

Clear Lake, Pierce County, WA  
Integrated Aquatic Vegetation Management Plan

prepared for  
Clear Lake Community Club

by  
Resource Management, Inc.

May 1999



Resource Management, Inc.

---

2900-B 29th Ave. SW • Tumwater, WA 98512 • (360) 754-3460 • Fax (360) 754-4561  
e-mail: rmiwa@aol.com

Clear Lake, Pierce County, WA  
Integrated Aquatic Vegetation Management Plan

# CONTENTS

	<u>page</u>
<b>Introduction</b> - - - - -	1
<b>Problem Statement</b>	
Lake User Groups - - - - -	1
Problem Categories - - - - -	3
Problem Statement - - - - -	3
<b>Watershed and Lake Characteristics</b>	
Watershed - - - - -	3
Lakes - - - - -	4
<b>Beneficial Uses</b> - - - - -	8
<b>Management Goals</b> - - - - -	8
<b>Aquatic Plant Characterization</b>	
Aquatic Plant Mapping - - - - -	9
Aquatic Plant Characterization - - - - -	9
<b>Control Alternatives</b>	
General - - - - -	10
The No-Action Alternative - - - - -	10
Currently Available Techniques - Preventive - - - - -	11
Currently Available Techniques - Physical Control - - - - -	12
Currently Available Techniques - Mechanical Control - - - - -	14
Currently Available Techniques - Biological Control - - - - -	16
Currently Available Techniques - Chemical Control - - - - -	17
Developing Techniques - - - - -	19

## CONTENTS (continued)

	<u>page</u>
<b>Integrated Treatment Action Plan</b>	
Overview - - - - -	20
Control Intensity - - - - -	22
Recommended Control Strategies - - - - -	23
Project Costs - - - - -	26
Local Funding Strategy - - - - -	26
<b>References - - - - -</b>	<b>27</b>

### Appendices:

1. Public Meeting Notices and Handouts
2. Summary of Aquatic Plant Management Techniques
3. Herbicide Information

# Clear Lake, Pierce County, WA Integrated Aquatic Vegetation Management Plan

## INTRODUCTION

Clear Lake supports a variety of beneficial uses including fishing, swimming, boating and wildlife observation. There is a Washington Department of Fish and Wildlife boat launch on the lake which is open year round. Overall public use of Clear Lake is high. Unfortunately, the lake is currently exhibiting growth in aquatic plants which is beginning to hinder the beneficial uses. This inhibition centers around the developing infestation of Eurasian watermilfoil (*Myriophyllum spicatum*, referred to as 'milfoil' herein).

This Integrated Aquatic Vegetation Management Plan (IAPMP) has been prepared as an effort to develop a holistic, integrated approach to controlling and managing the aquatic plants in this lake and thus protect the beneficial uses, wildlife habitat and water quality. The process followed in the preparation of this Plan is outlined in the Aquatic Weeds Management Fund Program Guidelines prepared by the Washington Department of Ecology<sup>1</sup>.

## PROBLEM STATEMENT

### Lake User Groups

The primary lake user group active in the determination of the problem statement and management goals was the Clear Lake Community Club. This homeowners group represents diverse interests and an active concern for protecting the lake.

It was primarily through the Community Club's newsletters and meetings that information exchange was accomplished. Prior to the initial public meeting, held January 16, 1999, weed controls had been discussed by the homeowners (see 8/1/98 newsletter and 8/22/98 meeting agenda in **Appendix 1**). Prior to the initial public meeting a newsletter was mailed to each landowner announcing the startup of the project and also the date for the meeting (see copy in **Appendix 1**). At the initial meeting a presentation was made by Terry McNabb of Resource Management, Inc. on the anticipated planning process for the aquatic weed controls and on control options. Initial comments on the proposed work were solicited. There were 30 lake residents in attendance at the initial public meeting and all of these were in support of proceeding with the outlined process.

A second community meeting was held at the Northwest Trek Auditorium on March 20th to present the draft IAPMP and discuss the treatment options for the 1999 season. Approximately 40 people attended this meeting and many of these were new to the process. The initial discussion centered around obtaining the permit for the treatment. Many residents also expressed concerns about water lily growth, some requesting that these be included in the treatment program and other discussing the fact that they had planted ornamental lilies. The impact of Sonar on lilies was discussed. Terry McNabb indicated that those lots experiencing heavy lily growth would be inspected with the residents and control discussed on an individual basis. There was some discussion regarding the status of the permit and this process was explained.

A major concern did develop as a result of the second meeting. Part of the presentation centered on the non native cattails present on the north shore. Residents of the lake that live in this area commented that these plants had been present there for decades and had not aggressively expanded. They opposed control of these plants adjacent to their property because of the Red Wing Blackbird use of these for nesting. After the meeting, other residents in that part of the lake contacted RMI and further indicated that they did not want to see these plants removed. Many residents of the lake travel by boat to this area to view these birds during nesting. Many of the shoreline residents on this part of the lake have left these plants alone for years allowing them to survive because of the benefit they receive from viewing opportunities of this wildlife. A letter in support of this position was also drafted by a resident and submitted to the Clear Lake Community Club.

This issue has been discussed with WA Department of Ecology staff. The original concern about these cattails is that they are not native to this area and in other parts of the country have degraded wetlands by replacing native species. Ecology staff had discovered this patch of plants during summer lake reconnaissance and were concerned about this occurring in Washington State. The concerned lake residents were also directed to Ecology staff for discussion of this issue.

This cattail species has not been placed on the Washington State Noxious Weed List. Through discussion with Ecology, and based on the concern of the local lake residents, the consensus is that the non-native cattail should not be targeted for control during 1999 unless a individual resident requests that they be controlled adjacent to their property. Ecology is going to expand reconnaissance for this species and determine if it is already established in other areas of the region. These colonies should be monitored over time as part of ongoing lake management and if the concerns of agencies or lake residents in this area change, then control considered within that framework. It is clear that the local lake residents in this area need to be heavily involved in the decision making process

## Problem Categories

From the comments and perspectives presented at the first public meeting, the following categories of aquatic plant problems are evident (or becoming evident) at Clear Lake:

- current and potential hindrance to swimming
- current and potential hindrance to boating
- current and potential hindrance to fishing and fish habitat
- continuing expansion of areas with excessive plant growth
- continuing domination of aquatic plant beds by exotic noxious weeds
- potential decrease in aesthetic appeal of the lake
- potential for hybridization of cattails resulting in aggressive non-native
- decreasing property values and revenues from recreational uses of the lakes

The presence and expansion of coverage by milfoil is viewed as the most significant cause of these problems. The presence of the non-native cattail *Typha angustifolia* presents the potential for the development of aggressively growing hybrid as has been seen elsewhere in the country.

## Problem Statement

The Problem Statement developed for this Plan is that Clear Lake is experiencing increasing recreational and fish habitat degradation due to the presence of milfoil and shoreline areas are at risk due to the presence of a non-native emergent cattail.

## WATERSHED and LAKE CHARACTERISTICS

The overall quality of lakes is closely related to the quality of the water flowing into them, including the quality of surface streams, overland runoff and groundwater. The quality of the inflows is a function of the quality of the watershed, both near shore and distant. There are human factors involved in lake and watershed quality, as well as other factors, such as the introduction of invasive, non-native aquatic plants.

In order to fully understand the lake system, with its uses and problems, and the opportunities for its protection and management, the watershed and waterbody must be described. The following discussion summarizes the available information as well as observations and measurements made at the lake during the fall of 1998.

### Watershed

The Clear Lake watershed is small, 262 acres, little more than twice the size of the lake itself (see **Figure 1**, USGS Topographic Map). It is located in Pierce County, within the Nisqually River basin (Water Resource Inventory Area #11) and less than one quarter

mile west of Ohop Creek and the steep sided Ohop Valley. Land cover in the watershed is predominantly forest or unproductive land with suburban residential development occupying 17% of the watershed area (Bortleson et al.<sup>2</sup>).

There are no surface streams in the watershed. Sources of water to Clear Lake include groundwater, a spring on the southwestern shore, precipitation, overland flow and a few storm drains<sup>4</sup>. Non-point sources of pollutants to Clear Lake include runoff from developed areas (which can include nutrients, pesticides and petroleum products). There are a number of drainage ditches and pipes that allow untreated stormwater from impervious surface areas directly into Clear Lake<sup>4</sup>.

There are no wetland areas in the watershed aside from two small areas of reeds and cattails on the north and west shores of Clear Lake. Rare, threatened or endangered plants are not known to exist in the Clear Lake watershed. There are no existing watershed management programs in this area.

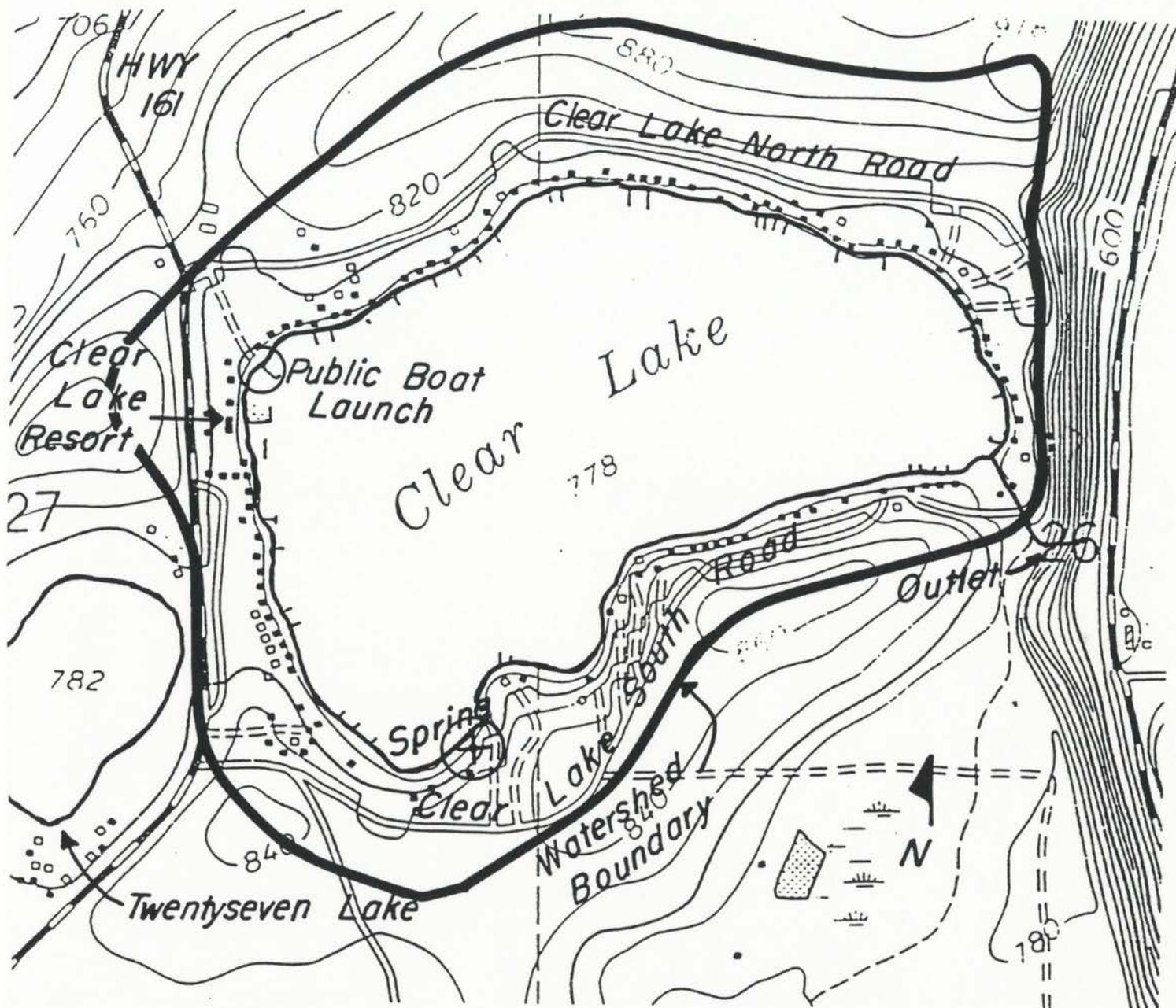
## Lake

The following information was excerpted primarily from three documents: Reconnaissance Data on Lakes in Washington (Bortleson et al.<sup>2</sup>), 1994 Statewide Water Quality Assessment Lakes Chapter (Rector and Hallock<sup>3</sup>) and Clear Lake Water Quality Assessment Project Final Report (Hanowell et al.<sup>4</sup>).

Clear Lake is located in Sections 26 and 27, T17 N, R4 EWM at a surface elevation of approximately 778 feet above sea level, as shown on **Figure 1**. The lake has a surface area of 160 acres, a volume of 6100 acre-feet, and a mean depth of about 38 feet. As indicated above, there are no surface water inlets to Clear Lake but Hanowell et al. reported a spring on the southwest side of the lake which had been used as a potable water source.

Lake bottom contours, updated during the 1998 plant survey, are shown on the aquatic vegetation map (**Figure 2**). The lake has a reasonably uniform bottom slope of about 3% dropping to the maximum depth of 85 feet. Irregularities include a noticeable shelf between the 30 and 40 foot contours located at the southwest corner of the lake, and a smaller shelf area between approximately five and 15 feet at the eastern point of the lake. In addition, the depth can be seen to drop more quickly along the southern shoreline than along the western, northern or eastern shorelines.

The shoreline of Clear Lake was listed as 84% developed in 1970. Currently, all platted lots around the lake are developed<sup>5</sup>. Control of water flow out of Clear Lake is by the shallow man made channel located at the eastern point of the lake, however outflow is only visible for part of the year. Information on existing water rights on Clear Lake was not obtained for this report.



Scale: 1 inch = 800 feet

Figure 1. Clear Lake Watershed showing lake beneficial use areas (from US Geological Survey, 7.5 minute series map of the Tanwax Lake, Washington quadrangle).

Water quality measurements from October, 1970 included Secchi Disk water clarity of 22 feet, temperature between 6 °F and 15 °F (between depths of 72 feet and 3 feet, respectively), and total phosphorus concentrations between 9 µg/L and 120 µg/L (between depths of 3 feet and 72 feet, respectively). Dissolved oxygen was observed to be depleted to 0.2 mg/L at the 72 foot depth at that time.

In 1992 the Tacoma-Pierce County Health Department conducted a Phase I water quality assessment on Clear Lake in response to concerns about toxic algae blooms. This assessment determined that the lake exhibited mesotrophic conditions.

Water quality data from the 1991-92 study showed Secchi Disk water clarity averaging 15 feet during the winter months (which corresponded with the higher chlorophyll concentrations seen at this time) and 20 feet during the summer months. Temperatures ranged between 43 °F and 73 °F at the two foot depth and stayed consistently between 40 °F and 43 °F at the 85 foot depth. Total phosphorus concentrations varied between 10 µg/L and 45 µg/L at the two foot depth with an average concentration of 21 µg/L. At the 85 foot depth the range in total phosphorus was 12 µg/L to 668 µg/L, with a mean of 296 µg/L. Dissolved oxygen was below 2 mg/L between June and September at the 85 foot depth. The conclusions of this study were that surface runoff was the primary mechanism of phosphorus loading in the higher precipitation winter months but that internal loading from the sediments was more significant in the drier summer months (when phosphorus was primarily trapped within the hypolimnion). The trophic status calculations performed using the 1991-92 data indicated that the lake was oligotrophic to mesotrophic in the summer and mesotrophic to eutrophic in the winter.

Aquatic plants were assessed briefly in 1970 for the Reconnaissance Data on Lakes and it was indicated that the sand and gravel littoral bottom supported few emerged plants. There was a band of submersed plants surrounding the lakeshore which included "water milfoil". No specific species of milfoil was stated.

To control algae and aquatic plants, the Clear Lake community has funded herbicide treatments on an infrequent basis for a number of years. The lake was treated in 1978, 1985, 1988 and 1989 to reduce aquatic weed and algae populations. Chemicals used in these treatments were Aquathol K (endothall), Rodeo (glyphosate) and copper sulfate. The 1988 treatment was a whole-lake application of Sonar (fluridone) which resulted in the complete eradication of milfoil from the lake.

Aquatic plants seen in the 1992 study included "nitella, (a macroalgae), waterweed (elodea), wild celery (vallisneria) and pondweeds (*Potamogeton amplifolius* and *P. berchtoldii*)" from the shore to a depth of 10 feet. The predominant plants at depths greater than 10 feet included "nitella, elodea and *P. berchtoldii*". There was no milfoil was found in the 1992 survey.

Aquatic plant mapping and characterization results from the 1998 field reconnaissance are presented in the Aquatic Plant Characterization section below.

