

PROBLEM STATEMENT

Tenmile Lakes Integrated Aquatic Plant Management Plan

In October of 1997 at the first of a number of the Tenmile Lakes Scoping meetings, participants established a list of problems related to the management of the Lakes.

Aquatic weeds were identified as a large problem that has negatively impacted many of the lakes beneficial uses. The identified problems are primarily related specifically to one species of invasive weeds, Brazilian elodea, *Egeria densa*. This non-native aquatic plant is associated with

- (1) The decline in the quality of drinking water
- (2) A loss in open water habitat
- (3) Decreased boat access
- (4) An increase in sediment entrapment
- (5) A reduction of many of the recreational uses historically provided by the Lakes

Since the 1940s Tenmile Lakes have been invaded by Brazilian elodea. Their origin is greatly disputed but most likely elodea entered the system by several sources: birds, boats, and merchantable logs from other coastal lakes. Since that initial introduction, this prolific aquatic plant has been very successful. This noxious species has taken over the entire shoreline of both Lakes and grows densely in depths less than sixteen feet (*Sytsma 1995*). At the end of each of the lakes' arms, shallow areas where increases in depth are gradual, Brazilian elodea growth is so dense that it removes substantial acreage of the waterbody from being available for other beneficial uses that the Lakes historically provided.

According to the 1998 Oregon State Boaters Survey, the combined system of North and South Tenmile is the second most utilized lake system in Oregon. The Tenmile Lakes Recreational Area support boating, swimming, skiing, and fishing. Coos County Parks maintains a boat ramp and swimming area on South Lake that is the main access for public users. Several resorts and many of the local businesses are also located along the shoreline. A number of businesses rely on the lakes for revenue. The rapid growth of elodea has severely impacted the shoreline swimming area and access to docks. As a result, several control measures are used to reduce these impacts, but there is no management plan in place to assist and coordinate these activities for the long-term betterment of the lake system as a whole.

The Tenmile Lakes have approximately 440 residences along its shorelines. For some permanent and seasonal residents, the lake system provides the sole transportation route and how they receive their mail. Where elodea growth is extensive, emergency services and mail delivery are affected for these residences. When people are unable to access their boat docks due to weed encroachment, uses and property values are reduced. Each landowner individually manages the weeds quite often with no thought to water quality, fisheries and wildlife benefits that this public resource provides for the community.

In addition, over 240 residences use lake water for domestic uses. Elodea and the corresponding “control” measures can negatively affect *individual residence’s water intakes* and increase the maintenance costs of these filtration systems.

Additionally, a very important concern of the *community* is how elodea has changed the ecology of the Lakes. In addition to the water quality problems, the plants have contributed to a change in species composition. Once a prolific coho salmon producer,

the lake habitat with the invasive weeds now favors introduced fish species that prey on or compete with the juveniles of these threatened salmonids. It is also thought that the extensive growth at the end of the arms traps sediments and contributes to the lakes filling in, resulting in additional loss of open water habitat.

A secondary concern is the emerging present of Purple loosestrife infestations along the shorelines. These infestations are recent (1990s) and it is assumed that a Lakefront resident unknowingly introduced this species. Before this species becomes permanently established, control measures must be implemented.

In summary, it is apparent these species – *E. densa* and Purple Loosestrife are negatively impacting the local economy: Land values and all the uses the lakes support are being impacted.

AQUATIC WEED MANAGEMENT GOALS

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At its first meeting in July of 1999, the Aquatic Weed committee, a subcommittee of the Tenmile Lakes' Basin Partnership (Watershed Council) developed a set of goals for the management of invasive aquatic weeds within the Tenmile Lakes. These goals were formulated after discussion, which took into account the lake and its characteristics as well as the needs of the community and watershed.

A public meeting was held to determine and evaluate the Committee's definition of the goals. The meeting was well attended by members of the community and Lakefront owners. Short and Long term goals were identified and prioritized. In every case, the committee's draft goals were identical with the community's aquatic plant concerns.

With these issues and concerns confirmed and supported by stakeholders, it was felt that it would be appropriate to encompass the committee's original goals into this plan. The following are the committee's goals in outline format.

