EXOTIC PLANT PREVENTION**

All watershed residents should be sent copies of an exotic plant prevention brochure. A group of lake homeowners should be trained to identify invasive plants and perform periodic volunteer surveys of the lakeshore. The exotic plant prevention plan was described in detail in the Invasive Plant Prevention and Detection Program section.

### **LAKESIDE STEWARDSHIP EDUCATION**

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 the greatest potential for adversely impacting the lake since pollutants generated on these properties have direct access to the water and no other defined surface inflows exist.

Lakeside property owners should be provided with information about problems associated with typical urban type landscapes around lake shorelines. 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.

Some important considerations for proper stewardship of lakeside property are described here. Informative brochures or newsletter articles should be used to educate lakeside property owners about best management practices (BMPs). Some examples of stewardship ideas include:

- Limit turf and landscaped areas to no closer than 25 feet from 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, and 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.
- Preserve natural "structure" that exists along the shoreline and in the shallow nearshore area, 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 the nearshore area and attract more fish and wildlife.

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

Public education and involvement will also center on 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 the plant control strategy for that year (e.g. where and when Rodeo<sup>®</sup> will be applied and mechanical harvesting take place). 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.

Thurston County Department of Water and Waste Management is a resource for technical assistance and noxious weed identification training. The Lakes Management Program also offers speakers on lake-related topics and can tailor programs to the community needs. The Lake Lawrence community could continue to participate in the program for specific contracted services.

## **WATERSHED PROTECTION/POLLUTION PREVENTION**

Over the long term, the quality of Lake Lawrence may be most impacted by development activity in the watershed. Recommendation of watershed protection measures is beyond the scope of this Plan; however lake residents should be aware of the potential impacts and take a pro-active role to insure protection of their lake. Lake residents need to monitor watershed related activities to insure that appropriate best management practices (BMP's) are being carried out in nearby commercial and residential developments. This should include; tracking where activities are occurring, reviewing permit applications to insure proper BMP's have been included, reporting violations to permit conditions or water quality standards, and generally keeping informed about the watershed problems.

Since much lake related public education information is already contained in available brochures, there is little cost associated with developing the information. A \$1000 per year cost has been included for development and reproduction of brochures, with an additional \$250 for mailing and postage. It is assumed that the first plant workshop would be done by a professional who can develop a training and survey program. After that the workshops would be put on by lake resident volunteers. The cost for the initial workshop was estimated at \$1,500. This cost was included as part of the invasive plant protection program.

## **PLAN ELEMENTS, COSTS, AND FUNDING**

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This section outlines the main aquatic plant control elements and their associated costs (Table 8). The primary elements of this plan are direct aquatic plant control (Rodeo<sup>®</sup>, mechanical harvesting, and grass carp), monitoring and evaluation (aquatic plant surveys and herbicide

monitoring), and public education. Detailed descriptions of these plan elements including costs are provided in the Recommended Aquatic Plant Control Plan section or the Monitoring, Evaluation, and Implementation section.

Table 8 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 \$500,280 for an average of about \$50,000 per year. Table 8 is intended to act as a guide for estimated annual and 10-year costs. The cost estimates are purposefully conservative to insure that any surprises on cost are pleasant ones.

The highest cost occurs during the first year when all the plan components are implemented simultaneously, some of these (e.g., volunteer training and public education brochures) could be offset to the following year to spread out the costs. These costs are based on 2004 cost estimates. If an inflation rate of 3 to 5 percent each year is assumed, the 10 year cost will range from \$573,514 to \$629,246.

Implementation of the Lake Lawrence IAVMP is projected to occur over a 10-year period. A combination of grant funding and local revenue from the Lake Lawrence LMD) is proposed to fund the plan's implementation.

## **FUNDING STRATEGY**

The following sections contain possible sources of both short and long-term funding for aquatic plant control related activities. It is important to understand that the Lake Lawrence LMD is the only group on the lake that takes a proactive role in annual plant control and water quality monitoring. Public agencies are not currently funding these annual activities and the LMD has been collecting assessments for this work since 1986.

### ***Short Term Funding***

One of the main sources of funding to implement an IAVMP is through the State's Aquatic Weed Management Fund (AWMF). The AWMF has a yearly funding cycle for general aquatic weed management projects. There is a competitive process for awarding these grant funds that begins with a written application. The annual application period begins October 1<sup>st</sup> and closes on or about November 1<sup>st</sup> of each year. Workshops are held before or during the application period to explain the application process and general program requirements. Grant applications are evaluated according to established criteria. Application guidelines, criteria, and other information about this program are detailed on Ecology's Aquatic Plants and Lakes website, under Aquatic Weed Grants.