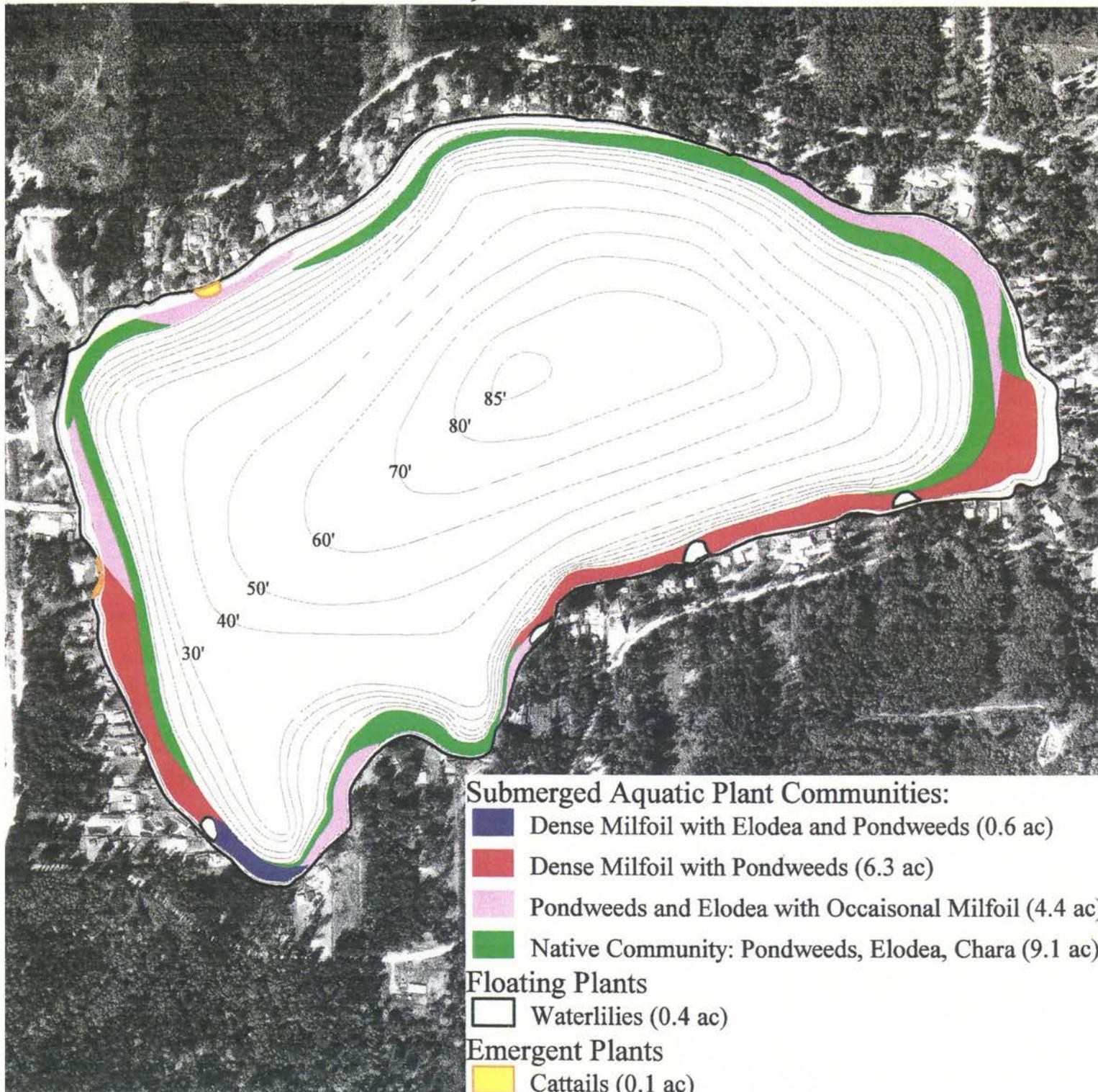


Figure 2. Clear Lake, Pierce County, WA, showing lake depth contours and distribution of aquatic vegetation on 12/3/98.

## BENEFICIAL USES

The current beneficial uses of Clear Laker were documented from the Clear Lake Water Quality Assessment Report<sup>4</sup> and from information provided at the first public meeting.

Clear Lake receives heavy recreational use by both lakeshore residents and the surrounding community. Popular activities include fishing, swimming and water skiing.

Clear Lake has been an extremely popular fishing lake for many decades. Fish plants by the Washington Department of Fish and Game over the years have included Mackinaw, kokanee, eastern brook trout, steelhead and rainbow trout and rotenone treatments have been performed periodically to eliminate competitive species. Starting in 1992 the Department of Fish and Wildlife changed the status of Clear Lake to a year-round fishing lake.

Clear Lake has also historically been utilized as a source of drinking and irrigation water. Toxic algae blooms occurring in 1990 resulted in use restrictions recommended by the Tacoma-Pierce County Health Department and the performance of the 1991 - 92 monitoring efforts. There have been no toxic blooms documented since 1992, according to the Tacoma-Pierce County Health Department<sup>6</sup> and a water system constructed in 1994 eliminated the need for domestic uses<sup>5</sup>. Currently, recreational uses of the lake are high with heavy seasonal use from lake residents and the Clear Lake Resort along virtually all of the shoreline, as well as year-round public fishing from the WDFW boat launch. The locations of the Clear Lake Resort and the Department of Fish and Wildlife boat launch are indicated on **Figure 1**. There are no other specific beneficial use areas on Clear Lake.

## MANAGEMENT GOALS

The development of the Problem Statement, the assessment of watershed and lake characteristics and the determination of desired beneficial uses have led to the following management goals for Clear Lake:

- Maintain recreational and fish/wildlife use of the lakes by removing exotic, invasive plants (milfoil, non-native cattails) from known locations
- Keep public swimming and boat launch areas free of aquatic plants
- Choose aquatic plant control techniques which are plant specific and promote the maintenance of natural and diverse aquatic plant populations
- Choose aquatic plant control techniques which have the widest public

support and a high cost to benefit ratio.

## AQUATIC PLANT CHARACTERIZATION

### Aquatic Plant Mapping

Current aquatic plant populations (both submersed and emergent) were determined from a boat and SCUBA diver survey conducted December 3 and 4, 1998. Plant community locations were plotted on a base map newly created for this project. The base map was produced using Geographical Information System (GIS) computer software incorporating the boat and diver information on a Washington Department of Natural Resources orthophoto.

The diver survey was performed with a SCUBA equipped diver following the lake bottom along transect lines which were perpendicular to the shore and extending out towards mid-lake to the limit of plant growth. Transects were placed around the shoreline based on the following lake characteristics: uniformity of bottom slope, unique areas of vegetation growth, disturbed areas and patterns of floating leaved plants. Identified aquatic plant species, relative plant densities, depth of water, sediment types and other information was relayed from the diver to the dive boat after each transect was swum. Following completion of the diver work, each transect was re-visited from the boat with depth finding and Global Positioning System (GPS) equipment to verify the locations of lake bottom contours (bathymetry).

### Aquatic Plant Characterization

The information gathered from the 1998 survey is summarized below to present a picture of the aquatic plant populations in Clear Lake. The aquatic plant map, presented in **Figure 2**, is a synthesis of this information.

There was a limited number of aquatic plant species found in Clear Lake. Submersed species were the pond weeds *Potamogeton amplifolius* and *P. americanus*, Canadian elodea (*Elodea canadensis*), milfoil (*Myriophyllum spicatum*) and stonewort (*Chara*). There were four small patches along the south shore of floating leaved waterlilies (primarily *Nymphaea*) and two small areas of emergent plants, primarily cattails (*Typha*) and rushes (*Juncus* species). One species of cattail, *Typha angustifolia*, is a non-native plant which can hybridize with native cattails forming an aggressively growing species<sup>7</sup>.

All aquatic vegetation was found at depths between three and 20 feet but in many areas plants were restricted to narrower bands because of rocky bottom or other factors.

As indicated on **Figure 2**, the density of milfoil varied from absent, to 'occasional' and 'dense'. milfoil was considered 'dense' (up to 3 plants per square meter) along

portions of the western and southern shores although it was still mixed with native species. Of the total area where submersed aquatic vegetation was found (20.4 acres from **Figure 2**), 9.1 acres contained only native species and no milfoil. Thus the Clear Lake milfoil infestation can be considered to be in a pioneering stage.

## **CONTROL ALTERNATIVES**

### **General**

This section of the Integrated Aquatic Vegetation Management Plan presents information on available and developing management techniques. Much of this information is excerpted from A Citizen's Manual for Developing Integrated Aquatic Plant Management Plans<sup>8</sup> and the Environmental Impact Statement for the Department of Ecology's Aquatic Plant Management Program<sup>9</sup>. Table 1 in **Appendix 2** presents a summary of the currently available techniques with estimated costs.

Additional information on new and developing control technologies is also presented where it appears to be appropriate in the near future (five to ten years). While all possible techniques are addressed here, only those which are specifically applicable to Clear Lake, the developed Problem Statement and the Management Goals are discussed in detail. Following from the review of appropriate techniques, an "action plan" has been developed which is presented in the next main section of this Management Plan.

### **The No-Action Alternative**

The focus of this Aquatic Vegetation Management Plan is on milfoil, which has been shown to be in a pioneering stage of infestation, but which can adversely affect all beneficial uses of the Clear Lake. Based on the public opinion that there is a problem with aquatic plants, this Plan has investigated options for controlling or eliminating the milfoil. In order to maintain a perspective on the costs and benefits of various plant control options, the costs and benefits of the "no action" alternative also must be kept in mind.

If organized action is not taken against nuisance aquatic plants, milfoil in particular, there is a potential that the problem will get worse. With an invasive plant such as milfoil this is almost a certainty.

Eurasian watermilfoil has been identified in the US Congress Office of Technology Assessment Report titled "Harmful Non-Indigenous Species in the United States" as a threat to our water resources. In 1997, the Washington State Pollution Control Hearing Board ruled that non-native or exotic species meet the legal definition of a "Pollutant" when they escape into the environment. Washington State Law has recognized the threat these plants pose to the environment and has classified them as

noxious weeds and subjects them to a quarantine. Washington State Law further directs for a streamlined process for permitting control activities for this plant to protect the aquatic resources of the state.

In addition, Department of Ecology Water Quality Antidegradation Policy requires a structured process for maintaining the highest possible quality for all waters of the state by "protecting physical, chemical, and biological integrity". Eurasian watermilfoil seriously degrades water quality and biological integrity. It replaces native species forming a monoculture and destroys the biological diversity of these waters. It degrades water quality under surface mats by restricting oxygen transfer to sub-surface waters and alteration of pH. It deposits substantial amounts of organic material on the lake bottom affecting spawning habitat for some fish species and adding to the biological oxygen demand in infested locations. Thus, the "no action" alternative is not considered to be a feasible alternative.

### **Currently Available Techniques - Preventive**

**Boat Washing Station:** The use of boat washing stations is a technique which has been used to help prevent the spread of milfoil and other invasive plants. These stations should be located on infested lakes to help prevent plant fragment movement to other lakes. Wash stations can also be located at uninfested lakes to prevent entry of invasive plants. Boat washing, like inspection for plant fragments, requires boaters awareness of the need for aquatic plant control.

Boat washing stations should include a water source (which can be non-potable), a washing area somewhat away from the lake and a disposal structure such as a drywell. The drywell is important since boat wash water must not be allowed to drain directly back into the lake.

The estimated cost of developing a boat washing station is \$10,000 to \$15,000 each. This includes administration/project management, engineering design, piping from the existing water system, drywell installation and grading/paving.

**Watershed Controls:** Watershed controls involve the reduction of nutrient, silt and other pollutant inputs to the lake from the drainage area (watershed). The principal is that reducing available nutrients (which are often carried on silt particles) will reduce in-lake plant and algae growth. The controls are collectively called "best management practices" and referred to as BMPs. BMPs include structural and non-structural techniques which address household and yard care, agricultural practices, forestry practices and construction practices and road maintenance activities.

Watershed controls/BMPs, while often being low cost and simple to construct, can be difficult to implement on a watershed basis especially if watershed boundaries cross jurisdictional boundaries. Watershed controls will seldom, by themselves, eliminate an aquatic plant problem since they do not address nutrients already in the lakes. These controls can be effective, however, when used in connection with in-lake water

quality or aquatic plant projects.

Watershed controls are recommended to be investigated and promoted concurrent with implementation of this Plan. All jurisdictions with interests in the watershed should be involved in this process. Following from the recommendations of the Clear Lake Water Quality Assessment Project<sup>4</sup>, watershed controls should address on-site sewage systems, stormwater runoff, landscaping and yard care, household practices and development activity. These efforts should be performed in cooperation with Pierce County, in particular the Tacoma-Pierce County Health Department.

**Public Awareness Program:** Through the efforts of the Department of Ecology and other groups, there is a heightened awareness of the potential for milfoil to infest and spoil lakes. Much of this awareness has been through the signs, produced by the Department of Ecology, which are posted at most public boat launches in Washington. It appears, however, that not all boat operators check their boat and trailer each time they load in or out of a lake. Thus, there is a need for additional public awareness.

The State of Washington, particularly the Department of Ecology, has taken the lead in controlling nuisance aquatic plants. There is a need, however, for a local, personal approach if these plants are to be effectively controlled. Public awareness efforts can take the form of volunteers stationed at boat launches to provide information and remind boaters to clean their boats. Much information has been published about milfoil, but additional information that ties milfoil with local lake conditions may be of greater interest. Mailings and presentations to lake residents and sportsman's clubs can also be effective if they present local interest information along with the warnings.

### **Currently Available Techniques - Physical Control**

**Hand Pulling:** Hand pulling is effective for clearing small areas but is a labor intensive method. It involves removing entire plants (leaves, stems and roots) from the area of concern and carrying them to a dry land disposal area (that is, away from the shoreline). In water less than three feet deep no specialized equipment is required, although a spade, trowel or long knife may be needed if the sediment is packed or heavy. In deeper water, hand pulling is best accomplished by divers with SCUBA equipment and mesh bags for collection of plant fragments.

In a lake system where an invasive plant, such as milfoil, is present, hand pulling is recommended for areas around docks, beaches and boat launches as an interim measure until more extensive treatments can be implemented. Hand pulling is also appropriate following an extensive treatment if new infestations are discovered. No permits are currently required for small scale hand pulling of aquatic plants.

**Hand Cutting:** This technique differs from hand pulling in that plants are cut or torn from the water and the roots may or may not be removed. This work can be performed using hand-held cutting tools which may or may not be powered. Alternatively, rakes, chains, logs, bedsprings or the like can be dragged across the lake

bottom to collect plant material. This is best done by pulling towards the shore since a substantial weight of material can be collected in a short distance. As with hand pulling, collected material should be disposed of at a dry land location.

Hand cutting is a labor-intensive technique and therefore appropriate for small areas like around docks, beaches and boat launches. It is a more short term technique, however, in that leaving the roots in place allows rapid regrowth of the nuisance plants. This method can also cause short term increases in turbidity in the work area. No permits are currently required for small scale hand cutting of aquatic plants, although the County Planning Department should be consulted for possible shorelines requirements.

**Bottom Barriers:** Bottom barriers are highly effective in the small to moderate scale control of aquatic vegetation. The barriers are typically synthetic (geo-textile) fabrics, or burlap, which are used to cover the lake sediments and existing plants and prevent further growth. By covering the lake bottom that the plants emerge from, all plants are effectively prevented from growing in those areas. These barriers are typically 100% effective in the installed areas initially. Installation can be at any depth, and divers are often required to place and secure the barrier material.

Since gases are produced in the sediments under the barrier, the barrier must be attached or weighted to the bottom, and allow these gasses to pass through it. Over time, these barriers can lose effectiveness if sediment builds up on them, providing a substrate for plants to root. Yearly maintenance by a dive team can prolong the effectiveness of this technique indefinitely (except with burlap which will decompose and must be replaced to maintain effectiveness).

Bottom barriers are expensive when used on a large scale. In addition, there can be environmental impacts if large areas of a lake bottom are covered with these materials. Bottom barriers are most applicable for individual properties and are recommended for around docks. Bottom barriers may not work well in swimming areas when placed over soft sediments, however. If swimmers walk on them, they tend to push the mats into the sediment.

**Water Level Drawdown:** Drawdown (or pump down) of the lake water levels during the winter months can have a dramatic impact on some aquatic weed problems. This methodology is possible where there is a water control structure which will allow lakes or reservoirs to drain for extended periods of time during this season. Alternatively, high capacity pumps must be used to draw water levels down.

Drawdowns will expose the lake sediments to both freezing and loss of water. Freezing can have a dramatic impact on aquatic plants (such as milfoil) that have no over-wintering structure like seeds, turions, tubers or winter buds. The impact on the root crowns of prolonged exposure to sub-zero temperatures is often fatal. As the lake is filled in the late winter or spring, regrowth from these crowns either does not occur or is severely stunted. There can also be a reduction in some other types of problematic

vegetation using this technology if the drawdown is prolonged.

This technique is not one that can claim eradication normally, and plants will survive in portions of the lake where water remains over the sediments. If the drawdown can extend to the deep edge of the plant communities it is obviously more effective than shallower drawdowns that only expose nearshore areas. This technique can also be used to encourage the expansion of native plants into areas infested with milfoil, as many native plants have over-wintering structures that allow them to survive.

Drawdown can have minimal cost if an outlet control structure of sufficient height is in place. This is not the case in the Clear Lake. In addition, this technique is not species specific and can negatively effect wetlands associated with the lake shore. For these reasons, drawdown is not recommended in this lake system.

**Water Column Dyes:** This technique involves the addition of dark colored dyes to the lake to suppress aquatic growth by shading plants from sunlight. Use of this technique is limited to shallow lakes or ponds which have minimal dilution with clear water and no outflow. Due to this fact, and the non-specificity to aquatic plant species, this technique is not recommended for the Clear Lake.

## **Currently Available Techniques - Mechanical Control**

**Mechanical Harvesting:** An extension of the hand cutting discussed above is the use of larger equipment which can cut or mow aquatic plants below the water surface. Barge mounted weed cutters, for instance, will cut the stems of submerged vegetation over large areas, with that vegetation typically floating off or being collected by the operator with some other implement. Aquatic weed harvesters are an improved version of a large weed cutter. These systems cut, collect and transport the vegetation for disposal on shore. A typical weed harvesting system will consist of the harvester and a shore station for unloading the harvested vegetation into a transport system for disposal.

Aquatic harvesters have a number of cutting blades located on the harvesting head and a conveyor system inside the knives that collects the plants and deposits them on a barge. There is typically a storage conveyor system that the plants fall onto when cut that facilitates unloading the machine at the shore station. The shore station equipment is usually either a shore conveyor that mates to the harvester and lifts the cut plants into a dump truck or other transport system, or a trailer conveyor that performs the same function as well as transports the harvester from lake to lake. Harvesting systems normally cut the plants from 5 to 7 feet below the surface and can harvest up to 2 acres per day depending on the distance to the disposal site.

Aquatic plant harvesters work well at cutting the plants and removing the bulk of the plant material from the lake. They do allow some plant fragments to escape, however, and they do not necessarily inhibit the continued growth of the cut plants. Harvesting is also not species specific (unless used in single species dominated areas) and it can also remove fish and invertebrates in the harvesting process. Harvesters should not

be used on lakes that are infested with milfoil in the pioneering or early colonization stages since additional fragments will accelerate the spread of the plant. For this reason, harvesting is not recommended in the Clear Lake at this time. Due to the fairly high cost of the equipment and of having harvesting contractors perform this work, and of the rapid regrowth in the case of milfoil, harvesting is not recommended as an ongoing program if more permanent techniques are available.