SHORT TERM GOALS

- Develop an emergency preliminary program to treat areas where mail can not be delivered or where residents are unable to access their boat docks.
- Improve public swimming area.
- Complete aquatic plant survey and mapping of Lakes.
- Develop and begin implementation of an education plan that will improve and coordinate weed management activities that restore water quality and native fisheries.
- Develop weed treatment "Questionnaire" to determine current methods of control.

- Establish boat/trailer inspection system.
- Implement a watch program to provide early identification of other invasive species.
- “Test Plot” studies; fund, permit, implement to determine most effective means of control in specific areas.
- Identify and Map Purple loosestrife infestations.

LONG TERM GOALS

- Reduce and then maintain Brazilian elodea at as low a density as is economically feasible.
- Eradication of Purple loosestrife infestations.
- Produce a plan to implement integrated control measures that take into consideration all the beneficial uses including the transportation, domestic water source, fisheries and wildlife, and recreational uses.
- Continue lake water quality monitoring and data collection.
- Lake current/flow study as a prerequisite for chemical control measures.
- Seek funding mechanisms in order to continue long term control of invasive aquatic plants.
- To return the Lakes to as close to their predisturbance condition as possible.

WATERSHED AND LAKE CHARACTERISTICS

The Tenmile Creek Watershed encompasses approximately 97 square miles. It is located on the southern Oregon coast between the Umpqua River and the Coos Bay area.

There are ten lakes within the watershed with a combined surface area of about 4.7 square miles (3000 acres) or approximately 5% of the watershed. These lakes and associated drainages can be divided into three subbasins.

The most northern, the Eel Lake subbasin, consists of North Clear, Edna, Teal, Schuttpelz and Hall Lakes which are all drained by Clear Creek into Eel Lake. Eel Lake is drained by Eel Creek, which flows into Tenmile Creek approximately 3.5 miles from the Ocean.

The southwestern most basin, the Saunders Creek subbasin, consists of Saunders and South Clear Lakes. Saunders Creek flows along the eastern most edge of the dunes and into Tenmile Creek one mile below its' confluence with Eel Creek. Combined these two subbasins encompass approximately 17.5 miles.

The Tenmile Lakes subbasin is the largest in the watershed and includes North and South Tenmile Lakes. Combined their drainage area covers about 70 square miles. Tenmile Creek carries the water from this subbasin for about 6.5 miles to the ocean. A northern portion of the watershed is in Douglas County and the remainder is in Coos County. The City of Lakeside is located where both lakes are connected by an improved canal.

The Tenmile watershed is underlain by the Flournoy formation, which consists of sandstone and siltstone. The soils consist mainly of sandy and silty loams that are locally very thin. The topography of the region ranges from steep in the eastern headwaters with slopes upwards of 50 %. A gradual decrease in gradient occurs with an increased

proximity to the coast. The areas with the lower valley portions of the major tributaries are quaternary alluvium with areas of peat and marsh characterized by flooding, stream bank erosion, siltation and slopes of 0 to 5%. The western portion of the watershed consists of areas of marine terrace deposits, sand dunes, deflation plain, and beach. The marine terrace areas contain the City of Lakeside as well as a large percent of the rural residential development.

The Tenmile Lakes Watershed has a variety of land uses including residential development, agriculture, and forestry (private and state). Most of the agricultural lands within the watershed, (over 1,800 acres), are located in the lower reaches of the tributaries flowing into North and South lakes. Of the forest lands, private industry, in general, manages the lower ridges. Menasha Corp. is the largest, managing approximately 11.4 square miles. Most of the steep headwater areas are within the Elliott State Forest, managed by the Oregon Department of Forestry. The Elliott State Forest covers approximately 33.5 square miles, making the State of Oregon the largest landowner in the watershed.