Limits have been set on the size of grants that are available.

- The maximum grant amount for general aquatic weed management grants is \$75,000. With the local match requirement of 25 percent, this equates to a project cost of \$100,000.
- Planning grants are limited to \$30,000. With the local match requirement, this equates to a project cost of \$40,000.
- The maximum grant amount for early infestation grants is \$50,000.

The development of this IAVMP was funded by a planning grant. The general aquatic weed management fund is often used to implement IAVMP's approved by the Department of Ecology. Early infestation grants are used to quickly control noxious aquatic weeds before they become widespread.

A public body (e.g. a local agency such as Thurston County) must sponsor the grant application and ultimately be responsible for meeting grant requirements. These public entities are also required to provide matching funds for AWMF grants.

Limits have also been set on the amount of funds available to each public body during each funding cycle. The ceiling amount per public body is \$75,000 for general aquatic weed management projects and \$75,000 for early infestation projects. Funding for implementation of an IAVMP is expected to be used over a five to 10-year period and does not occur annually.

Ultimately these projects will fail unless funded through some sort of self-taxing district (e.g. a LMD) to carry on with monitoring and other long-term efforts. The Lake Lawrence LMD has exhibited a willingness to pursue aquatic plant control and monitoring efforts for the past two decades.

### ***Long-Term Funding***

The Lake Lawrence LMD is a special assessment district whose taxes are used to fund lake management activities. The LMD has been in existence since 1986 and is one of the oldest LMD's in Washington. The LMD was reauthorized in 2003 for another four years and will not expire until December of 2007. Under the current LMD, property owners at Lake Lawrence are granted one vote for every dollar they are assessed. The following list shows the annual charges per parcel:

- |  |         |
|--|---------|
| • Private lakefront property                         | \$230   |
| • Private canal front property                       | \$115   |
| • Private upland property (w/ community lake access) | \$49    |
| • Improved public boat launch property               | \$3,240 |
| • Other public access                                | \$1,620 |

Some areas of the lake (e.g. zoned for agriculture or designated as forest) are exempt from LMD fees.

**Table 8. Estimated costs for implementation of the Lake Lawrence Integrated Aquatic Vegetation Management Plan**

<b>TASK</b>	<b>YEAR 1</b>	<b>YEAR 2</b>	<b>YEAR 3</b>	<b>YEAR 4</b>	<b>YEAR 5</b>	<b>YEAR 6</b>	<b>YEAR 7</b>	<b>YEAR 8</b>	<b>YEAR 9</b>	<b>YEAR 10</b>	<b>10-YEAR</b>
<b><i>Rodeo® (glyphosate) Herbicide<sup>1</sup></i></b>											
Permit & Notification <sup>2</sup>	\$1,000	\$1,000	\$1,000	\$1,000	-	-	-	-	-	-	\$4,000
Treatment <sup>3</sup>	\$2,500	\$2,500	\$2,500	\$2,500	-	-	-	-	-	-	\$10,000
<b><i>Mechanical Harvesting</i></b>											
Permit	-	-	-	-	-	-	-	-	-	-	-
Harvest <sup>4</sup>	\$60,000	\$60,000	\$60,000	\$60,000	-	-	-	-	-	-	\$240,000
<b><i>Grass Carp</i></b>											
Tech. Support & Permit <sup>5</sup>	\$5,000	-	-	\$650	-	-	-	\$650	-	-	\$6,300
Stocking <sup>6</sup>	\$25,000	-	-	\$12,500	-	-	-	\$12,500	-	-	\$50,000
<b><i>Monitoring &amp; Evaluation</i></b>											
Comprehensive Surveys <sup>7</sup>	\$10,000	\$5,000	\$10,000	\$5,000	\$10,000	\$5,000	\$10,000	\$5,000	\$10,000	\$5,000	\$75,000
Herbicide Monitoring <sup>8</sup>	\$2,500	\$2,500	\$2,500	\$2,500	\$2,500	\$2,500	\$2,500	\$2,500	\$2,500	\$2,500	\$25,000
Evaluation Report	\$2,500	\$2,500	\$3,500	\$2,500	\$2,500	\$2,500	\$3,500	\$2,500	\$2,500	\$2,500	\$27,000
Volunteer Surveys	\$1,500	-	-	-	-	-	-	-	-	-	\$1,500
<b><i>Public Education</i></b>											
Volunteer Training w/brochures/newsletter <sup>9</sup>	\$1,600	\$1,600	\$1,600	\$1,600	\$1,600	\$1,600	\$1,600	\$1,600	\$1,600	\$1,600	\$16,000
<b><i>Contingency Fund (10%)</i></b>	<b>\$11,160</b>	<b>\$7,510</b>	<b>\$8,110</b>	<b>\$8,825</b>	<b>\$1,660</b>	<b>\$1,160</b>	<b>\$1,760</b>	<b>\$2,475</b>	<b>\$1,660</b>	<b>\$1,160</b>	<b>\$45,480</b>
<b>TOTAL COST</b>	<b>\$122,760</b>	<b>\$82,610</b>	<b>\$89,210</b>	<b>\$97,075</b>	<b>\$18,260</b>	<b>\$12,760</b>	<b>\$19,360</b>	<b>\$27,225</b>	<b>\$18,260</b>	<b>\$12,760</b>	<b>\$500,280</b>