**Rotovation:** Rotovation, or underwater cultivation, is a newer concept in mechanical aquatic plant management. It can provide for longer term control of some aquatic plants like milfoil and it can remove plants to greater depths than conventional harvesters (approximately 12 feet versus six feet). Rotovators are basically underwater rototillers which churn the bottom sediments to a depth of up to 12 inches. This action dislodges plants and root crowns. Typical rotovation will provide one to three years of acceptable weed control. It can be especially effective on milfoil in flowing water situations.

milfoil does not produce seeds, tubers, or overwintering buds but grows back from shallow root crowns in the upper portions of the sediment. Rotovation can remove these root crowns. If there are untreated areas in the lake with milfoil present, however, fragments will reestablish the populations over time. Dislodged plants must be collected as they float to the surface. As with plant cutting or harvesting, rotovation should not be considered in lake or river systems where plants like milfoil are in the pioneering stages of an infestation. As a result, rotovation is not recommended for the Clear Lake.

**Diver dredging:** Diver operated suction dredging is also a relatively new concept for the treatment of lake systems with noxious aquatic weeds present. These systems use divers equipped with suction dredge hoses that vacuum the plant material out of the lake. The suction hoses pump the plant material and sediments to the surface where they are deposited into a screened basket. Water and sediment are allowed to return to the water column, normally contained in sediment curtains to prevent turbidity problems. The collected material is disposed of on-shore.

Plants like milfoil that have no seeds or over-wintering structures can be effectively vacuumed from the lake. In one large scale operation in Western Washington, two years of diver dredging have reduced populations of milfoil by 80%. This technique is also selective in that divers can target a single species in a mixed population area.

A potential drawback to this process is cost. The prevailing wage rates for divers required by state law puts a high premium on this type of treatment. Depending on density of plants, specific equipment used and disposal requirements, costs can range from a minimum of \$1,500 to \$2,000 a day. Actual removal rates vary from approximately 0.25 acres per day to one acre per day.

An environmental concern with diver dredging is that of turbidity and nutrient release from disturbed sediments. This is especially true of the light, organic

sediments that often accumulate in heavy weed bed areas. While sediment curtains can be used to minimize the drift of resuspended sediment materials, there is no practical way of controlling nutrient release. Placement of sediment curtains is also time consuming and, thus, costly.

Permits required for diver dredging projects are a Hydraulic Project Approval from the Washington Department of Fish and Wildlife, a Temporary Modification of Water Quality Standards from the Washington Department of Ecology and a Shoreline Management permit from the County Planning Department. In addition, it may be necessary to obtain a letter of approval from the Washington Department of Natural Resources.

### **Currently Available Techniques - Biological Control**

The biological control of aquatic plant problems focuses on the selection of organisms that have an impact on the growth of a target plant. By stocking a lake with these organisms, or "agents", the population of the target plant can be reduced. Biological control is not an exact science at this time. There have been a number of dramatic success stories with the control of aquatic weeds using some organisms. There have also been some undesirable effects from their use. The majority of the tools in this field are in the experimental or review stage at this time.

Biological control agents are generally of two types. There are general agents like grass carp that will consume most aquatic vegetation. As such, they are of limited use when trying to target specific plants. The second type of "biocontrol" agent are those that are target-specific for problematic species. Many of these agents focus on exotic plants that have been introduced to this country. Research typically starts in the region of the world where these plants are from, and focuses on the organisms that keep it in check there. Once identified, these organisms are brought through a quarantine protocol into this country where further research is conducted to determine if there is operational potential for control. At this time there are no biological control agents available in Washington State which are effective against milfoil other than grass carp.

**Grass Carp:** Grass carp (or White Amur) are plant consuming fish native to China and Siberia. There are a wide range of aquatic plants that these fish will eat, but they have definite feeding preferences and will generally eat the plants they prefer first. If the fish are stocked to the point of reducing a population of milfoil, which they appear to have a low preference for, they may have consumed all the other aquatic vegetation in the lake system, a result that is not desirable. In addition, grass carp can indirectly increase milfoil coverage by removing competing plants.

To prevent grass carp from reproducing and taking over a lake, and to keep them from moving to other lakes, certain requirements are placed on their usage. Only sterile (triploid) fish can be used and inlets and outlets must be screened to prevent fish passage. In addition, grass carp stocking is regulated by the Washington Department of Fish and Wildlife to insure that sufficient vegetation is retained for fish and wildlife

habitat needs. Recent articles by the Department of Fish and Wildlife have indicated that these fish should not be considered for large scale projects in multi-purpose lake systems.

In view of these considerations, grass carp are not recommended for Clear Lake.

### **Currently Available Techniques - Chemical Control**

Chemical herbicides are one of the leading methods of controlling, and in some cases, eliminating, noxious aquatic weed growth. The herbicides which are approved for aquatic use by the US Environmental Protection Agency are well reviewed and considered compatible with the aquatic environment when used according to label directions. In addition to the review and regulation provided by the EPA, the Washington Department of Ecology completed an Environmental Impact Statement (EIS) in 1992 for the aquatic plant management program which allows for the introduction of a number of compounds into state waters<sup>9</sup>. The Department of Ecology also evaluates the use of herbicides on a lake-by-lake basis through required short-term water quality modification permits.

There are two general types of aquatic herbicides in use, referred to as "contact" and "systemic" products. Contact herbicides kill susceptible plant stems and leaves generally leaving roots and some reproductive structures alive and capable of regrowth. As such, a contact herbicide is generally considered a maintenance tool, one that can provide relief from aquatic plant problems, but not something that can eliminate the problem from the lake system. Systemic herbicides are absorbed and carried throughout the plants thereby making them capable of killing the entire plant.

The contact herbicides approved for use in Washington State are Endothall and certain copper-containing products. The two systemic herbicides which are registered and approved for use in Washington are Fluridone and Glyphosate. Glyphosate is not appropriate for control of submersed plants.

**Fluridone:** Fluridone is available in the SePRO Corporation product Sonar as a liquid or slow release pellet. Fluridone can show good control of submersed and emergent plants where there is little water movement and an extended time for the treatment. It is most applicable to whole-lake or isolated bay treatments where dilution can be minimized. Because of the eight- to ten-week recommended treatment period, treatments should take place in early spring or fall.

There are a number of plants which are susceptible to fluridone and milfoil is among them. Many native aquatic plants, some in the pondweed family, are not impacted by this herbicide. As such, it can be used to remove a problematic species like milfoil and allow the native vegetation to recover. Other aquatic plants which may be impacted by Fluridone are expected to grow out of the effect or to regrow from seeds produced in previous seasons.

Use of fluridone does not pose a threat to human health or to fish and wildlife when used according to the label. While there is a short term precaution when using treated waters for irrigation, there are no other water use restrictions when using the liquid formulation of fluridone for milfoil control. The slow release pellet formulation cannot be used within one quarter mile of a water intake, however.

The direct costs associated with an aquatic plant control treatment using fluridone is \$700 to \$1,000 per acre depending on water depth, the scale of the treatment and other factors. As indicated above, a short term water quality modification is required from the Department of Ecology before beginning a treatment with Fluridone.

**Glyphosate:** Glyphosate is available in the Monsanto Corporation product Rodeo® as a liquid for aquatic use. As a systemic herbicide, glyphosate is capable of killing the entire plant and producing long term control. This herbicide is not effective below the water surface, however, because it breaks down rapidly in water and loses its herbicidal effect. This product is non-selective and can kill most vegetation if sufficient chemical contacts the plant. Applications can be somewhat selective, however, as the applicator can focus the liquid spray on target plants and leave nearby non-target plants unaffected. It is often used in lake systems to contain waterlily growth within habitat protection areas.

Glyphosate carries no swimming, fishing, irrigation or other water use restrictions. It also has a low toxicity to invertebrates, fish and other wildlife. Glyphosate dissipates quickly from natural waters, having an average "half-life" of two weeks.

The direct costs of a glyphosate treatment are approximately \$250 per acre. As with other aquatic herbicides, a short-term water quality modification is required.

**Endothall:** Endothall is a contact herbicide available in the Elf Atochem Corporation product Aquathol® in liquid or granular forms. Endothall compounds are used primarily for short term (one season) control of a variety of aquatic plants. Use of Endothall involves swimming, fish consumption and irrigation restrictions.

Because of the short-term benefits and the water use restrictions, Endothall compounds are not recommended for the Clear Lake.

**Copper Compounds:** The copper compounds approved for use in Washington are the products Komeen®, Cutrine® and Nautique® which are "chelated" or complexed compounds. (Chelation allows the copper to stay in solution for a longer period.) While copper can be effective on plants such as milfoil, its use for macrophyte control is not encouraged by the Department of Ecology. Its use is limited to algae control which is also not encouraged due to its short-term effect and the potential for accumulation in sediments.

Due to the short-term effect of copper compounds, the lack of species specificity and potential impacts on invertebrates, fish or wildlife, they are not recommended for use

in the Clear Lake.

## Developing Techniques

There are a number of organisms in the federal research programs that might have a biological control application to milfoil in the near future. One such organism is a fungal pathogen, MT, that is in the development stage at the US Army Corps of Engineers, Waterways Experiment Station. Although MT is very effective in the laboratory, a number of field tests have not been successful. New research is looking at combinations of low rates of Sonar herbicide with MT and this approach is promising. These organisms will have to receive approval from the US EPA before commercial use is allowed.

There are a small number of insects that have been observed feeding on milfoil. These include a weevil and a midge larvae. Ongoing research will determine whether these will be viable control options. At this point they are not available for use by aquatic plant managers in operational programs. There should be an awareness of this technology as it develops and these tools should be considered if applicable when commercialized.

**Triclopyr:** This is a systemic herbicide produced by SePRO Corporation which is not yet fully registered for aquatic uses but is available to approved "manufacturer cooperators" under an Experimental Use Permit in the product Renovate®. Triclopyr is a product that has been tested extensively against milfoil. This product is specific for this type of plant and can be used in habitat recovery programs focusing on selective removal of milfoil or Purple Loosestrife. It will not affect plant species in the monocot family, which is the majority of native aquatic and wetland plant types. Renovate is a liquid product with a contact time requirement of 24 to 48 hours so it has applicability in spot treatments. Under the current EUP label, however, there are several temporary water use restrictions that apply to treated water.

The direct costs associated with using Renovate is \$900 to \$1,500 per acre depending on water depth and other factors. Other costs for permit acquisition, monitoring and reports may need to be developed. An EUP application must be prepared and submitted to the Department of Ecology before beginning a treatment with Renovate.

**2,4-D.** There are two products labeled for aquatic use in the US which are granular formulations of 2,4-D. These products (Navigate® available from Applied Biochemists, Inc. and AquaKleen® available from Nufarm Americas, Inc.). Both products are effective for selective control of milfoil and are appropriate for spot treatments. Granular 2,4-d formulations would not be appropriate for whole-lake treatments.

The 2,4-D products have not been approved for use in Washington through the Department of Ecology's Environmental Impact Statement (EIS) process. However, a 1999 legislative action directed that the EIS be updated to include 2,4-D and that 2,4-D was allowed for immediate use for the control of milfoil where the area to be treated

was limited to 20% or less of the littoral zone of the lake. While no permit is needed under this legislation, a 21 day notification to agencies and lake residents is required. There are also potential water use restrictions which may be imposed by State or local agencies.

The direct costs of a 2,4-D treatment are approximately \$425 per acre.

## **INTEGRATED TREATMENT ACTION PLAN**

### **Overview**

Integrated Aquatic Vegetation Management Plans (IAVMPs) are designed to be site specific based on the type of plant problem present and the needs of the water users. An IAVMP reviews all control options available and selects the best mix to apply to the problem over time. An IAVMP is not a one-year management tool; it evolves as conditions in the lake or river system change. For example, if a lake has a major Eurasian watermilfoil infestation, the first years of the program may focus on that problem and select tools to target that plant. In later years, there may still be problematic weed growth, but it could be from native plant communities or from different aquatic weed species. Different tools might be considered in these cases and applied. The management plan should have both short-term and a long-term strategies.

The major aquatic plant problem in Clear Lake is the noxious, exotic weed Eurasian watermilfoil (milfoil). This weed has not yet reached its maximum potential infestation in this lake, and the area infested will increase if left alone. In addition, milfoil spreads by fragments carried from lake to lake on boat trailers. As such, the plant poses a threat to all uninfected lakes in the region.

There are a number of sites in Washington State where the objective of milfoil eradication has been achieved using a combination of technologies, including herbicides. Key to this has been the use of the systemic herbicide Sonar as part of an IAVMP. This herbicide can remove milfoil from lake systems and allow for the expansion of native plants back into the milfoil dominated areas. This occurs due to native aquatic plant reproductive structures (seeds and tubers for example) which are not effected by the herbicide. Milfoil does not generally produce these resistant structures.

Research conducted by the US Army Corps of Engineers, Aquatic Plant Control Research Program, indicated that if milfoil is exposed to 10 parts per billion of fluridone for 40 to 60 days, complete control (eradication) would be possible. This technology has been field tested in a number of large-scale lake treatments in Washington State and is now considered to be an operational technology. Traditional applications target milfoil primarily in the spring but recent research has also shown that there is a "window of opportunity" to eradicate milfoil in fall applications. Field

observations have shown that native plants recover the areas previously infested with milfoil where they have been replaced in one to two years. In addition, there is no other tool that can accomplish this objective that is currently registered and allowed for use in Washington waters.

The first recommended approach for milfoil control is the one that has been discussed through the meeting process. Sonar aquatic herbicide is an extremely effective product when used to manage milfoil. Normally, the technique employed in whole lake Sonar treatment technology is to make an initial treatment based on water volume at 20 parts per billion and make two or three follow-up treatments to maintain Sonar levels over 10 parts per billion. The estimated cost for this approach for a lake the size of Clear Lake would be \$110,000.00. Sonar treatments at this level have been very effective in eradicating milfoil from Washington State Lakes. This methodology is based on research conducted by the US Army Corps of Engineers Aquatic Plant Control Research Program and field validated by RMI biologists. There have, however, been excellent successes when lower amounts of this herbicide are used. In the past years this maximum level of treatment has been implemented on Department of Ecology funded projects because there was no approved systemic herbicides that could be used to spot treat any small numbers of plants that may survive. The goal with this level of treatment has been to maximize the potential for eradication of this weed.

Clear Lake however has experienced a Sonar treatment that effectively eradicated milfoil from the system. In 1988, RMI biologists treated the lake with this product and remove this noxious weed from the system. The Water Environmental Services report for Pierce County confirmed this some years later. As such, we have records of a methodology that has been successful in this situation. The cost to duplicate that treatment is approximately \$45,000.00 and involves two treatments made at about four week intervals. This is one of the recommended options, that the community pursue this treatment.

The second approach is to use a 2,4-D based aquatic herbicide, which has been made possible following legislation passed by during the 1999 Session. 2,4-D has been registered by the US EPA for years but not available in Washington because of an outdated Environmental Impact Statement (EIS) that is used to govern the Department of Ecology permit program. Navigate and AquaKleen are 2,4-D based herbicides with full aquatic clearance by the EPA. These are both granular products which are target-specific for milfoil. These products can be used to spot treat just the effected areas and provide selective and long term control of this weed.

Senate Bill 5424 was passed by both houses and signed by Governor Locke on May 10, 1999. This bill requires Ecology to update their EIS. This will allow for expanded use of the 2,4-D products in the next year or so. It also directs that units of government in Washington can use Navigate or AquaKleen to control milfoil without a permit if certain conditions can be met. These are the milfoil find is a recent discovery or that it is currently infesting less than 20 percent of the littoral zone of the lake. It can also be used to treat milfoil plants that survive whole lake Sonar treatments.

The 2,4-D treatment approach may better suit the needs of the Clear Lake community during 1999 when funding is restricted. The first step will be to perform the spring mapping task that closes this project out. RMI biologists will determine the amount of the littoral zone that is covered with this weed to determine if this lake will qualify for the 2,4-D treatment. If that is the case, this option would be open.

The notification form would have to be submitted to the required agencies 21 days prior to the treatment by a unit of local government like the County Noxious Weed Board. The treatment could then move forward.

The treatment should target the areas of known infestations with some overlap into adjacent waters. There should also be a follow-up survey about three to four weeks after treatment to determine if touch-up is required in any of the areas or if there is new growth outside of the target areas.

It should be noted that this approach was not discussed with the community during the public meeting other than to mention that the legislation was moving through the system and may pass. As such, there is no input from the Clear Lake residents regarding this. There will be some water use restrictions placed on the residents by this. There will also be no effect from this treatment on the emergent cattails where Sonar would cause some discoloration and slow growth. Water Lilies will only be affected if they occur in the treatment area.

## **Control Intensity**

The current aquatic plant problem at Clear Lake is related to the pioneering infestation of milfoil and to the continuing expansion of areas infested by milfoil. Specific problem areas are the shoreline areas. As a result, preventative and high intensity controls are recommended for the short term and preventative and low intensity controls are recommended for the long term. These controls (detailed in the Recommended Control Strategy section below) are:

- **Short Term (1999):** Begin public awareness effort, whole lake application of systemic herbicide for complete eradication of milfoil, spot treatment of systemic herbicide for complete eradication of non-native cattails (if desired), surveillance, hand pulling as needed in any areas where milfoil remains.
- **Long Term (2000- ):** Annual surveillance, watershed nutrient controls, hand pulling in isolated areas if milfoil or other noxious aquatic plant becomes introduced, continue public awareness effort.

## Recommended Control Strategies

As indicated in the Control Intensity analysis, preventive, low intensity and high intensity controls are recommended for Clear Lake. The preventative techniques are aquatic plant population surveillance, installation of watershed nutrient controls, and a public awareness program. The recommended low intensity technique is hand pulling, if needed, to control new infestations of nuisance aquatic plants. These techniques are expected to have relatively low cost, low environmental or human health risks and no direct permit or approval requirements. **Specific costs for these efforts have been estimated and are included in the Project Costs section below.**

The high intensity controls, whole lake herbicide treatment of milfoil and spot spraying of cattails (possibly), has the greatest cost, permit requirements, potential environmental impact and also the greatest direct benefit. The following information is presented as it relates to the recommended implementation of high intensity aquatic plant controls at Clear Lake. Costs of the herbicide treatments are included in the Project Costs section below.