WETLANDS

The location, size and significance of wetland areas outside the City of Lakeside's UGB are currently an unknown. It is estimated that significant wetlands occur along most of the shorelines between the low and high water levels and low gradient areas where tributaries enter the Lakes. Within the UGB, the Watershed Council and DSL, have conducted a Local Wetlands Inventory and Riparian Assessment

FISHERIES AND WILDLIFE

Fisheries and Wildlife issues are numerous within the Tenmile basin. Currently, Tenmile's coho salmon run is one of the most stable within the state at approximately 5,000 adults. In addition, the Lakes are home to a relatively large colony of Purple Martins, 27 pairs of Ospreys, 3 active Bald Eagle nest, and breeding Western Pond Turtles.

LAKE CHARACTERISTICS

The Tenmile Lakes were created during a period of coastal submergence resulting from glacial processes. Sand dune formation separated the valley from the ocean. Additional sand dune movement split the valley into two areas: North and South Tenmile. Both lakes are highly dendritic and shallow with large shorelines. Combined, North and South lakes have a surface area of approximately 2,200 acres and a perimeter of 42.2 shoreline miles. The lakes during a typical year have large fluctuations in water levels ranging from 5.67 ft during summer to 19.87 ft MSL in winter. North lake has a greater maximum depth 23-ft, than South Lake. Both lakes have average depths over 3 ft. (Johnson et al. 1985). Additional information on limnological surveys of the watershed are available in Johnson et al. (1985), Eilers et al. (1996) (Sytsma 1995).

Water quality data has been collected since the 1950s. Since 1988, the volunteer Lake Watch Program has conducted a more intense monitoring protocol that provides data on Secchi transparency, temperature, dissolved oxygen, and turbidity. In addition, the Watershed Council has implemented a two-year Nutrient Budget study. This current

project will provide information on the amount of nutrients entering and leaving the lake system. The data collected from this monitoring has identified and has the potential to isolate several important factors that are relevant to Brazilian elodea such as the growing period and what/where are the sources of the nutrients supporting this growth. Currently, both Lakes are listed as water quality limited on the Federal 303d list for aquatic weeds and algae.

Shoreline use is mainly residential development. Currently there are approximately 440 residences along the shorelines of both North and South Lakes. Historically, the shoreline areas supported small lumber mills and log rafts in each of the eight arms. In addition, the shoreline within the limits of the City of Lakeside was a popular swimming area. Currently the shoreline areas within the Urban Growth Boundary are rapidly being developed into large RV parks.

BENEFICIAL AND RECREATIONAL USES

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The Tenmile Lakes Recreational Area provides residents and visitors alike a wide variety of recreational activity. The County Park offers a public boat launch, fishing dock, and swimming area. With the large surface area, the lakes support many water skiers and jet skiing is becoming a popular activity. The lakes also support a popular warmwater fishery for bass and other pan fish. During the summer season, there can be two or three Bass tournaments going during a single weekend. These activities are also necessary for the local businesses, as many are dependent on visitors purchasing supplies from the local vendors. The area in addition provides residents with an area to walk and just enjoy their surroundings.

The lakes also support a great diversity of wildlife. Lake surveys in 1998 counted 3 Bald Eagle nests and 18 active Osprey nests. Most are visible from the shoreline where the interested public can observe them. The lakes support a variety resident waterfowl, including Canada geese. Northern birds migrating south use the lakes as a resting area and Tenmile over winters a large population of Mallards. The lakes are also a serve a refuge for the threatened Western Pond Turtle. Surveys have revealed that Tenmile supports more turtles than was originally estimated and may be one of the few areas in the state where they are successfully reproducing.

Tenmile also provides habitat that use to support a large population of Coho and Searun Cutthroat Trout. Historically, the juveniles of these species would leave the tributaries during low summer flows and rear in the lakes for nearly a year before migrating to the ocean. With the altered lake habitat it is unknown precisely how many juveniles are surviving in the lakes to migrate. Even with this estimated mortality, the lakes provide the only travel route for migrating adults and juveniles.