Note 1: May not be required if noxious plants eradicated or become negligible

Note 2: Includes labor and materials cost for public notification and permitting (No application fee for NPDES Noxious Weed Permit)

Note 3: Assumes initial and follow-up treatment of approximately 2 acres of fragrant waterlilies/yellow flag

Note 4: Assumes two harvests of approximately 30 acres during the growing season

Note 5: Cost associated with working with WDFW, completing HPA and Fish Stocking Permits, SEPA checklist

Note 6: Assumes initial stocking rate of 20 fish per vegetated acre

Note 7: Includes aquatic plant diver biomass survey every year, whole-lake diver survey every other year

Note 8: Not required if project self-funded. If monitoring required, overall cost may be less depending on analytical costs

Note 9: Cost for annual public meeting, materials, travel, etc.

The LMD currently collects approximately \$75,000 in assessments to fund lake management activities. These funds generally are sufficient to cover annual expenses such as mechanical harvesting, net pen operation, and Thurston County administrative costs.

The current tax assessment for the LMD will fund most of the annual plant control related activities proposed in this plan, except in the first year when initial grass carp stocking takes place. The LMD and Thurston County should consider applying for an implementation grant, which would at a minimum cover most of the costs associated with stocking grass carp and eradicating noxious weeds. As stated earlier, long-term plant control costs may be significantly lower if grass carp adequately control native submerged vegetation (thus eliminating mechanical harvesting costs) and noxious weeds are eradicated.

Lake Lawrence is used by other outside groups such as fishing clubs and boat racing organizations. These groups often are experienced in organization fund-raising activities such as raffles and benefits, which could become annual events in the area. This represents an additional potential source of long-term funding for lake management activities.

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## **MONITORING, EVALUATION AND IMPLEMENTATION**

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### **MONITORING AND EVALUATION STRATEGY**

Several different plant control-related monitoring and evaluation needs are identified for Lake Lawrence. These include:

- Plant surveys,
- Plant biomass monitoring,
- Herbicide residue monitoring, and
- An annual evaluation.

Water quality monitoring may also be a part of lake management activities but is not part of this plan. The following sections describe specific activities as they relate to aquatic plant management at the lake.

#### ***Aquatic Plant Surveys***

Ongoing surveys are critical to preventing the rapid expansion of existing fragrant waterlily and yellow flag populations or new infestations of other noxious weeds. When infestations are relatively small there are options for control that are much less expensive than, for instance, treating the whole lake with herbicide. The aquatic plant survey performed in 2003 by Thurston County staff included the identification of plant species and their relative locations and densities. The survey also included the use of GPS equipment to help document the relative densities and locations of different plant species along transect lines. The general locations of the different aquatic plant communities were incorporated into a Geographic Information System (GIS) computer program (ArcView 3.3) and an aquatic plant community map was prepared (Figure 2). It is recommended that GPS/GIS mapping be performed in 2004 and every other year thereafter

as a regular component of the long-term surveillance program. Aquatic plant maps and an explanatory report should be prepared and provided to the residents of Lake Lawrence as part of the Education/Awareness program. A professional diver survey that included a map and report would cost approximately \$5,000.