**Herbicide Treatment Plan:** There are two herbicides recommended for the milfoil treatment at Clear Lake. One is fluridone, which is found in the product Sonar and the other is 2,4-D, found in the products Navigate and AquaKleen. There is one herbicide recommended for the non-native cattail treatment (if desired); glyphosate, which is found in the product Rodeo.

### RECOMMENDATION A (SONAR)

The recommended Sonar treatment program would be a one-year process. Initially, the milfoil distribution map (**Figure 2**) and field data on water temperatures (specifically, depth to the thermocline) will be used to calculate the dose of Sonar needed to achieve a concentration of fluridone of 20 parts per billion. See **Appendix 3** for Material Safety Data Sheet and product label information. The initial treatment would be performed in early spring (May - June). The herbicide will be applied (injected) from boats into the water using the liquid (AS) formulation or spread over the water surface if the SRP formulation is used. The week following this initial application, a series of water samples will be collected from the lake which will be analyzed for fluridone content. Information on the movement of fluridone through the system will be used to balance subsequent applications of Sonar. The goal will be to maintain fluridone concentrations between 10 and 20 parts per billion over a 50 day period. This work is required to be performed by a Certified Aquatic Applicator, and the selected firm should have extensive experience with this methodology.

At the end of this first season, SCUBA inspection of aquatic plant populations will be performed in order to assess the need for follow-up controls.

### RECOMMENDATION B (2,4-D)

The recommended 2,4-D treatment would be performed only on areas where milfoil is known to exist. Using the milfoil distribution map (**Figure 2**) the granular product (either Navigate or AquaKleen, see **Appendix 3** for Material Safety Data Sheet and product label information) would be spread over the water surface using a granular blower or cyclone-type spreader. This would be a one-time application. Following the application, a diver survey should be conducted to identify any regrowth of milfoil and follow-up spot treatments should be made.

### RECOMMENDATION C (RODEO)

The herbicide recommended for the removal of non-native cattails is glyphosate which is found in the product Rodeo® (see **Appendix 3** for Material Safety Data Sheet and product label information). Glyphosate is sprayed directly on target plants using a 1.5 % solution. While this chemical will kill growing plants it will not effect seeds from previous years growth. Therefore, annual treatments will be required as long as seeds continue to germinate. This is the product that would be used should there be consensus to move forward with a treatment in the future.

**Environmental Impacts:** Environmental impacts of the planned herbicide treatment using Sonar are expected to be minor and of a temporary nature. Non-target aquatic plants may be effected since a variety of plants do show degrees of susceptibility to fluridone. As stated previously, native aquatic plants which reproduce by seeds, tubers or turions are expected to recover to pre-milfoil distribution and density within two years. Some non-target plants which are expected to show some effect in Clear Lake and are expected to recover are Canadian Elodea (*Elodea canadensis*) and watershield (*Brasenia schreberi*).

Emergent wetland plants are expected to show only temporary effects from the fluridone. Plants such as common cattail (*Typha*) will show whitening of new growth during the treatment but will grow out of this once the herbicide is flushed out of the system. Deeper rooted or woody plants should show no effect due to the absorptive capacity that soils have for fluridone. It should be noted that there is an irrigation precaution when using lake water treated with herbicides. While the effect of this is not known precisely, it is recommended that treated water not be used for lawn or garden irrigation during or for at least two weeks after the planned treatment ends.

Fish and wildlife are not expected to show a negative effect from the planned treatment. Fluridone has very low toxicity to animals while the removal of milfoil will have a strong positive benefit to fish and wildlife.

The potential exists for the release of nutrients and the consumption of oxygen from dying and decaying vegetation. Released nutrients can cause short-term increases in algal growth and potential further consumption of oxygen. This effect should be

minimized because of the long contact time with Sonar and due to the timing (May - June) of the treatment.

Environmental impacts of the planned herbicide treatment using 2,4-D are expected to be negligible. Spot-treatments will minimize the amount of chemical applied and natural degradation will remove all trace of this chemical within several weeks. Extensive information is available on the environmental fate of 2,4-D in aquatic systems and this information points to the safety of using this when following label directions. In addition, monitoring of a trial 2,4-D treatment at Loon Lake, (in Stevens County, WA) showed that native plants, fish and wildlife were not adversely effected by the 2,4-D.

Environmental impacts of the planned herbicide treatment using Rodeo® are expected to be negligible. Spot spraying will minimize the amount of chemical used. Non-target plants may be killed if contacted by sufficient Rodeo® spray. Regrowth from the soil seed bank will provide a mechanism of recovery for non-target plants. Fish and wildlife are not expected to show a negative effect from the planned treatment.

More detailed information on the environmental impacts of fluridone and glyphosate is contained in the EIS prepared by the Department of Ecology<sup>8</sup>. More detailed information on the use and impacts of 2,4-D is contained on the Internet website of the Industry Task force on 2,4-D Research Data.

**Human Health Risks:** There are no human health risks anticipated from the planned herbicide treatments or possible hand removal of noxious aquatic plants. The total dose of fluridone for any given area will be less than 50 parts per billion while the drinking water tolerance for this chemical is 150 parts per billion. In addition there are no water use restrictions in place for either fluridone or glyphosate when used for these types of treatments. The 2,4-D products cannot be used in water used for irrigation or domestic uses so lake residents will be asked to cease these uses during the treatment and water testing may be performed to determine when the levels of 2,4-D in the treatment areas are below the drinking water tolerance.

**Mitigation:** No mitigation measures are expected to be needed for any of the recommended control strategies.

**Permits and Approvals:** A temporary water quality modification will be required from the Washington Department of Ecology to allow the Sonar and Rodeo® applications. This agency has regulatory authority over the application of aquatic herbicides and has developed a programmatic Environmental Impact Statement that governs the program<sup>2</sup>. An Aquatic Plant Management Permit Application will have to be submitted for these treatments. No permit is required for 2,4-D use although there is currently a 21 day notice which must be provided to the Departments of Ecology, Health, Agriculture and Fish and Wildlife, as well as to affected lake residents. No other permits are anticipated for the milfoil treatments.

## Project Costs

The estimated cost, in 1999 dollars, for the recommended integrated aquatic plant control strategy would have the following components:

TASK	ESTIMATED COST (before sales tax)
• Planning/Administration	\$2,000
• Public Awareness Effort (PER YEAR)	\$2,000
• Watershed Nutrient controls	*
• Aquatic Plant Surveillance (PER YEAR)	\$,000
• milfoil Treatment:	
• Public Notifications	\$575
• Sonar Application	\$45,000
• Navigate/AquaKleen Application	**
• Cattail Treatment:	
• Rodeo® Application	\$750
• Hand Removal of weeds	*
• Project Closeout/Reports	\$2,000

\* Costs for this task were not be developed for this planning document

\*\* Costs for spot 2,4-D treatment(s) are calculated at \$425 per acre treated and include a post treatment survey during the treatment year to identify any surviving milfoil plants which need to be treated. As an example, the total cost for treating eight acres, performing the post-treatment survey and re-treating two acres would be \$5,700 (plus sales tax).

## Local Funding Strategy

Funding can be a limiting factor in a lake association's ability to effectively manage noxious aquatic weeds. There are a number of funding mechanisms available. State law allows for the establishment of lake management districts. There are also grants available from the Washington Department of Ecology's Freshwater Aquatic Weed Fund, although this fund has been over-extended for the past two seasons.

The Clear Lake Community Club is one of a few lakes groups in Washington State that can obtain funding under RCW 90.24. Those lakes that qualify for this can determine

what level of aquatic plant management work is necessary and obtain proposals from contractors. After they settle on a contractor and a methodology, they are ready for the next step. This law allows lake organizations to petition the County Superior Court to establish funding for lake management activities through the county property tax system. The Washington State Legislature removed this funding technique when the Lake Management District legislation passed in the late 1980's. Those lakes that had used this technique in the past are grandfathered and still have access to this process. Clear Lake is in this category.

The Clear Lake Community circulated a petition in the fall of 1998 to the Superior Court for Pierce County. The community had received a proposal based on prior experience on the lake with Sonar aquatic herbicide. They requested that half funding level be placed on the ballot and collected during the 1999 tax period. They intended to go back to the Court this fall with a second petition and request the second half of this funding. The community intended to explore low interest loans or grants to fill the short term gap in funding until next year's taxes would be collected. This may potentially limit the ability to move forward if funding or loan sources do not appear.

## REFERENCES

1. Washington Department of Ecology. 1994. Aquatic Weeds Management Fund Grant Guidelines. Water Quality Financial Assistance Program. Olympia, WA.
2. G. C. Bortleson, N. Dion, and J. McConnell. 1976. Reconnaissance Data on Lakes in Washington, Kitsap, Mason and Pierce Counties. Water Supply Bulletin 43, Volume 3. Washington State Department of Ecology. Olympia, WA.
3. Rector J. and D. Hallock. 1995. 1994 Statewide Water Quality Assessment Lakes Chapter, Companion Document to Washington State's 303(b) Report. Publication 95-311. Washington State Department of Ecology. Olympia, WA.
4. Hanowell, Ray, J. Michaud, M. Gibbons, R. Dickerson, N. Turner, J. Hoyle and M. Root. 1994. Clear Lake Water Quality Assessment Project Final Report. Tacoma-Pierce County Health Department. Tacoma, WA
5. Guthrie, Don. 1999. Personal communications regarding Clear Lake history, activities and characteristics. Mr. Guthrie is currently the Vice President of the Clear Lake Community Association.
6. Hanowell, Ray. 1999. Personal communication regarding toxic algae blooms at Clear Lake. Mr. Hanowell is an Environmental Health Specialist with the Tacoma-Pierce County Health Department.

7. Hamel, Kathy. 1999. Personal communications regarding non-native cattail in Clear Lake. Ms. Hamel is with the Washington Department of Ecology, Aquatic Plant Management Program.
8. Gibbons, Maribeth V., H. Gibbons and M. Sytsma. 1994. A Citizen's Manual for Developing Integrated Aquatic Vegetation Management Plans, First Edition. Publication #93-93, Washington Department of Ecology, Financial Assistance Program, Olympia, WA.
9. Washington Department of Ecology. 1992. Final Supplemental Environmental Impact Statement and Responsiveness Summary, Volumes 1 and 2. Aquatic Plant Management Program, Olympia, WA.

# Appendix 1

---

Public Meeting Notices and Information

- ADDRESS BOOKS Ready by August Meeting
- COMMUNITY CLUB MEETING: August 22, 1998
- Message from George

- 1 Minutes from June 20, 1998 meeting
- 2 Meeting Location changed
- 3 Survey Results

# CLEAR LAKE COMMUNITY CLUB

August 1, 1998

## AUGUST COMMUNITY CLUB MEETING

DATE: August 22, 1998

TIME: 10:00 am

PLACE: Carl & Lora Langberg  
36117 W. Clear Lake Rd. E.

### PRESIDENTS CORNER

*During the last election of officers, I challenged all members of the Community Club to reverse the past trend whereby 95% of the work has been done by 5% of the members. My challenge was to achieve an 80/20 split, or better. As chairman of the fireworks committee the past 3 years, I am convinced that level of participation is possible. The following demonstrates we are well on our way toward achieving it:*

*Pam Hurych and Don Guthrie are chairing a committee to print a new membership address and telephone directory. They are lining up local commercial sponsors to help defray the cost.*

*Don is also working on getting a program going to control aquatic weeds in the lake. Recent technological advances make this much more affordable than even last year. He will have a L.I. D. petition at the next meeting for signatures.*

*Bill Stoner is investigating with the State to get the fishing launch closed, as it was for many, many years. Previously the launch was closed from July 4<sup>th</sup> until after Labor Day. This along with the next item should go a long way toward alleviating the public Jet Ski and boat problem we have all endured since the launch was opened to year-round fishing. We need volunteers to photograph incoming boats at the launch for a weekend. Pictures do say more than words.*

*Finally, the resort development proposal is moving forward through the Pierce County approval process. Your Water District Commissioners have met with the project proponents to convey concerns and suggestions you expressed in the written survey and at the last Community Club meeting. Interestingly the proponents share many of the same concerns as our community. The Commissioners*

*are aggressively pursuing an action plan that could have long-range benefits to the lake and all it's residents*

*We hope you will come to the August 22<sup>nd</sup> meeting, for details of current club projects and join us for coffee and doughnuts! Have a great summer until then. George Berry*

### FIREWORKS:



This year's fireworks display was a success, despite the drizzly weather. Many thanks to all the following people who helped with the setup, orchestration and tear down at the show as well as the distribution of flares:

*Dick and Kellen Hurych; Mark Dawkins; Denny Rowley and grandsons, Roy Bognard; Pat Olson; Dave Holder; The Gibson Family; Rick and Pam Wise; Ken Beard; Harold Fish; Tom and Phyllis Folk; The Podraskey boys; Keith Makom; Don Faker; Bob Popek and George Berry.*

We also want to thank the pyro-technician, Ted Gord for giving us so much "bang for the buck".

**ADDRESS BOOKS:** Hopefully, the address books will be ready for printing by August 15<sup>th</sup> and available at the August 22<sup>nd</sup> Community Club Meeting for pick up. If you know of any changes or corrections please let Pam know before the 15<sup>th</sup>. I hope that there will be few errors. **If you want additional books, please let Pam know before August 15<sup>th</sup>.**

**MINUTES FROM THE June 20, 1998  
COMMUNITY CLUB MEETING**

The Clear Lake Community Club was called to order by President George Berry. Minutes from the April 25, 1998 Community Club Meeting were approved as mailed. Correction: Ralph Nelson assisted in developing the survey, not Paul.

**MEETING SITE:** The Fire District is converting the upstairs for sleeping quarters. It is possible that we will be able to use the downstairs where the fire trucks are stored for our meetings after the remodel. If there are any suggestions for other meeting sites or if anyone wants to volunteer their home please contact one of the board members. Carl & Lora Langberg have graciously volunteered their home today.

**FIREWORKS:** The contract is in place with Ted Gord. The fireworks cost \$3,000. Pam Wise will tow the raft with fireworks out in the lake and get it in a better position than last year. Last year we broke even with the fireworks. The fireworks float is difficult to move to the center of the lake in rough water. We are asking that everyone refrain from using his or her boats after 9:00 p.m. on the fourth of July. The set up of the float will be on Saturday morning at 9:00 am. We take down the float Sunday morning and store at the water tower.

**Treasurers Report:**

Checking	\$ 1,763.43
Savings	\$ 3,698.78
Trust	\$12,712.62

We have collected \$2,060 in dues and \$1,840 in fireworks donations.

**WATER DISTRICT:** At this point Tom Folk sees no problems with our water district. Denny Rowley did mowing at the water tanks. Don Faker has cleared around the fire hydrants. Please keep your meters free of weeds and ask or assist your neighbors in doing the same. Water samples are taken 4 to 5 times per week. Bob Popek and Don Faker flushed the lines. Bill Noe needs a couple of people to read meters. This is done six times per year.

**CLEAR LAKE RESORT:** The application for the development at the resort is in the environmental review.

Only those homes within 300 feet will receive information when this goes to hearing. The Community Club will inform the rest of the members when this hearing is to take place.

The developers have approached the Water District. At this point, the Water District is approved for 122 hookups. We do not have state approval to add more hookups. The developers might consider several options. If they are developing small lots (9,000 square feet), they may have to do their own water district. If they have larger lots (1 acre), they may opt to put a well on each lot.

At this point, the Water District wants to protect our aquifer. The Community is not in favor of a large housing development, however if it is going to go in regardless of our wishes/concerns we may want to consider having some control over the water. Having a public launch for the housing development across the road is a major concern for the residences. It is also a concern that if these homes are on our water district they could easily outvote the lake community since many of them are not voting in the Eatonville community.

**LAKE SAFETY:** We currently have components for six more buoys. There was a red & white Jet Ski that ran over the Carlson's buoy. The Carlson's had to replace this buoy. Vince Troccoli will help get six more decals for the buoys. We do have the large signs from the Pierce County Sheriff Marine Services Unit that give information of speed limits, hours of operations, age restrictions, Personal Water Craft laws, laws relating to pulling skiers and direction of travel. Harold Fish will work on getting these signs posted at the access.

**GIFT TO MILLIE:** Pam delivered a plaque of appreciation and an inside terrarium to Millie. She was greatly please and thanked everyone in the Community Club for their support.

**WILDLIFE ACCESS:** Bill Stoner has volunteered to work with the state to see if we can again close the public access from July 4 until after labor day.

**IN SYMPATHY:** Harold Fish's mother passed away June 19<sup>th</sup>. The Community Club would like to express their sympathy to Harold and his family. A card was past around for members to sign.

**WEED CONTROL:** Don Guthrie, Don Faker and Harold Fish have headed up a committee to explore weed control. Don Guthrie has compiled information from all past attempts at weed control, current information and research. Each of these members has this notebook if you are interested in reading it. Resource Management has several options: cutting the weeds, weed rolling, herbicides and hand picking. In 1988, the lake was treated with Sonar. This was very success and worked for 6 to 8 years.

Sonar is EPA approved and is fairly safe now. There is more information on this method than ten years ago. RMI usually treats an entire lake for \$123,000. We might be able to limit the treatment to the perimeter for \$45,000.

**Funding:** through assessed property tax in 1988, we funded the weed control. Grants are not available for treating lakes until the year 2000. We must develop an action plan and than submit it for a grant up to \$75,00 with 25% matching funds from the Community. If we are to get a grant, the Community Club needs to spend money to evaluate the lake. If we have a structured plan, we could make some decision in August. It was moved and second to allow the board the power to spend the money for the study and proposal for weed control on Clear Lake.

**SURVEY RESULTS:** We had a great response to the survey. Fifty-one people returned their surveys with the following responses:

**Do you agree with the limited use restrictions as in accordance with our present plan?**

YES	45
NO	3
Undecided	3

**Would you be in favor of expansion of the Clear Lake Water District to include the homes proposed by the new Concept Homes?**

YES	2
NO	45
UNDECIDED	4

There were many written concerns and comments. Of greatest concern seemed to be the over use of the lake, pollution of the lake, and noise pollution. Lake safety and jet skis were another frequently mentioned concerns. Many people wanted to see the public access closed during the summer and better monitoring of boat launch to allow only fishing boats. Many people wanted the Community Club to address weed control. If you would like to see the complete survey results, please contact Pam.