OFFICIAL STATE LISTED BENEFICIAL USES

Private Domestic Water Supply
Industrial Water Supply
Irrigation
Livestock Watering
Anadromous Fish Passage
Salmonid Fish Rearing
Resident Fish & Aquatic Life
Wildlife & Hunting
Fishing
Boating
Water Contact Recreation
Aesthetic Quality
Commercial Navigation & Transportation

AQUATIC PLANT CHARACTERIZATION

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During the summer months of 1999, volunteers assisted by staff from Portland State University and the Watershed Council conducted distribution surveys and mapped aquatic vegetation in 5 areas: Coleman Arm, Lindross Arm, Shutters Arm, Blacks Arm, Main North Lake. The purpose of these surveys was 1) to identify number of species present. 2) water depths where each species was most abundant. 3) identify specific access problems. This project will continue until both Lake shorelines have been mapped and a GIS layer has been created. This information will provide baseline data, which will be used to recommend control treatments.

METHODS

Portland State University staff provided a 4-hour initial training course for volunteers. After completion, volunteers surveyed by boat shoreline areas late in the growth period. Surveying perpendicular to the shoreline, surveyors collected plant samples and depth measurements.

In addition to gathering this information surveyors used visual estimates of plant biomass for each species and produced a generalized mapping of “problem areas”. With additional surveys this information will be used to create “aquatic plant” GIS layer.

RESULTS

Preliminary results identified Brazilian elodea as the species that most directly effects the beneficial uses occurring on the Lakes. Around docks and approximately 90% of the shoreline areas with depths less than 12ft, elodea had the highest densities and frequency of occurrence.

Beside Brazilian elodea, 2 other plants species were present and seasonally abundant, Coontail (*Ceratophyllum demersum*) Big-leaf pondweed (*Potamogeton amplifoliosus*).

Other species less common include: *Potamogeton natans*, *Elodea canadensis*, *Callitriche palustris*, *Lemna spp.*, *Axolla spp.*, *Brasenia schreberi*, *Nuphar spp.*, *Nymphaeae odorata*, *Myriophyllum hippuroides*, *Potamogeton praelongus*, *Potamogeton richardsonii*, and *Myriophyllum aquaticum*. These plants were also found in the Tenmile Lakes

Limnological Survey (Sytsma 1995). These species are usually occurred in depths of less than 3ft and resulted in few negative impacts on the beneficial uses. In addition, volunteers identified a small outbreak of Purple loosestrife in Big Creek Arm.

It is recommended to characterize and specifically quantify the aquatic plant community of the lakes, further studies and sampling **are** needed **to** be undertaken. To enable managers and lakefront homeowners to distinguish changes in Brazilian elodea abundance and evaluate treatment results, specific intense distribution and abundance monitoring surveys need to be conducted.

DISCUSSION

Based on the results of these initial surveys, Brazilian elodea appears to be the most abundant species and dramatically affects the identified beneficial uses. Its dense growth,

from the shoreline to depths of 12ft effects residential boat access, mail delivery, and native fish habitat. In the treatment plan, control strategies are primarily focused on this species.

PUBLIC INVOLVEMENT

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The task of involving local citizens and gathering information on important issues concerning the Lakes has been ongoing since the Tenmile Lakes' Basin Partnership began in 1994. The Watershed Council has worked closely with the City of Lakeside and other local groups to improve watershed conditions. Even though "Weeds" have been a long-standing problem, a focus came about from an ongoing series of Scoping meetings sponsored by the City, Division of State Lands, and the Partnership. Aquatic weeds and the problems associated with them were one of the four main issues identified.

The Watershed Council and other partners decided it was time to initiate some kind of action directed at reducing the negative impacts associated with nuisance aquatic plants, specifically non-native Elodea. In 1999, a "Weed" committee was formed. The committee has members representing the City of Lakeside, ODEQ, Tenmile Lakefront Homeowners, Tenmile Bass Club, and two Lakefront residents.

Monthly meetings are held and community members and other interested parties were encouraged to participate. The committee has met formally 7 times and continues to meet monthly.

In January of 2000, a public meeting was held to review the official problem statement, and short terms goals. An enthusiastic group of approximately 50 people gathered to brainstorm and share ideas. A facilitator, City of Lakeside's attorney, guided this group and citizens present agree that the committee was right on track with their short and long term goals.

In addition to these tasks, some committee members compiled a phone number list of all the Lakefront residences living around Tenmile. Other members produced a Weed Questionnaire that would provide information on the treatments residences were currently using to treat weeds.