Performing an additional survey later in the growing season was not included as a component of this Management Plan but should be considered if new infestations of other noxious plants are detected. Money from the contingency fund would be used to accomplish this additional survey.

### ***Plant Biomass Monitoring***

The Washington State Department of Ecology strongly recommends that lake groups (through volunteers or a consultant) monitor plant species and area of coverage, before and for several years after stocking grass carp. The WDFW often has made the stocking of grass carp contingent on having more extensive aquatic plant monitoring (i.e. use of divers to perform quantitative biomass estimates). The data collected during this monitoring would be used as evidence for obtaining additional grass carp if plant biomass in the lake has not been reduced a few years after the initial stocking effort

Annual plant biomass estimations would cost approximately \$5,000. This cost is based on plant biomass estimations conducted at Duck Lake to assess grass carp efficacy (EnviroVision 2000), and includes approximately two days of diving along set transects to collect plant material.

### ***Herbicide Monitoring***

Beginning in 2003, the NPDES Noxious Weed Permit requires permit holders to monitor herbicide residues. However, in order to minimize the costs of this requirement for privately funded projects, only those projects funded through Ecology's Aquatic Weed Management Fund will be required to perform the monitoring. Therefore, the cost of the monitoring will be covered by the grant. A detailed discussion of these requirements and the procedures used to monitor herbicide residues may be seen by reviewing Ecology's Annual Group Monitoring Plan at:

[http://www.ecy.wa.gov/programs/wq/pesticides/final\\_pesticide\\_permits/noxious/monitoring\\_data/2003monitoring\\_plan.html](http://www.ecy.wa.gov/programs/wq/pesticides/final_pesticide_permits/noxious/monitoring_data/2003monitoring_plan.html).

Herbicide sampling should be accomplished by experienced water quality professionals. This may include but is not limited to: a County or State water quality professional, a private firm with monitoring expertise, or lake residents who have received training on how to perform herbicide monitoring (note: Ecology recommends that the person sampling should not be the applicator or use applicator's boat or equipment because of the possibility of sample contamination). In general, monitoring for herbicide residues involves sampling water within and outside of the treatment area; immediately before and after treatment, 24 hours after treatment, and at some later time interval. Exact locations, time to sample, and number of samples vary depending on the herbicide(s) applied and target species. Samples are then sent to an accredited laboratory for analysis. The results of herbicide monitoring are submitted to the Department of Ecology and/or Agriculture annually in the same year that treatment occurs.

It is estimated that herbicide monitoring would cost approximately \$2,500 in the years in which herbicide is used at the lakes. This estimate includes time, labor, travel, and analytical costs. In some instances the manufacturers of the herbicides perform the sample analysis for free, in which case the overall cost of herbicide monitoring would be less.

### ***Annual Evaluation***

A complete annual evaluation should be completed that describes which elements of the management plan have been implemented, relates the existing plant community to established goals, and makes recommendations for the next years activities.

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, those that have not, and why. It should also include a summary of the 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 and lake conditions. For example, it is possible that the goals will be met, but that some people will remain dissatisfied. Although it is unlikely that the needs of all stakeholders 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 activities; does an herbicide treatment or the stocking of additional grass carp need to be scheduled? Has there been a dramatic increase or decrease in the amount of nuisance plants in the lake? Have any other noxious aquatic plants been identified? Should other control tools (bottom barriers, for example) be considered? Is it necessary to implement a back-up plan? Is funding adequate for the control measures in place? Over the long-term, adequate annual evaluations can make the difference between project success or failure.

It is estimated that writing an evaluation would cost approximately \$2,500 per year. The cost to write this evaluation is somewhat higher (\$3,500) in the third and seventh year of this plan. This reflects a more detailed evaluation that includes information from past years that would serve as documentation for restocking grass carp the following year, if necessary.

## **IMPLEMENTATION PLAN**

### ***Year 1***

The first and most important steps for implementing IAVMP's have already been taken by the Lake Lawrence residents. These include, securing a long term funding source (i.e., the LMD) and establishing a committee to oversee plan implementation. Therefore, activities in the first year can focus directly on aquatic plant control. As soon as this IAVMP is approved by the State, planners should immediately move forward on two fronts; applying for an implementation grant from Ecology and applying for a grass carp stocking permit from WDFW.