**SUMMER PICNIC:** It was suggested that we have a summer picnic in August. We need volunteers to host this picnic. Denny Rowley and Don Faker have agreed to chair this committee. Anyone interested in hosting a picnic please give them a call.

**ADDRESS BOOK:** The address book is on its way to completion. Don has sold several adds to local business's in Eatonville. A rough draft of the current addresses was sent around at the meeting for members to make any corrections. I hope that the book will be ready for distribution at the August meeting. Previously, we had a \$5.00 donation to defray the cost of the book. Each person in the address book received a book as well as local sponsors.

Respectfully Submitted,

Pam Hurych  
6620 243<sup>rd</sup> St. E.  
Graham, WA 98338  
PHONE:847-2109

## AGENDA

Clear Lake Community Club Meeting  
August 22, 1998

1. **President's Welcome**
2. **Officer's Reports**
  - A. Secretary – Pam Hurych
  - B. Treasurer – Bernice Riippi
  - C. President – George Berry
3. **Committee Reports**
  - A. Water District – Gary Pessimier
  - B. Weed Control – Don Guthrie
  - C. Public Boat Launch - Bill Stoner
  - D. Other
4. **New Business**
  - A. "Fishing" launch photos – George Berry
  - B. Community picnic – Don Faker
  - C. Next meeting – schedule based on Resort events
  - D. Other
5. **Adjourn**

FILED  
IN COUNTY CLERK'S OFFICE

A.M. NOV 20 1998

PIERCE COUNTY, WASHINGTON  
TED RUTT, COUNTY CLERK  
BY \_\_\_\_\_ DEPUTY

**COPY**

IN THE SUPERIOR COURT OF THE STATE OF WASHINGTON  
IN AND FOR THE COUNTY OF PIERCE

In re the Matter of:

FIXING THE LEVEL OF CLEAR LAKE.

in Pierce County, Washington.

NO. 98 2 12642 1  
NOTICE OF HEARING

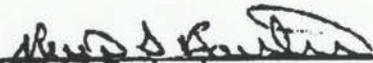
NOTICE IS HEREBY GIVEN that on the 4th day of December, 1998, at 9:00 a. m., at the County-City Building, 930 Tacoma Avenue South, Tacoma, Washington, in Department 19, Judge Marywave Van Deren, Superior Court of the State of Washington, in and for Pierce County, the hearing of the petition in the above-entitled matter will be held.

The object of the petition is to authorize the employing of a suitable company, an aquatic weed control expert, to treat Clear Lake for weed control purposes and apportion the cost among the persons whose property abuts on Clear Lake.

The reason and necessity for the application of the treatment is to facilitate the control of weed growth and other objectionable matter in Clear Lake.

DATED this 18th day of November, 1998.

EISENHOWER & CARLSON, PLLC

By:   
Robert J. Backstein  
WSBA # 458  
Attorneys for Petitioner

EISENHOWER & CARLSON, PLLC

ATTORNEYS-AT-LAW  
1500 WELLS FARGO PLAZA  
1201 PACIFIC AVENUE  
TACOMA, WASHINGTON 98402  
PHONE 253-572-4500  
FAX 253-572-5732

NOTICE OF HEARING - 1



## CLEAR LAKE COMMUNITY CLUB NEWSLETTER

MEETING: January 16 @ 10:00 AM

JANUARY 1999

### COMMUNITY CLUB MEETING

*Mark  
your  
Calendar*

DATE: January 16, 1999

TIME: 10:00 am

PLACE: Eatonville High  
School Library

*\*Resource Management, Inc  
will explain the weed con-  
trol program approved for  
Clear Lake.*

### PRESIDENTS CORNER:

Greetings from George  
At our August meeting we had reports presented by the Community Club's committees on weed control, fishing launch/public access and the membership telephone directory. I also gave a report on the Clear Lake Resort development status and the Water District's efforts to influence the scope of that development. Pam's minutes of the meeting in this newsletter provide details of the reports as well as actions taken by the Club. In summary, Don Guthrie was authorized to petition Pierce County Superior Court to implement a multi-year program to

control lake weeds. Bill Stoner was requested to seek summer closure of the public fishing launch. Pam Hurych distributed a first-class directory of Community Club Members (complete with commercial ads to defray a portion of publication costs) and Water District commissioners were given support for their efforts to negotiate beneficial changes in the Resort development proposal (specifically, elimination of the boat launch and the store and the limitation of waterfront development to single-family residences with no public access).

Clearly, significant business was conducted at the August meeting. Attendance was far greater than at any meeting in recent memory. For me it was gratifying to see how many people have responded to my election day last spring for greater community involvement. We're on a roll now. Your continued involvement will be needed to maintain our momentum into 1999.

Since August, several more important events have taken place because of the clubs efforts. Over the Labor Day weekend, use of the public fishing launch was recorded and documented with pho-

tographs to help Bill Stoner convince the Fish and Wildlife Department that non-fishing use of the launch area is being abused in the absence of effective enforcement. At the end of November, we organized a telephone tree to notify Community Club members of the December 6th Superior Court hearing on our weed control petition. We received very short notice of the hearing so this was the only way we could get the word out. The petition was approved by the court such that treatment of the lake will start this spring by Resource Management, Inc.

Representatives of RMI will be at our next Community Club meeting on January 16th (see notice on this page) to provide technical and financial information on the treatment program. They will also be available to answer your questions. This is an important issue to all of us lake residents so I encourage everyone to attend. At the meeting, we'll also have an update on the resort development status, a discussion of ideas for Community club action(s) this year and refreshments from the winter chill. I look forward to seeing you there. George

**MINUTES FROM  
AUGUST 22, 1998  
Community Club  
Meeting**

**TRACK  
BOY**

Our meeting was held outdoors at Carl & Lora Langbergs today. It was a great turn out with at least 50 members present.

Thank you Carl & Lora for allowing us to meet at your home.



**TREASURE'S  
REPORT:**

Weed Control: 12,780.29  
Savings: 3,318.72  
Checking: 86.88  
Dues Collected for 98: 2,085.00  
Fireworks Collected: 3,340.00  
Expenditures: \$3,000 Fireworks  
71.35 Float Repair

**President's Report:**

Clear Lake Resort developers have met with the Clear Lake Water District Commissioners. The Developers were willing to listen to concerns of the community. Their initial proposal consists of 55 acres that will include 96 lots. Seven lots will be at the resort with a track left to be used by residences and maintaining existing store. Concerns of this proposal consisted of the boat launch at the resort, community public access by 96 homes and traffic control. The developers supported our concerns to not have a boat launch or access by the 96 homes. They are most concerned about developing the water front to single family resi-

dences.

**WATER DISTRICT:**



Our original proposal requested water for 133 hookups from the Department of Ecology. We only have 3 unassigned hookups. There are a couple of property owners who have purchased a water hook-up but are willing to give this up in the interim for the development on the lake. The developers have agreed to eliminate the store, the boat launch and public access to the 96 homes. With these stipulations the Clear Lake Water District has agreed to have 8 hookups at the former Clear Lake Resort for development of single living homes.

George has met with the Pierce County Planning Commissioners and the developer on tailoring this proposal with binding conditions. *The Community Club Members voted unanimously to support this proposal.*

The Water District would like to thank the following people for all their help: Don Fakar, Bill Noe,

Denny Rowley, Carl Langberg, Vince Troccoli, Bob Popek, Roy Iltson, Bill & Patty Dawson, Tom & Phylis Folk, Tom Rogers, Mark Perry. Also a big thank you to North West Cascade which has donated more than \$1,000 worth of equipment/supplies/etc. to assist the water district.



**WEED CONTROL:**

Don Guthrie presented an extensive history of weed control on Clear Lake. He explained the current problem's. A petition has been drawn up requesting the authorization for weed and algae treatment and the utilization of the funds for engineering and scientific study of the Lake for algae and weed treatment. Treatment of the lake will not affect the fish. The Department of Ecology grants usually fund 75% worth of treatment with 25% being funded by the community. We will be able to apply for a grant in one year.

*A Preliminary Weed Control Funding Proposal for 1999 to 2008 was approved by Community club members.* The proposal includes costs to submit a plan to request a grant from the Department of Ecology. If a grant were awarded (earliest 2000) it could provide matching funds of up to 75% of the costs reflected in the proposal, up to a maximum of \$75,000. The ten year Proposal would cost \$111,500 which includes all costs of years 1998-2008 excluding county fees.

**PUBLIC ACCESS:** Bill Stoner has explored the option of getting the access closed from July 4th till labor day. He was not encouraged by the Fish and Wildlife Department that we would have any luck closing the access. We must fill out an application form to review our request. We need to get support of our public officials. Community Club members voted

to support the action of getting the public access closed during the summer months.

### PHOTO SHOOT:

George is recommending that we get a group of volunteers to take pictures at the public access with date/time so we can show officials that boats are not using this access properly. Tentative date for this is labor day weekend. Volunteers signed up to help.



**LANDFILL:** Bill Dawson handed out information on the development of the landfill. There is still a chance that the decision to go ahead with the landfill will be appealed.



**CROWD:**  
Concerned Residents on Waste Disposal  
30404 Meridian E.  
Graham, WA 98338  
Phone: 253-846-2850  
FAX: 253-841-7435

**OUTLET:** The outlet is currently dry and ready to be cleaned out. Everyone is invited to bring their boots and rake and assist with cleaning this public outlet.  
**DATE:** Saturday at 10:00. Aug 29th.

**ADDRESS BOOKS:** The address books are completed and were distributed for a nominal fee of \$5.00 to defray costs.

Don Guthrie obtained paid adds from Van Eaton Chevrolet, The Rainier Group, Northwest Dock Systems, Eatonville Furniture, Arrow Lumber Company,



Malcom's Mill Village Motel, Century 21 Magic, ERA Countryside Real Estate, Aaron's Ark Restaurant, Between the Bread Restaurant, Ohop Valley Bakery & Deli, Puerta Vallarta Restaurant, Tall Timber Restaurant, The Pizsa Deli Company, Ford's Small Engine Repair, Barney's Mini-Mart, Kirk's Pharmacy, Plaza Market, and the Blue Moon Pub.

Please return the Community Club's support of these local merchants by purchasing their goods and services whenever possible. Please let Pam know of any corrections or additions. She will post them within the newsletters.

**Cost of Address Book:**  
\$742.70 Printing/Publishing  
\$550.00 Collected from ads  
\$192.70 Cost to Community Club

Respectfully Submitted,  
Pam Hurych  
6620 243rd St. E.  
Graham, WA 98338  
PHONE: 847-2109

**DUE**

Dues are now payable to Clear Lake Community Club for \$25 for

the 99 year. Please make checks payable to Clear Lake Community Club.

The Community Club is active in keeping members informed on activities that may impact the community of Clear Lake. Meetings are held 4 to 5 times per year. Water safety and weed control continue to be areas of great support and concern of the Clear Lake Community Club. The Community Club sponsors an annual fireworks display each year with many volunteers assist from the community. The fireworks are funded by donation with an average cost of \$3,400. Newsletters are mailed, as is information on community events that impact the lake. Each mailing runs between \$70 to \$100.

\*Checks Payable to: CLEAR LAKE COMMUNITY CLUB  
c/o Bernice Riippi  
11817 Clear Lake N.Rd. E.  
Eatonville, WA 98328-8304

**Clear Lake Aquatic Plant Management  
Public Meeting, January 16, 1999**

**Agenda**

**Introduction of Clear Lake Community Club Board and Resource Management, Inc.**

**Opening Comments, Two Objectives of this meeting**

- a. Discuss the development of the Integrated Aquatic Vegetation Management Plan
- b. Discuss the treatment program for 1999

**Introduction to Aquatic Plant Management**

- a. Why do we have aquatic weeds
- b. Why are they a problem
- c. Exotic aquatic weeds
- d. Control options, the tool box

**Clear Lake 1999**

**Task One Results, Aquatic Plant Mapping**

- a. Eurasian Milfoil
- b. Non native cattails
- c. Bathymetric mapping

**Upcoming Tasks**

- a. Public meeting
- b. Develop integrated management plan
- c. Present the plan at public meeting for comments
- d. Deliver the plan to the Clear Lake Community

**Need for Comments and questions**

Submit to RMI, 2900-B 29<sup>th</sup> Ave SW, Tumwater, WA 98512, [rmiwa@aol.com](mailto:rmiwa@aol.com),  
[www.rmi-usa.com](http://www.rmi-usa.com).



# CLEAR LAKE COMMUNITY CLUB NEWSLETTER

MEETING: March 20 @ 9:00 AM

MARCH 1999

## COMMUNITY CLUB MEETING

*Mark  
your  
Calendar*

**DATE:** March 20, 1999

**TIME:** 9:00 am 11:00 am

**PLACE:** Northwest Trek  
Theater

*Resource Management, Inc  
will explain the weed control  
program approved for  
Clear Lake.*

*\* Please note earlier time.*

### PRESIDENTS CORNER:

Greetings from George  
Record rainfall has made this a long winter. The signs of spring are, however, gradually starting to appear. With them comes a new season on the lake and an opportunity for us all to see some important results from projects undertaken by the Community Club last season.

Those of you who attended our last meeting received an overview of the weed control program that will soon be implemented. Terry McNabb of Resource Management Inc.. (RMI) gave an excellent presentation on the natural life cycle of

*lakes, the role of aquatic weeds in that cycle and the available alternatives to controlling the adverse impacts of weeds. Terry also reported on the work RMI has performed to analyze the physical and biological condition of Clear Lake. Based on that analysis, RMI is now preparing a detailed weed control plan that can be safely implemented and monitored for effectiveness.*

*At our upcoming Community Club meeting, RMI will present details of the plan. You will be able to ask questions and/or make suggestions, so please plan to attend. Besides the RMI presentation, we'll have officer elections and committee reports on other projects the Club initiated last year (development of the Clear Lake Resort, use of the public fishing launch, 4th of July fireworks, etc..) A new meeting place has been selected (Northwest Trek Theatre) which should be very comfortable and convenient. Refreshments will be provided. We hope to see every one there for a great program.*

*George*

## MINUTES FROM January 16, 1999 Community Club Meeting

### TREASURE'S REPORT:

Weed Control:	12,910.05
Savings:	3,360.67
Checking:	333.28
Dues Collected for 99:	475.00
Fireworks Collected 99:	75.00
<i>Contributions for address book- including ads (\$655)</i>	

We would like to thank Don Faker, Harold Fish and Don Guthrie for all their efforts into the weed control project.



**WATER DISTRICT:** A generator has been hooked up to the water system. If the power goes out we will still have water. The generator is behind the well house. The Water District paid \$2500 for a used generator that had 1,000 hours on it. Thank you to Ken Beard who helped with the hook up. The water district will be Y2K compliant since we are not hooked into any monitor system.

### WEED CONTROL:

A draft plan of the weed control for Clear Lake will be presented to Community Club members at

the March/April meeting. The final draft will be presented by June so we can get permits to begin treatment.

#### **PUBLIC ACCESS:**

Bill Stoner will be meeting this week with the Fish and Wildlife department to see if we can have some impact on the fish launch. If the launch is closed during July & August, we must decide how to have access to the lake for homeowners. There was a great response with volunteers who took pictures on labor day of people accessing the boat launch.

**Clear Lake Resort:** There has been no new developments since the August meeting. It is still in the environmental review process. They need to develop sanitary drain fields and address traffic issues.

#### **FIREWORKS:**

Entertainment Fireworks have submitted a proposal for fireworks holding their price at the \$3000 we paid last year. It was decided to maintain the contract with Entertainment fireworks.

**Election of Officers:** Next meeting we will have election of officers. Terms are up for Vice President & Secretary.

#### **PRESENTATION BY Terry McNabb**

Resource Management has developed the Integrated Aquatic Vegetation Management Plan for Clear Lake. They have been authorized to:

1. Map the Aquatic Vegetation which was completed Dec. 98.
2. Develop an integrated aquatic Vegetation Management Plan
3. Hold a Public meeting to explain the plan(1-16-99 at Eatonville High School)
3. Hold a 2nd meeting to explain the draft plan in April/May
4. Have the final plan completed by June 99.

The expense for this plan is \$7,000 which is coming out of the current weed control money. The formal petition in December was for assessment for the next 2-3 years. We will refocus after we see what we can secure in the way of grants.

Terry had a slide series that showed aquatic weeds, eutrophication (process of lake aging), aquatic plant growth, watershed, benefits of aquatic management, exotic aquatic weeds, and types of aquatic plant strategies. This was an excellent presentation and my notes would not do it justice. Hopefully, you can attend the next meeting.

On the North Shore of Clear Lake there are nonnative cattails. This is the only place in Washington State that has this type of cattails. The potential for the cattails to cause harm and spread around the state is great. We will get money from the State to eliminate the cattails.

This summer if the plan is developed as expected they will use Sonar to treat the Eurasian

milfoil. It was used in 1988 which eliminated it. Unfortunately, it was reintroduced into the lake, possibly by a boat in 1990. The Sonar is safe in drinking water. There should be no lake closures or restrictions on drinking water or fish consumption.

In two months another public meeting will be held to go over the draft of the plan. A manual will be developed after that 2nd meeting.

There were several questions regarding the algae. The green algae in the water is related to the phosphates in the water. It is difficult to control. Copper has been used to treat it but not with much success. It is generally seen during the winter months. Algae is a single cell organism that reproduces with light and phosphorous.

Terry gave an excellent presentation. Please try and attend the March 20th meeting so you can hear first hand about the weeds on Clear Lake and how we can treat them.