Committee members recognize that involving the public is perhaps the most important component of any coordinated effort to control nuisance plants. The process is ongoing and with the Watershed Council's continued support, the local community and state agencies alike will be continued to be kept informed as to ongoing process of development of this Integrated Aquatic Plant Management Plan.

INTEGRATED TREATMENT ACTION PLAN

Tenmile Lakes Integrated Aquatic Weed Management Plan

Currently, the steering committee feels that control treatments be focused on Brazilian elodea and Purple loosestrife. For elodea, the lake was separated into different areas according to depth and type and amount of use. With Purple loosestrife, a high intensity control is recommended of volunteers actively seeking infestations and removing plants. Specific control intensities, treatments and treatment areas are listed in the following table.

In addition, the steering committee recommends the following strategies to address the problems associated with Brazilian elodea and Purple loosestrife in Tenmile Lakes:

- Continue to monitor the lake for water quality and fish and wildlife habitat conditions (ODFW, DEQ, DSL, TLBP).
- Continue mapping the spread of Brazilian elodea and Purple loosestrife (Volunteers from TLBP and TLOA).
- Encourage small-scale weed control with recommended treatments in areas of <12ft. (TLBP, TLOA).

- Establish a link and/or support the Coos County Weed Board (TLOA, DEQ, ODFW, TLBP).
- Continue public education of recommended treatments using flyers, newsletters, public meetings (TLBP, TLOA, DEQ).
- Continue to search for grant or other funding sources for study of controls, education, monitoring (TLBP, TLOA, DEQ).

BRAZILIAN ELODEA TREATMENTS

LAKE AREAS

RECOMMENDED TREATMENTS

SHORELINE (< 12FT DEPTHS)	
<ul style="list-style-type: none"> • W/OUT DOCKS 	PHYSICAL <ul style="list-style-type: none"> • Hand –pulling • Hand-cutting • Bottom barriers • Alfalfa bales • No treatment CHEMICAL <ul style="list-style-type: none"> • NOT A RECOMMENDED TREATMENT AT PRESENT TIME BIOLOGICAL <ul style="list-style-type: none"> • Future prospect
<ul style="list-style-type: none"> • WITH DOCKS 	PHYSICAL <ul style="list-style-type: none"> • Hand –pulling • Hand-cutting

	<ul style="list-style-type: none"> • Bottom barriers • Alfalfa bales • Mechanical Harvester <p>CHEMICAL</p> <ul style="list-style-type: none"> • NOT A RECOMMENDED TREATMENT AT PRESENT TIME <p>BIOLOGICAL</p> <ul style="list-style-type: none"> • Future prospect
<ul style="list-style-type: none"> • MAIL DELIVERY PROBLEMS 	<p>PHYSICAL</p> <ul style="list-style-type: none"> • Hand –pulling • Hand-cutting • Bottom barriers • Alfalfa bails • Mechanical Harvester <p>CHEMICAL</p> <ul style="list-style-type: none"> • NOT A RECOMMENDED TREATMENT AT PRESENT TIME
<ul style="list-style-type: none"> • PUBLIC SWIMMING AREA 	<p>PHYSICAL</p> <ul style="list-style-type: none"> • Mechanical Harvester
OPEN WATER (>12FT DEPTHS)	NO TREATMENT
TRIBUTARY MOUTHS (END OF ARMS)	<p>PHYSICAL</p> <ul style="list-style-type: none"> • Mechanical Harvester • Alfalfa bails <p>CHEMICAL</p> <ul style="list-style-type: none"> • NOT A RECOMMENDED TREATMENT

	BIOLOGICAL: Future prospect
OUTLET/TENMILE CR.	PHYSICAL TREATMENTS ONLY
	BIOLOGICAL: Future prospect

ACKNOWLEDGEMENTS

Tenmile Lakes Integrated Aquatic Weed Management Plan

This Aquatic Plant Management Plan is a result of the work of a dedicated group of people. All efforts from Lake surveys to the phone Weed Questionnaire have been volunteer. Many people deserve a gracious thank you.

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