The Lake Lawrence LMD with Thurston County as a sponsor should have a strong competitive advantage for winning an implementation grant to fund surveys and fragrant waterlily and yellow flag iris eradication. This is because the lake group has already taken the most difficult step of establishing a long-term funding source (i.e., the LMD), it has an established record for accomplishing aquatic plant management goals, and also because some of the steps required for plan implementation are related to management of an invasive or noxious plant species.

The grass carp stocking permit itself is easy to fill out and submit. However, it may be prudent to meet with WDFW staff people first to discuss the project. As was described during the public meetings, it may be difficult to obtain this permit and a proactive approach is recommended. (Although WDFW staff has been contacted during the planning process and will receive a copy of this plan, this in no way implies their approval of this approach.) Elements of the evaluation and monitoring plan (e.g., establishing grass carp exclusion areas to assist with impact evaluation) as well as mitigation plans for supplementing habitat should be reviewed with WDFW staff.

If possible, grass carp should be stocked in the spring when plants are actively growing. Therefore, if a grass carp permit is approved in the spring of 2004, the grass carp should be stocked shortly thereafter, and a detailed monitoring and evaluation plan should be designed and implemented. If the permit is not issued until the summer of 2004, the LMD should consider waiting until the spring of 2005 to stock the grass carp. Elements of this plan were described in the Recommended Aquatic Plant Control section and described above. It can be assumed that at the very least quantitative estimates of aquatic plant biomass will be necessary on an annual basis. If grass carp exclusion areas are set up they also will need to be considered in the monitoring plan. WDFW may also require monitoring of waterfowl and fish populations. These requirements would be determined during development of the stocking permit. They have not been assumed to be required in this plan.

Following the process used in past years, a harvesting strategy will still need to be agreed upon and implemented. The herbicide treatment for waterlilies and yellow flag iris will also need to be contracted and scheduled.

## ***Year 2***

This second year would be a good time to set up a long-term plan for detection of new invasive species. As described in other portions of this plan, this element may include use of trained lake volunteers and continuation of County visual plant surveys, as well as periodic diver surveys. This long-term need should be considered in development of the detailed monitoring and evaluation plan, especially since divers will be required to perform the quantitative biomass estimates.

During the second year harvesting planning and implementation efforts as well as herbicide treatments would still occur. As stated earlier, these activities may not be necessary three to five years after implementation of this plan.

### ***Ongoing/Following Years***

Each year the LMD steering committee will need to evaluate the past years progress. At the very least they will need to determine whether harvesting should be continued or whether it is time to supplement the grass carp population. This determination will be largely based on the plant biomass results. The steering committee will also need to be ready to apply for early infestation grants if new invasive species are found during annual surveys.

Other items to be considered on an annual basis include; boater education at the boat launch and checking that signage and information is still available, as well as identified tasks for lakeside resident education and volunteers.

## **SUMMARY AND CONCLUSIONS**

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The Lake Lawrence LMD has been active in controlling aquatic plants since its inception in 1986. The 1995 Lake Lawrence Management Plan has served as an aquatic plant management guide for lake residents and Thurston County for the past nine years. This IAVMP serves as an update to the aquatic plant control portion of the 1995 Lake Lawrence Management Plan.

This Integrated Aquatic Vegetation Management Plan was developed through a public involvement process following guidelines set by the Washington State Department of Ecology (WDOE 1994). During the plan development process lake residents reviewed plant management goals and objectives, control methods, and selected a preferred aquatic plant control strategy. This strategy was designed to address both native nuisance plants and noxious plants at the lake.

The native submerged plants at Lake Lawrence impede beneficial uses such as swimming, boating, and fishing. The noxious aquatic weeds fragrant waterlily and yellow flag also threaten beneficial uses and fish and wildlife habitat. Without some sort of action plan the aerial coverage of these aquatic plants are likely to increase and further impede beneficial uses of the lake. This report details a plan for eradicating fragrant waterlily and yellow flag with the use of an herbicide (Rodeo<sup>®</sup>) and control of native submerged plants with mechanical harvesting (short-term) and grass carp (long-term). Implementation of this plan is estimated to cost approximately \$500,000 over ten years, or an average of \$50,000 per year.

Re-invasion by fragrant waterlily, yellow flag, or other non-native plants will be closely monitored through semi-annual diver surveys, and a contingency plan is included in case invasions do occur. Public education and awareness programs will be focused on exotic plant prevention, and providing general pollution prevention and best management practices information to lake residents.

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.

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