Respectfully Submitted,  
Pam Hurych  
PHONE: 847-2109

If you have not paid your **DUES** you can mail them to:

\*Checks Payable to:  
**CLEAR LAKE COMMUNITY CLUB (\$25)**  
c/o Bernice Riippi  
11817 Clear Lake N.Rd. E.  
Eatonville, WA 98328-8304



# CLEAR LAKE COMMUNITY CLUB MEETING

*Important informational meeting. . . Please Attend!!!*

**DATE:** Saturday, March 20, 1999

**TIME:** 9:00 am to 11:00 am

**PLACE:** Northwest Trek Theater

## **AGENDA**

- Resource Management will explain the weed control program for Clear Lake
- Time for questions, concerns and suggestions on the Weed Control Plan
- Election of Officers: Vice President & Secretary
- Committee Reports on: development of Clear Lake Resort, use of public fishing launch, 4th of July fireworks

~~CONFIDENTIAL~~

To whom it may concern:

I am greatly opposed to the elimination of the cattails in front of my property. By whose authority can this occur? I've lived here for 2 decades and that stand of cattails has no more than doubled. I would venture to say the cattails have been here well over 50 years and cover only 350 sq. ft. And this is a potential to cause "harm" and "spread around the state"??

I have for years kept the cattails pruned back. I have nurtured the stand to grow increasing in front of my property in the event that Clem Heath eliminated the bulk of the stand in front of his property. He too has pruned them back in recent years.

These cattails are a beautiful, and naturally occurring event. Each year these cattails provide a natural habitat for hundreds of Red Wing blackbirds. How many decades? Is this nonnative?

These cattails have been here so long that to disrupt their growing area would unleash years of

naturally occurring build up. What happens to the build up of sediment? Leave it! Isn't that shoreline disruption? What happens to the broken roots that drift around the lake? To try to fix this so called problem will we create a larger one? We are not alone in our feelings. For years now Clear Lake residents have enjoy the swarms of Redwings as they soar in the late summer evenings. Who has the authority to eliminate this!

If this foolishness is persued I will notify every agency that could even remotely help me. This is not right! And I do not want to bring in outside government to handle a lake problem. Let's work as a community on this problem.

Respectfully  
Mark Dawkins

# Appendix 2

---

Summary of Aquatic Plant Management Techniques

**SUMMARY OF AQUATIC PLANT MANAGEMENT TECHNIQUES AVAILABLE IN WASHINGTON (Continued)**

Method	Appropriate Scale (area or extent)	Duration of Control	Intensity of Control	Cost	Advantages	Disadvantages	Permit Required?
Biological Grass carp	Large-scale	Potentially long	Low-High	\$50 to \$200/acre (depending on stocking density)	<ul style="list-style-type: none"> <li>• Low maintenance</li> <li>• Large area covered</li> <li>• Triploid fish are sterile</li> </ul>	<ul style="list-style-type: none"> <li>• Stocking densities not well established</li> <li>• Difficult to fine-tune control</li> <li>• Preference for native species over exotics</li> <li>• Containment structures required</li> <li>• Ecological impacts unknown</li> <li>• Not site specific</li> <li>• Recapture problems</li> <li>• Susceptible to predation by wildlife or humans</li> </ul>	Yes
Chemical Fluridone	Large-scale	> 1 year (depends on availability of propagules for recolonization)	High	\$700 to \$1000/acre	<ul style="list-style-type: none"> <li>• Systemic herbicide</li> <li>• Some species specificity with correct application rates</li> <li>• Non-toxic</li> </ul>	<ul style="list-style-type: none"> <li>• Requires long contact time</li> <li>• Off-site movement possible</li> <li>• Nutrient release and dissolved oxygen</li> </ul>	Yes
Glyphosate	Large-scale	> 1 year (depends on availability of propagules for recolonization)	High	\$250/acre	<ul style="list-style-type: none"> <li>• Systemic herbicide</li> <li>• Non-toxic</li> <li>• No label restrictions on swimming and fishing</li> </ul>	<ul style="list-style-type: none"> <li>• Non-selective herbicide</li> <li>• Emergent plants only</li> </ul>	Yes
Endothall	Large-scale	Weeks to months	Moderate	\$500 to \$700/acre	<ul style="list-style-type: none"> <li>• Short contact time required</li> <li>• Low toxicity</li> <li>• Low cost</li> <li>• Fast dissipation</li> </ul>	<ul style="list-style-type: none"> <li>• Contact herbicide</li> <li>• Temporary effect</li> <li>• Some label restrictions for swimming and domestic water use</li> </ul>	Yes
Copper chelates	Large-scale	Weeks to months	Mod to High (depends on species present)	\$120 to \$340/acre (depends on species present)	<ul style="list-style-type: none"> <li>• No use restrictions</li> <li>• Short contact time required</li> </ul>	<ul style="list-style-type: none"> <li>• Potential toxic effects</li> <li>• Persistent in environment</li> <li>• Species susceptibility varies</li> </ul>	Yes

**SUMMARY OF AQUATIC PLANT MANAGEMENT TECHNIQUES AVAILABLE IN WASHINGTON**  
Effectiveness and duration of control depend upon correct implementation for most techniques.

Method	Appropriate Scale (area or extent)	Duration of Control	Intensity of Control	Cost	Advantages	Disadvantages	Permit Required?
Physical Hand-pulling	Small-scale	Season or longer	Moderate to High (with complete removal)	\$0 with volunteer labor \$500 to \$2400/day for contract divers	<ul style="list-style-type: none"> <li>• Site specific</li> <li>• Species specific</li> <li>• Minimum impact on native plants</li> <li>• Use near obstructions</li> <li>• Immediate plant removal</li> </ul>	<ul style="list-style-type: none"> <li>• Slow, labor intensive, expensive</li> <li>• short-term turbidity increase</li> <li>• Diver visibility can restrict effectiveness</li> <li>• Slow</li> <li>• Fragments generated</li> <li>• Short-term increase in turbidity</li> </ul>	No
Hand-cutting	Small-scale	< One season	Moderate	\$100 to \$1000 for equipment + labor	<ul style="list-style-type: none"> <li>• Immediate plant removal</li> </ul>	<ul style="list-style-type: none"> <li>• Slow</li> <li>• Fragments generated</li> <li>• Short-term increase in turbidity</li> </ul>	Yes
Bottom Barriers	Small-scale	2 to 3 years	High	\$0.15 to \$0.75/sq. ft. for material \$0.25 to \$0.50/sq. ft. for installation	<ul style="list-style-type: none"> <li>• Immediate plant removal</li> <li>• Materials reusable</li> <li>• Site specific</li> <li>• Useful around obstructions</li> </ul>	<ul style="list-style-type: none"> <li>• Not species specific</li> <li>• Benthic organism impacts</li> <li>• Material costs</li> <li>• Maintenance required</li> </ul>	Yes
Drawdown	Large-scale	None	Low	Variable	<ul style="list-style-type: none"> <li>• Useful for repair/ maintenance of shorelines and structures</li> <li>• May enhance growth of emergents (waterfowl habitat)</li> </ul>	<ul style="list-style-type: none"> <li>• Not species specific</li> <li>• May impact wetlands</li> <li>• Loss of recreation</li> <li>• Dissolved oxygen decrease</li> <li>• Benthic invertebrate impacts</li> </ul>	Yes
Watershed Controls	Small-scale	None - long-term	Low	Low	<ul style="list-style-type: none"> <li>• Long-term improvement in water quality</li> <li>• May encourage rooted and discourage non- rooted species</li> </ul>	<ul style="list-style-type: none"> <li>• Does not address nutrient sources used by most aquatic plants</li> <li>• May encourage rooted/discourage non-rooted species</li> <li>• Sometimes difficult to implement</li> </ul>	No

**SUMMARY OF AQUATIC PLANT MANAGEMENT TECHNIQUES AVAILABLE IN WASHINGTON (Continued)**

Method	Appropriate Scale (area or extent)	Duration of Control	Intensity of Control	Cost	Advantages	Disadvantages	Permit Required?
Water column dye	Weeks to months	Weeks to months	Low	\$12.50/acre-ft.	<ul style="list-style-type: none"> <li>• Non-toxic</li> <li>• No special equipment needed</li> <li>• Colors water blue</li> </ul>	<ul style="list-style-type: none"> <li>• Shallow, closed systems only</li> <li>• Repeat treatments through growing season required</li> <li>• Not effective when plants near surface flowing, or chlorinated water herbicides</li> <li>• Some classified as herbicides</li> </ul>	Yes/No (Those classified as herbicides require a permit)
Mechanical Harvesting	Large-scale	Less than one season	Low-Mod	\$600/acre (May vary with transport costs)	<ul style="list-style-type: none"> <li>• Immediate plant removal to cutting depth (4 to 8 ft.)</li> <li>• Minimal bottom disturbance</li> <li>• Materials may be composted</li> <li>• Reduces internal loading of nutrients</li> </ul>	<ul style="list-style-type: none"> <li>• Plant disposal</li> <li>• Fragments produced</li> <li>• Fish and invertebrate impacts</li> <li>• Slow</li> <li>• High initial capital costs</li> <li>• Operating depth limited</li> <li>• Operations depend on weather</li> <li>• Not species specific</li> </ul>	Yes
Rotovation/ Cultivation	Large-scale	2 to 3 years	Mod-High	\$1000 to \$1700/acre (depends on plant density and area of treatment)	<ul style="list-style-type: none"> <li>• Winter treatment minimizes summer season recreation impacts</li> <li>• May increase species diversity</li> </ul>	<ul style="list-style-type: none"> <li>• Bottom disturbance / increased turbidity</li> <li>• Long-term efficacy only on perennials</li> <li>• Bottom obstructions limit use</li> <li>• Not species specific</li> </ul>	Yes
Diver-operated dredge	Small-scale	Potentially long (Depends on availability of propagules for recolonization)	Mod-High	\$1100-2000/day (coverage depends on plant density)	<ul style="list-style-type: none"> <li>• Site specific</li> <li>• Species specific</li> <li>• No depth constraints</li> <li>• Used near obstacles</li> </ul>	<ul style="list-style-type: none"> <li>• Labor intensive</li> <li>• Slow</li> <li>• Potential fragment production</li> <li>• Temporary bottom disturbance and increased turbidity</li> </ul>	Yes

# Appendix 3

---

Herbicide Information

# Specimen Label



## Herbicide

A herbicide for management of aquatic vegetation in fresh water ponds, lakes, reservoirs, drainage canals and irrigation canals

### Active Ingredient:

fluridone: 1-methyl-3-phenyl-5-[3-(trifluoromethyl)phenyl]-4(1 <i>H</i> )-pyridinone.....	41.7%
Inert Ingredients.....	58.3%
Total.....	100.0%

Contains 4 pounds active ingredient per gallon.

EPA Reg. No. 67690-4

## Precautionary Statements

Hazards to Humans and Domestic Animals  
Keep Out of Reach of Children

## CAUTION                      PRECAUCION

**Precaucion al usuario:** Si usted no lee inglés, no use este producto hasta que la etiqueta le haya sido explicada ampliamente.

**Harmful if Swallowed, Absorbed Through Skin, Or If Inhaled**

**Avoid breathing of spray mist or contact with skin, eyes, or clothing. Wash thoroughly with soap and water after handling. Wash exposed clothing before reuse.**

## First Aid

**If in eyes:** Flush eyes or skin with plenty of water. Get medical attention if irritation persists.

**If swallowed:** 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.

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

## Environmental Hazards

Follow use directions carefully so as to minimize 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. herbicide may occasionally develop chlorosis. Do not apply in tidewater/brackish water.

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.

## Directions for Use

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

Read all Directions for Use carefully before applying.

**Shake well before using.**

## Storage and Disposal

Do not contaminate water, food, or feed by storage or disposal.

**Storage:** Store in original container only. Do not store near feed or foodstuffs. In case of leak or spill, use absorbent materials to contain liquids and dispose as waste.

**Pesticide Disposal:** Wastes resulting from use of this product may be used according to label directions or disposed of at an approved waste disposal facility.

**Container Disposal:** Triple rinse (or equivalent). Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke.

**Sonar\* A.S. Herbicide**

## General Information

Sonar A.S. herbicide is a selective systemic aquatic herbicide for management of aquatic vegetation in fresh water ponds, lakes, reservoirs, drainage canals and irrigation canals. Sonar A.S. is absorbed from water by plant shoots and from hydrosol by the roots of aquatic vascular plants. It is important to maintain the recommended concentration of Sonar A.S. in contact with the weeds as long as possible. Rapid water movement or any condition which results in rapid dilution of Sonar A.S. in treated water will reduce its effectiveness. In susceptible plants, Sonar A.S. inhibits the formation of carotene. In the absence of carotene, chlorophyll is rapidly degraded by sunlight. Herbicidal symptoms of Sonar A.S. appear in seven to ten days and appear as white (chlorotic) or pink growing points. Under optimum conditions 30 to 90 days are required before the desired level of aquatic weed management is achieved with Sonar A.S. Species susceptibility to Sonar A.S. may vary depending on time of year, stage of growth, and water movement. For best results, apply Sonar A.S. prior to initiation of weed growth or when weeds begin active growth.

Sonar A.S. is not corrosive to application equipment.

## General Use Precautions

**Obtain Required Permits:** Consult with appropriate state or local water authorities before applying this product. Permits may be required by state or local public agencies.

**Chemigation:** Do not apply Sonar A.S. through any type of irrigation system.

**Potable Water Intakes:** In lakes and reservoirs, do not apply Sonar A.S. within one-fourth mile (1320 feet) of any functioning potable water intake. **Note: Existing potable water intakes which are no longer in use, such as those replaced by potable water wells or connections to a municipal water system, are not considered to be functioning potable water intakes.**

**Irrigation:** Irrigation with water treated with Sonar A.S. may result in injury to the irrigated vegetation. SePRO recommends informing those who irrigate from areas treated with Sonar A.S. of the irrigation time frames presented in the table below. These time frames are suggestions which should be followed to reduce the potential for injury to vegetation irrigated with water treated with Sonar A.S.:

Application Site	Days After Application		
	Established Tree Crops	Established Row Crops Turf/Plants	Newly Seeded Crops/Seedbeds or Areas to be Planted Including /Overseeded Golf Course Greens
†Ponds and Static Canals	7	30	30
Canals	7	14	30
††Lakes and Reservoirs	7	14	14

†For purposes of Sonar A.S. labeling, a pond is defined as a body of water 10 acres or less in size. A lake or reservoir is greater than 10 acres.

††In lakes and reservoirs where one-half or greater of the body of water is treated, use the pond and static canal irrigation restrictions.

## Weed Control Information

### Vascular Aquatic Plants Controlled by Sonar A.S.

#### Floating Plants:

Common duckweed (*Lemna minor*)<sup>†</sup>

#### Emerged Plants:

spatterdock (*Nuphar luteum*)  
water-lily (*Nymphaea* spp.)

†Controlled only with a surface application of Sonar AS.

#### Submersed Plants:

bladderwort (*Utricularia* spp.)  
common coontail (*Ceratophyllum demersum*)  
common elodea (*Elodea canadensis*)  
egeria, Brazilian elodea (*Egeria densa*)  
fanwort, cabomba (*Cabomba caroliniana*)  
hydrilla (*Hydrilla verticillata*)  
naiad (*Najas* spp.)  
pondweed (*Potamogeton* spp., except Illinois pondweed)  
watermilfoil (*Myriophyllum* spp.)

#### Shoreline Grasses:

paragrass (*Brachiaria mutica*)

### Vascular Aquatic Plants Partially Controlled by Sonar A.S.

alligatorweed (*Alternanthera philoxeroides*)  
American lotus (*Nelumbo lutea*)  
cattail (*Typha* spp.)  
common watermeal (*Wolffia columbiana*)<sup>††</sup>  
creeping waterprimrose (*Ludwigia peploides*)  
giant cutgrass (*Zizaniopsis miliacea*)

Illinois pondweed (*Potamogeton illinoensis*)  
parrotfeather (*Myriophyllum brasiliense*)  
reed canarygrass (*Phalaris arundinaceae*)  
smartweed (*Polygonum* spp.)  
spikerush (*Eleocharis* spp.)  
southern watergrass (*Hydrochloa caroliniensis*)  
torpedograss (*Panicum repens*)  
waterpurslane (*Ludwigia palustris*)  
watershield (*Brasenia schreberi*)

††Partial control only with a surface application of Sonar A.S. at the maximum labeled rate.

### Vascular Aquatic Plants Not Controlled by Sonar A.S.

algae (*Chara* and *Nitella*)  
American frogbit (*Limnobium spongia*)  
arrowhead (*Sagittaria* spp.)  
bacopa (*Bacopa* spp.)  
big floatingheart, banana lily (*Nymphoides aquatica*)  
bulrush (*Scirpus* spp.)  
floating waterhyacinth (*Eichhornia crassipes*)  
maidencane (*Panicum hemitomon*)  
pickerelweed, lanceleaf (*Pontederia cordata*)  
rush (*Juncus* spp.)  
tapegrass, American eelgrass (*Vallisneria americana*)  
waterlettuce (*Pistia stratiotes*)  
water pennywort (*Hydrocotyle umbellata*)

## Mixing and Application Directions

The aquatic plants present in the treatment site should be identified prior to application to determine their susceptibility to Sonar A.S. It is important to determine the area (acres) to be treated and the average depth in order to select the proper application rate. Do not exceed the maximum labeled rate for a given treatment site per annual growth cycle.

**Shake Sonar A.S. well before using.** Add the recommended amount of Sonar A.S. to water in the spray tank during the filling operation. Agitate while filling and during spraying. Surface or subsurface application of the spray can be made with conventional spray equipment. Sonar A.S. can also be applied near the surface of the hydrosol using weighted trailing hoses. A spray volume of 5 to 100 gallons per acre may be used. Sonar A.S. may also be diluted with water and the concentrated mix metered into the pumping system.

### Application to Ponds

Sonar A.S. may be applied to the entire surface area of a pond. Rates may be selected to provide 0.06 to 0.09 ppm of active ingredient in the treated water. Application rates necessary to obtain these active ingredient concentrations in treated water are shown in the following table. When average water depth of the treatment site is greater than 5 feet, apply 1 to 1.5 quarts of Sonar A.S. per treated surface acre.

Average Water Depth of Treatment Site (feet)	Quarts of Sonar A.S. per Treated Surface Acre
1	0.16 - 0.25
2	0.33 - 0.50
3	0.50 - 0.75
4	0.65 - 1.00
5	0.80 - 1.25

Use the higher rate within the rate range where there is a dense weed mass or when treating more difficult to control species.

### Application to Lakes and Reservoirs

For best results in lakes and reservoirs, Sonar A.S. treatment areas should be a minimum of 5 acres in size. Treatment of areas smaller than 5 acres or treatment of narrow strips such as boat lanes or shorelines may not produce satisfactory results due to dilution by untreated water. In lakes and reservoirs, do not apply Sonar A.S. within one-fourth mile (1320 feet) of any functioning potable water intake.

Rates may be selected to provide 0.075 to 0.15 ppm of active ingredient in the treated water. Application rates necessary to obtain these active ingredient concentrations in treated water are shown in the following table. When average water depth of the treatment site is greater than 10 feet, apply 3 to 4 quarts of Sonar A.S. per treated surface acre.

Average Water Depth of Treatment Site (feet)	Quarts of Sonar A.S. per Treated Surface Acre
1	0.2 - 0.4
2	0.4 - 0.8
3	0.6 - 1.2
4	0.8 - 1.6
5	1.0 - 2.0
6	1.2 - 2.4
7	1.4 - 2.8
8	1.6 - 3.2
9	1.8 - 3.6
10	2.0 - 4.0

Use the higher rate within the rate range where there is a dense weed mass or when treating more difficult to control species.

**Use Rates for Control of Eurasian Watermilfoil in Whole Lake or Reservoir Treatments:** The following application rates may be used for control of Eurasian watermilfoil when treating lakes or reservoirs where little dilution with untreated water is expected to occur. Under these conditions, Sonar may be applied to provide a concentration of 0.01 to 0.02 ppm (10 to 20 ppb) of active ingredient in treated water. Application rates necessary to achieve these active ingredient concentrations in treated water are shown in the following table. For optimum control, it is recommended that applications be made early in the growing season.

Average Water Depth of Treatment Site (feet)	Quarts of Sonar A.S. per Treated Surface Acre
1	0.027 - 0.05
2	0.05 - 0.11
3	0.08 - 0.16
4	0.11 - 0.22
5	0.14 - 0.27
6	0.16 - 0.32
7	0.19 - 0.38
8	0.22 - 0.43
9	0.24 - 0.49
10	0.27 - 0.54

When treated with these use rates, other less susceptible species listed under Aquatic Plants Controlled may exhibit only temporary injury or stunting followed by recovery and normal growth. These 0.01 to 0.02 ppm rates may be applied where functioning potable water intakes are present. Note: When applications for management of Eurasian watermilfoil are made to only portions of lakes or reservoirs such as bays or fingers of these water bodies, the higher rates and use directions listed on this label for Applications to Lakes and Reservoirs are recommended.

### Application Rate Calculation - Ponds, Lakes and Reservoirs

The amount of Sonar A.S. to be applied to provide the desired ppm concentration of active ingredient in treated water may be calculated as follows:

Quarts of Sonar A.S. required per treated surface acre = Average water depth of treatment site (feet) x Desired ppm concentration of active ingredient x 2.7

For example, the quarts per acre of Sonar A.S. required to provide a concentration of 0.075 ppm of active ingredient in water with an average depth of 5 feet is calculated as follows:

$$5 \times 0.075 \times 2.7 = 1.0 \text{ quart per treated surface acre.}$$

When measuring quantities of Sonar A.S., quarts may be converted to fluid ounces by multiplying quarts to be measured x 32. For example, 0.25 quarts x 32 = 8 fluid ounces.

**Note:** Calculated rates should not exceed the maximum allowable rate in quarts per treated surface acre for the water depth listed in the application rate table for the site to be treated.

### Application to Drainage Canals and Irrigation Canals

In drainage and irrigation canals, Sonar A.S. should be applied at the rate of 2 quarts per treated surface acre. Where water retention is possible, the performance of Sonar A.S. will be enhanced by restricting water flow. In moving bodies of water, use an application pattern that will provide a uniform distribution and avoid concentration of the herbicide.

---

**Warranty Disclaimer**

---

SePRO Corporation warrants that this product conforms to the chemical description on the label and is reasonably fit for the purposes stated on the label when used in strict accordance with the directions, subject to the inherent risks set forth below. SEPRO CORPORATION MAKES NO OTHER EXPRESS OR IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR ANY OTHER EXPRESS OR IMPLIED WARRANTY.

---

**Inherent Risks of Use**

---

It is impossible to eliminate all risks associated with use of this product. Plant injury, lack of performance, or other unintended consequences may result because of such factors as use of the product contrary to label instructions (including conditions noted on the label, such as unfavorable temperatures, soil conditions, etc.), abnormal conditions (such as excessive rainfall, drought, tornadoes, hurricanes), presence of other materials, the manner of application, or other factors, all of which are beyond the control of SePRO Corporation or the seller. All such risks shall be assumed by Buyer.

---

**Limitation of Remedies**

---

The exclusive remedy for losses or damages resulting from this product (including claims based on contract, negligence, strict liability, or other legal theories), shall be limited to, at SePRO's election, one of the following:

- (1) Refund of purchase price paid by buyer or use for product bought, or
- (2) Replacement of amount of product used.

SePRO Corporation shall not be liable for losses or damages resulting from handling or use of this product unless SePRO Corporation is promptly notified of such loss or damage in writing. In no case shall SePRO Corporation be liable for consequential or incidental damages or losses.

The terms of the Warranty Disclaimer above and this Limitation of Remedies cannot be varied by any written or verbal statements or agreements. No employee or sales agent of SePRO Corporation or the seller is authorized to vary or exceed the terms of the Warranty Disclaimer or this Limitation of Remedies in any manner.

# Material Safety Data Sheet



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

**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/m<sup>3</sup> 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.

# Material Safety Data Sheet



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 Communication 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, CO<sub>2</sub>, 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 LD<sub>50</sub> for skin absorption in rabbits is greater than 2000 mg/kg.

# Material Safety Data Sheet



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

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

The Information Herein Is Given In Good Faith,  
But No Warranty, Express Or Implied, Is Made.  
Consult SePRO Corporation For Further Information.

# NAVIGATE<sup>®</sup>

## GRANULAR AQUATIC HERBICIDE FOR CONTROLLING WATER WEEDS

ACTIVE INGREDIENTS: 2,4-Dichlorophenoxyacetic acid, butoxyethyl ester\* ..... 27.6%  
 INERT INGREDIENTS: ..... 72.4%  
\*Isomer specific by AOAC method No. 6.D01-5  
 \*2,4-Dichlorophenoxyacetic acid equivalent 19% by weight

EPA Reg. No. 264-109-8959

EPA Est. No. 33560-TN-1

### KEEP OUT OF REACH OF CHILDREN CAUTION

For PRODUCT USE information Call 1-800-558-5106.  
 For MEDICAL and TRANSPORTATION Emergencies ONLY Call 24 Hours A Day 1-800-334-7577.

#### GENERAL INFORMATION

NAVIGATE Granular Aquatic Herbicide contains 2,4-D formulated as the low-volatile butoxyethyl ester. This has been formulated on special heat treated attaclay granules that resist rapid decomposition in water. NAVIGATE<sup>®</sup> sinks quickly to lake or pond bottoms and releases the weed killing chemical in the critical root zone area. This product is designed to control the weeds listed on the label. Control of other weeds may not be satisfactory. Generally, weeds are difficult to control in lakes where water replacement comes from bottom springs.

#### WHEN TO APPLY

For best results, spread NAVIGATE<sup>®</sup> Granular Aquatic Herbicide in the spring and early summer, during the time weeds start to grow. If desired, this timing can be checked by sampling the lake bottom in areas heavily infested with weeds the year before.

If treatments are delayed until weeds form a dense mat or reach the surface, two treatments may be necessary. Make the second treatment when weeds show signs of recovery, but no later than mid-August.

Treatments made after mid-August may be less effective depending upon water temperatures and weed growth. Occasionally, a second application will be necessary if heavy regrowth occurs or weeds move in from untreated areas.

#### HOW TO APPLY

**FOR LARGE AREAS:** Use a fertilizer spreader or mechanical seeder such as the Gerber or Gandy. Before spreading any chemical, calibrate your method of application to be sure of spreading the proper amount. When using boats and power equipment, you must determine the proper combination of (1) boat speed, (2) rate of delivery from the spreader, and (3) width of swath covered by the granules.

**FOR SMALL AREAS (Around Docks or Isolated Patches of Weeds):** Use a portable spreader such as the Cyclone seeder. Estimate or measure out the area you want to treat. Weigh out the amount of material needed and spread this uniformly over the area. More uniform coverage is obtained by dividing the required amount in two and covering the area twice, applying the second half at right angles to the first.

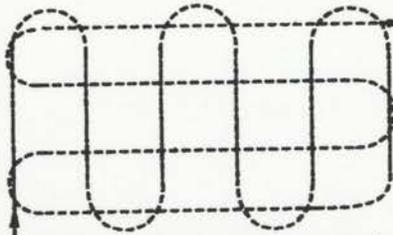
Use the following formula to calibrate your spreader's delivery in pounds of NAVIGATE<sup>®</sup> Granular Aquatic Herbicide per minute.

$$\frac{\text{miles per hour} \times \text{spreader width} \times \text{pounds per acre}}{495} = \text{pounds per minute}$$

**Example:** To apply 100 pounds of NAVIGATE<sup>®</sup> Granular Aquatic Herbicide per acre using a spreader that covers a 20 foot swath from a boat traveling at 4 miles per hour, set the spreader to deliver 16 pounds of NAVIGATE<sup>®</sup> Granular Aquatic Herbicide granules per minute.

$$\frac{4 \text{ mph} \times 20 \text{ feet} \times 100 \text{ lbs./A}}{495} = 16 \text{ lbs./min.}$$

When spreading NAVIGATE<sup>®</sup> Granular Aquatic Herbicide from a boat, we suggest setting out guide posts at frequent intervals marking out the area. This helps to steer a straight course. (See illustration below.)



#### AMOUNTS TO USE

Rates of application vary with the resistance of weed species to the chemical, density of weed mass at the time of treatment, water depth, and rate of water flow through the treated area. Use the higher rate for dense weeds, when water is more than 8 feet deep and where there is a large volume turnover.

	NAVIGATE <sup>®</sup> POUNDS PER ACRE	NAVIGATE <sup>®</sup> POUNDS PER 2000 SQUARE FEET
<b>SUSCEPTIBLE WEEDS</b>		
Water milfoil ( <i>Myriophyllum</i> spp.)	100	5
Water stargrass ( <i>Heteranthera dubia</i> )		
<b>SLIGHTLY TO MODERATELY RESISTANT WEEDS</b>		
Bladderwort ( <i>Utricularia</i> spp.)	150 to 200	7 1/2 to 10
White water lily ( <i>Nymphaea</i> spp.)		
Yellow water lily ( <i>Nuphar</i> spp.)		
or spatterdock*		
Water shield ( <i>Brasenia</i> spp.)		
Water chestnut ( <i>Trapa natans</i> )		
( <i>Ceratophyllum demersum</i> )		

**(SEE ADDITIONAL  
PRECAUTIONS &  
DIRECTIONS ON BACK)**

**CAUTION**  
**HAZARD TO HUMANS AND DOMESTIC ANIMALS**

Avoid contact with skin, eyes or clothing. When mixing, loading or applying this product or repairing or cleaning equipment used with this product, wear eye protection (face shield or safety glasses), chemical-resistant gloves, long-sleeved shirt, long pants, socks and shoes. It is recommended that safety glasses include front, brow and temple protection. Wash hands, face and arms with soap and water as soon as possible after mixing, loading, or applying this product. Wash hands, face and arms with soap and water before eating, smoking or drinking. Wash hands and arms before using toilet. After work, remove all clothing and shower using soap and water. Do not reuse clothing worn during the previous day's mixing and loading or application of this product without cleaning first. Clothing must be kept and washed separately from other household laundry. Remove saturated clothing as soon as possible and shower.

**ENVIRONMENTAL HAZARDS**

This product is toxic to fish. Drift or runoff may adversely affect fish and non-target plants. Do not apply to water except as specified on this label. Do not contaminate water when disposing of equipment washwaters. Do not apply to waters used for irrigation, agricultural sprays, watering dairy animals or domestic water supplies. Clean spreader equipment thoroughly before using it for any other purpose unless thoroughly cleaned. Vapors from this product may injure susceptible plants in the immediate vicinity. Avoid drift of dust to susceptible plants.

**MIXING AND LOADING:** Most cases of groundwater contamination involving phenoxy herbicides such as 2,4-D have been associated with mixing/loading and disposal sites. Caution should be exercised when handling 2,4-D pesticides at such sites to prevent contamination of groundwater supplies. Use of closed systems for mixing or transferring this pesticide will reduce the probability of spills. Placement of the mixing/loading equipment on an impervious pad to contain spills will help prevent groundwater contamination.

**DIRECTIONS FOR USE**

IT IS A VIOLATION OF FEDERAL LAW TO USE THIS PRODUCT IN A MANNER INCONSISTENT WITH ITS LABELING. Read entire label before using this product.

**STORAGE AND DISPOSAL**

**STORAGE**

Do not contaminate water, food or feed by storage or disposal. Store in original container in a dry, secured storage area.

**PESTICIDE DISPOSAL**

Pesticide wastes are toxic. Improper disposal of excess pesticide is a violation of Federal Law and may contaminate groundwater. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance.

**CONTAINER DISPOSAL**

Do not reuse empty bag. Completely empty bag into application equipment. Then dispose of empty bag in a sanitary landfill or by incineration, or, if allowed by State and local authorities, by burning. If bag is burned, stay out of smoke.

**GENERAL PRECAUTIONS AND RESTRICTIONS**

Do not use in or near a greenhouse.

**OXYGEN RATIO**

Fish breathe oxygen in the water and a water-oxygen ratio must be maintained. Decaying weeds use up oxygen, but during the period when NAVIGATE™ Granular Aquatic Herbicide should be used, the weed mass is fairly sparse and the weed decomposition rate is slow enough so that the water-oxygen ratio is not disturbed by treating the entire area at one time.

If treatments must be applied later in the season when the weed mass is dense and repeat treatments are needed, spread granules in lanes, leaving buffer strips which can then be treated when vegetation in treated lanes has disintegrated. During the growing season, weeds decompose in a 2 to 3 week period following treatment.

Buffer lanes should be 50 to 100 feet wide. Treated lanes should be as wide as the buffer strips. (See illustration below.)



**WATER pH**

Lake water that is extremely acid or alkaline may influence the effectiveness of NAVIGATE™ Granular Aquatic Herbicide. A pH on the acid side (pH 6.0 or below) generally favors the action of the chemical while a pH on the alkaline side (pH 8.0 or above) may reduce the action. If regrowth occurs within a period of 6 to 8 weeks, a second application may be needed.

**PERMIT TO USE CHEMICALS IN WATER**

In many states, permits are required to control weeds by chemical means in public water. If permits are required, they may be obtained from the Chief Fish Division, State Department of Conservation, or the State Department of Public Health.

**LIMITED WARRANTY AND DISCLAIMER**

The manufacturer warrants (a) that this product conforms to the chemical description on the label, (b) that this product is reasonably fit for the purposes set forth in the directions for use when it is used in accordance with such directions; and (c) that the directions, warning and other statements on this label are based upon responsible experts' evaluation of reasonable tests of effectiveness, of toxicity to laboratory animals and to plants, and of residues on food crops and upon reports of field experience. Tests have not been made on all varieties or in all states or under all conditions. THE MANUFACTURER NEITHER MAKES NOR INTENDS, NOR DOES IT AUTHORIZE ANY AGENT OR REPRESENTATIVE TO MAKE ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED, AND IT EXPRESSLY EXCLUDES AND DISCLAIMS ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

THIS WARRANTY DOES NOT EXTEND TO, AND THE BUYER SHALL BE SOLELY RESPONSIBLE FOR, ANY AND ALL LOSS OR DAMAGE WHICH RESULTS FROM THE USE OF THIS PRODUCT IN ANY MANNER WHICH IS INCONSISTENT WITH THE LABEL DIRECTIONS, WARNINGS OR CAUTIONS.

BUYER'S EXCLUSIVE REMEDY AND MANUFACTURER'S OR SELLER'S EXCLUSIVE LIABILITY FOR ANY AND ALL CLAIMS, LOSSES, DAMAGES, OR INJURIES RESULTING FROM THE USE OR HANDLING OF THIS PRODUCT, WHETHER OR NOT BASED IN CONTRACT, NEGLIGENCE, STRICT LIABILITY IN TORT OR OTHERWISE SHALL BE LIMITED, AT THE MANUFACTURER'S OPTION, TO REPLACEMENT OF OR THE REPAYMENT OF THE PURCHASE PRICE FOR, THE QUANTITY OF PRODUCT WITH RESPECT TO WHICH DAMAGES ARE CLAIMED. IN NO EVENT SHALL MANUFACTURER OR SELLER BE LIABLE FOR SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES RESULTING FROM THE USE OR HANDLING OF THIS PRODUCT.

**NOTICE TO BUYER**

Purchase of this material does not confer any rights under patents governing this product or the use thereof in countries outside of the United States.

**NET CONTENTS:  
25 LBS.**



NAVIGATE is the trademark of Applied Biochemist

MADE IN U.S.A.  
RP-5301-095-0AB-11

# Material Safety Data Sheet

## EMERGENCY

FOR CHEMICAL EMERGENCY: SPILL, LEAK, FIRE, EXPOSURE OR ACCIDENT CALL  
CHEMTREC - DAY or NIGHT - (800) 424-9300

Product Name:

### AB NAVIGATE

#### SECTION I - GENERAL INFORMATION

Manufacturer's Name:

APPLIED BIOCHEMISTS  
division of:  
LAPORTE WATER TECHNOLOGIES & BIOCHEM, INC.  
6120 West Douglas Ave.  
Milwaukee, WI 53218  
(414) 464-1200

Trade Name &amp; Synonyms:

AB NAVIGATE

Chemical Name &amp; Synonyms:

2,4-DICHLOROPHENOXYACETIC ACID, BUTOXYETHYL ESTER

Generic Description:

AQUATIC HERBICIDE

Formula:

PROPRIETARY

D.O.T. Proper Shipping Name:

U.N. or N.A. Identification #:

D.O.T. Hazard Class:

D.O.T. Emergency Response Guide:

Hazardous Mat's ID System Values (H&MS):	Health -1	Flammability -1	Reactivity -0	Personal Protection -F
Nat'l Fire Protection Assn. (NFPA 704):	Health -	Flammability -	Reactivity -	Specific Hazard:

#### SECTION II - HAZARDOUS INGREDIENTS

Hazardous Component(s)	CAS#	PEL	TLV
2,4-Dichlorophenoxyacetate Acid, Butoxyethyl Ester	1929-73-3	10 mg/m <sup>3</sup>	10 mg/m <sup>3</sup>
Crystalline Silica	14808-80-7	0.1 mg/m <sup>3</sup>	0.1 mg/m <sup>3</sup>

Ingredients listed in this section have been determined to be hazardous as defined in 29 CFR 1910.1200. Materials determined to be health hazards are listed if they comprise 1% or more of the composition. Materials identified as carcinogens are listed if they comprise 0.1% or more of the composition. Information on proprietary materials is available as provided in 29 CFR 1910.1200 (f) (1).

#### SECTION III - PHYSICAL DATA

Boiling Point (F):	N/A	Specific Gravity (water = 1):	N/A
Vapor Pressure (mm Hg):	NOT KNOWN	% Volatile (by Volume):	NOT DETERMINED
Vapor Density (air = 1):	NOT KNOWN	Evaporation Rate: (Ether = 1)	< 1
Melting Point (F):			
Solubility in Water:	INSOLUBLE TO SLIGHTLY SOLUBLE.		
Appearance & Odor:	GRAY/TAN GRANULES WITH MILD PHENOLIC ODOR.		

#### SECTION IV - FIRE & EXPLOSION DATA

Flash Point (F):	NOT FLAMMABLE	Method:
Extinguishing Media:	CO <sub>2</sub> , WATER, DRY CHEMICAL OR FOAM TO FIGHT FIRES IN WHICH THIS PRODUCT IS INVOLVED.	
Special Fire Fighting Procedures:	WEAR APPROVED SELF-CONTAINED BREATHING APPARATUS. DIKE TO PREVENT CONTAMINATION OF WATER SOURCES.	
Unusual Fire & Explosion Hazards:	THERMAL DECOMPOSITION PRODUCTS INCLUDE OXIDES OF CARBON, SULFUR DIOXIDES AND HYDROCHLORIC ACID.	

#### SECTION V - REACTIVITY DATA

Stability -	Unstable	<u>X</u> Stable
Conditions to Avoid:	NONE KNOWN	
Incompatibility (Materials to Avoid):	ACIDS, BASES, OXIDIZERS.	
Hazardous Decomposition Products:	THERMAL DECOMPOSITION PRODUCTS INCLUDE OXIDES OF CARBON, SULFUR DIOXIDES AND HYDROCHLORIC ACID.	
Hazardous Polymerization:	Will Occur	<u>X</u> Will Not Occur
Conditions to Avoid:	NONE	

**AB NAVIGATE****SECTION VI - HEALTH HAZARD DATA****Acute Health Hazards:****Chronic Health Hazards:****Signs & Symptoms of Exposure:**

EYE CONTACT MAY CAUSE TEARING AND REDNESS. MAY CAUSE SLIGHT SKIN IRRITATION. INHALATION OF DUST MAY CAUSE IRRITATION TO RESPIRATORY TRACT. INGESTION MAY CAUSE NAUSEA, VOMITING, ABDOMINAL PAIN, MUSCLE WEAKNESS MYOTONIA, AND A FALL IN BLOOD PRESSURE.

**Medical Conditions Generally Aggravated by Exposure:**

**Chemical Listed as Carcinogen or Potential Carcinogen by:**

National Toxicology Program:

Yes:

No:

✓

I.A.R.C. Monographs:

Yes:

No:

✓

O.S.H.A.

Yes:

No:

✓

**Emergency & First Aid Procedures:**

FOR PRINCIPLE ROUTE OF ENTRY, SEE APPROPRIATE EMERGENCY PROCEDURES BELOW.  
NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON.

**Route of Entry:** Inhalation:  
Eyes:

REMOVE TO FRESH AIR, CONTACT A PHYSICIAN IF NECESSARY.  
FLUSH WITH FRESH WATER FOR AT LEAST 15 MINUTES.  
CALL A PHYSICIAN.

## Skin:

WASH SKIN WITH PLENTY OF SOAP AND WATER.  
WASH CLOTHES THOROUGHLY BEFORE REUSE.

## Ingestion:

DRINK 2-3 GLASSES OF MILK OR WATER, INDUCE VOMITING.  
CALL A PHYSICIAN.

**SECTION VII - SPILL OR LEAK PROCEDURES****Steps to be Taken in Case Material is Released or Spilled:**

SWEEP UP AND PLACE IN APPROVED CONTAINERS.  
DO NOT FLUSH AREA WITH WATER AS IT CAN CAUSE CONTAMINATION OF SEWER SYSTEM.

**Waste Disposal Methods:**

DISPOSE OF IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL REGULATIONS. 100 LBS. RESULTS IN A REPORTABLE QUANTITY AS SPECIFIED BY D.O.T.

**SECTION VIII - SPECIAL PROTECTION AND CONTROL MEASURES****Respiratory Protection (Specify Type):**

NOT REQUIRED

Ventilation - Local Exhaust:

MECHANICAL

Special Exhaust: STAND DOWN WIND  
WHEN USING.

Mechanical Exhaust:

Other Exhaust:

Protective Equipment - Gloves:

PLASTIC OR CHEMICAL RESISTANT  
SAFETY GLASSES OR CHEMICAL GOGGLES

Eye Protection:

PROTECTIVE CLOTHING

Other Protective Equipment:

Work or Hygienic Practices:

USE SAFE CHEMICAL HANDLING PROCEDURES SUITABLE  
FOR THE HAZARDS PRESENTED BY THIS MATERIAL.

**SECTION IX - SPECIAL PRECAUTIONS****Precautions to be Taken in Handling and Storage:**

DO NOT SWALLOW, BREATHE DUST, STORE NEAR FOOD, CONTAMINATE WATER FOOD OR FEED, APPLY TO WATERS USED FOR IRRIGATION, AGRICULTURAL SPRAYS, WATERING DAIRY ANIMALS OR DOMESTIC WATER SUPPLIES.

**Other Precautions:**

AVOID DRIFT TO SUSCEPTIBLE PLANTS. AVOID GETTING INTO EYES, ON SKIN OR CLOTHING. KEEP OUT OF REACH OF CHILDREN

THESE DATA ARE OFFERED IN GOOD FAITH AS TYPICAL VALUES AND NOT AS A PRODUCT SPECIFICATION. NO WARRANTY, EITHER EXPRESSED OR IMPLIED, IS HEREBY MADE. THE RECOMMENDED INDUSTRIAL HYGIENE AND SAFE HANDLING PROCEDURES ARE BELIEVED TO BE GENERALLY APPLICABLE. HOWEVER, EACH USER SHOULD REVIEW THESE RECOMMENDATIONS IN THE SPECIFIC CONTEXT OF THE INTENDED USE AND DETERMINE WHETHER THEY ARE APPROPRIATE.

Date of Last Revision:

2/2/98

MONSANTO PRODUCT NAME

**RODEO®  
Herbicide**

MONSANTO COMPANY

800 N. LINDBERGH

ST. LOUIS, MO 63167

EMERGENCY PH. NO. (CALL COLLECT) (314) 694-4000

Date Prepared: March, 1993

## PRODUCT IDENTIFICATION

EPA Registration Number: 524-343

Synonyms: None

Chemical Name: Not Applicable, Formulated Product

Active Ingredient: Glyphosate, N-phosphonomethylglycine, in the form of its isopropylamine salt ..... 53.5%

Inert Ingredients: ..... 46.5%

100.0%

\*Contains 648 grams per liter or 5.4 pounds per U.S. gallon of the active ingredient, glyphosate in the form of its isopropylamine salt. Equivalent to 480 grams per liter or 4 pounds per U.S. gallon of the acid, glyphosate.

CAS Reg. No.: Not Applicable, Formulated Product

CAS Reg. No. Active Ingredient: 1071-83-6

DOT Proper Shipping Name: Not Applicable

DOT Hazard Class/I.D. No.: Not Applicable

DOT Label: Not Applicable

Reportable Quantity (RQ) Under Clean Water Act: Not Applicable

U.S. Surface Freight Classification: Weed killing compound, N.O.I.B.N.

## SARA Hazard Notification

Hazardous Categories Under Criteria of SARA Title III Rules (40 CFR Part 370): Not applicable

Section 313 Toxic Chemical(s): Not Applicable

Hazardous Chemical(s) Under OSHA Hazard Communication Standard: Not Applicable

---

## WARNING STATEMENTS

Keep out of reach of children.  
**CAUTION!**  
**MAY BE HARMFUL IF INHALED**

---

## PRECAUTIONARY MEASURES

- Remove contaminated clothing and wash clothing before reuse.
- Wash thoroughly with soap and water after handling.
- Do not contaminate water when disposing of equipment wash waters.
- Treatment of aquatic weeds can result in oxygen depletion or loss due to decomposition of dead plants. This oxygen loss can cause fish suffocation.

## EMERGENCY AND FIRST AID PROCEDURES

### First Aid:

If Inhaled: Remove individual to fresh air. Seek medical attention if breathing difficulty develops.

---

## OCCUPATIONAL CONTROL PROCEDURES

- Eye Protection:** RODEO® herbicide does not present significant eye irritation or eye toxicity requiring special protection. Avoid eye contact as good industrial practice.
- Skin Protection:** RODEO® herbicide does not present significant skin concern requiring special protection.
- Respiratory Protection:** For Handling of the Undiluted Product: Undiluted RODEO® herbicide is not likely to represent an airborne exposure concern during normal handling. In the event of an accidental discharge of the material during manufacture or handling which produces a heavy vapor or mist, workers should put on respiratory protection equipment. Consult respirator manufacturer to determine appropriate type of equipment. Observe respirator use limitations specified by NIOSH/MSHA or the manufacturer.
- For Application of Product Diluted in accordance with label instructions: Respirators are not required for applications of use - dilutions of RODEO® herbicide.
- Ventilation:** No special precautions are recommended.
- Airborne Exposure Limits:**
- |                 |   |                                      |
|-----------------|---|--------------------------------------|
| <b>Product:</b> | <b>RODEO® herbicide - 100% by weight:</b> |                                      |
|                 | OSHA PEL/TWA: None established            | ACGIH TLV/TWA/STEL: None established |

---

## FIRE PROTECTION INFORMATION

- Flash Point:** This material is not combustible as tested by the Tag Cup Test.
- Extinguishing Media:** Use appropriate extinguishing media for exposure fire.
- Special Firefighting Procedures:** Firefighters or others who may be exposed to mists or products of combustion should wear a self-contained breathing apparatus and full protective clothing. Equipment should be thoroughly cleaned after use.
- Unusual Fire and Explosion Hazards:** None

---

## REACTIVITY DATA

- Stability:** Stable for at least 5 years under normal conditions of warehouse storage. Heated facilities are not required.
- Incompatibility:** Spray solutions of this product should be mixed, stored and applied using only stainless steel, aluminum, fiberglass, plastic and plastic-lined steel containers.
- DO NOT MIX, STORE OR APPLY THIS PRODUCT OR SPRAY SOLUTIONS OF THIS PRODUCT IN GALVANIZED OR UNLINED STEEL (EXCEPT STAINLESS STEEL) CONTAINERS OR SPRAY TANKS. This product or solutions of this product react with such containers and tanks to produce hydrogen gas which may form a highly combustible gas mixture. This gas mixture could flash or explode, causing serious personal injury, if ignited by open flame, spark, welder's torch, lighted cigarette or other ignition source.
- Hazardous Decomposition Products:** None known.
- Hazardous Polymerization:** Does not occur. This product can react with caustic (basic) materials to liberate heat. This is not a polymerization but rather a chemical neutralization in an acid-base reaction.

## HEALTH EFFECTS SUMMARY

The following information summarizes human experience and results of scientific investigations reviewed by health professionals for hazard evaluation of RODEO® herbicide and development of Precautionary Statements and Occupational Control Procedures recommended in this document.

## EFFECTS OF EXPOSURE

Inhalation and skin contact are expected to be the primary routes of occupational exposure to RODEO® herbicide. Occupational exposure to this material has not been reported to cause significant adverse health effects. On the basis of available information, exposure to RODEO® herbicide is not expected to produce significant adverse human effects when recommended safety precautions are followed.

## TOXICOLOGICAL DATA

Data from laboratory studies conducted by Monsanto with RODEO® herbicide are summarized below.

Oral -	Practically Non-toxic, (Rat LD <sub>50</sub> - >5,000 mg/kg)
Dermal -	Practically Non-toxic, (Rabbit LD <sub>50</sub> - >5000 mg/kg)
Inhalation -	No more than Slightly Toxic (Rat 4-hr LC <sub>50</sub> - >1.3 mg/L, the highest atmospheric concentration achievable in this study.)
Eye Irritation -	Non irritating (Rabbit, 0.0/110.0)
Skin Irritation -	Practically Nonirritating (Rabbit, 24-hr exposure, 0.1/8.0)

In repeat dosing studies (6-months), dogs fed RODEO® herbicide exhibited slight body weight changes. Following repeated skin exposure (3-weeks) to RODEO® herbicide, skin irritation was the only effect in rabbits. No skin allergy was observed in guinea pigs following repeated skin exposure. Additional toxicity information is available on glyphosate, the active herbicidal ingredient of RODEO® herbicide. Following repeated exposures (90-days) to glyphosate in their feed, decreased weight gains were noted at the highest test level in mice, while no treatment-related effects occurred in rats. Following repeated skin exposure (3 weeks) to glyphosate, slight skin irritation was the primary effect observed in rabbits. No skin allergy was observed in guinea pigs following repeated skin exposure. There was no evidence of effects on the nervous system, including delayed effects in chickens (repeat oral doses) or cholinesterase inhibition in rats (single oral doses). Reduced body weight gain and effects on liver tissues were observed with long-term (2-year) feeding of glyphosate to mice at high-dose levels. Reduced body weight gain and eye changes were observed at the high-dose level in one long-term (2 year) feeding study with rats, while no treatment-related effects occurred in a second study. No adverse effects were observed in feeding studies with dogs. Glyphosate did not produce tumors in any of these studies. **Based on the results from the chronic studies, EPA has classified glyphosate in category E (evidence of non-carcinogenicity for humans).** No birth defects were noted in rats and rabbits given glyphosate orally during pregnancy, even at amounts which produced adverse effects on the mothers. Glyphosate was fed continuously to rats at very high dose levels for 2 successive generations. Toxicity was reported in offspring from the high dose, a level which also produced adverse effects on the mothers. In a 3 generation study conducted at lower dose levels, no effects were seen on the ability of male or female rats to reproduce. Glyphosate has produced no genetic changes in a variety of standard tests using animals and animal or bacterial cells.

---

## PHYSICAL DATA

Appearance:	Colorless solution
Odor:	Essentially odorless
pH:	4.6 - 4.8
Specific Gravity:	1.22 - 1.25 (water = 1)

**NOTE:** These physical data are typical values based on material tested but may vary from sample to sample. Typical values should not be construed as a guaranteed analysis of any specific lot or as specification items.

**SPILL, LEAK & DISPOSAL INFORMATION****SPILL/LEAK:**

Observe all protection and safety precautions when cleaning up spills – see Occupational Control Procedures.

Liquid spills on floor or other impervious surfaces should be contained or diked, and should be absorbed with attapulgite, bentonite or other absorbent clays. Collect contaminated absorbent, place in plastic-lined metal drum and dispose of in accordance with instructions provided under DISPOSAL. Thoroughly scrub floor or other impervious surfaces with a strong industrial type detergent solution and rinse with water.

Liquid spills that soak into the ground should be dug up, placed in plastic-lined metal drums and disposed of in accordance with instructions provided under DISPOSAL.

Leaking containers should be separated from non-leakers and either the container or its contents transferred to a drum or other non-leaking container and disposed of in accordance with instructions provided under DISPOSAL. Any recovered spilled liquid should be similarly collected and disposed of.

Do not contaminate water, foodstuffs, seed or feed by storage or disposal.

**DISPOSAL:**

Wastes resulting from the use of this product that cannot be used or chemically reprocessed should be disposed of in a landfill approved for pesticide disposal or in accordance with applicable Federal, State and local procedures.

Emptied container retains vapor and product residue. Observe all labeled safeguards until container is cleaned, reconditioned or destroyed.

Do not reuse container. Return emptied container per the Monsanto container return program. If not returned, triple rinse container, then puncture and dispose of in a sanitary landfill or by incineration or, if allowed by State and local authorities, by burning. If burned, stay out of smoke.

**STORAGE:**

STORE ABOVE 10°F (-12°C) TO KEEP FROM CRYSTALLIZING.

Crystals will settle to the bottom. If allowed to crystallize, place in a warm room at 68°F (20°C) for several days to redissolve and mix well before using.

---

**ENVIRONMENTAL EFFECTS****ENVIRONMENTAL TOXICITY INFORMATION:**

96-hr LC <sub>50</sub> Bluegill:	> 1,000 mg/L, Practically Nontoxic
96-hr LC <sub>50</sub> Trout:	> 1,000 mg/L, Practically Nontoxic
96-hr TL <sub>50</sub> Carp:	> 10,000 ppm, Practically Nontoxic
48-hr EC <sub>50</sub> <i>Daphnia</i> :	930 mg/L, Practically Nontoxic
Oral LD <sub>50</sub> Goat:	5,700 mg/Kg, Practically Nontoxic

Brahman-cross heifers were given RODEO® herbicide, by gavage, at daily dosages of 0, 540, 830, 1290 and 2000 mg/Kg for 7 consecutive days. Clinical signs of toxicity, including loss of appetite, diarrhea and death (1290 and 2000 mg/Kg) were observed at 830 mg/Kg or above. The no-effect level was considered to be 540 mg/Kg/day.

For environmental toxicity information of Glyphosate, the active herbicidal ingredient of RODEO® herbicide, refer to the Glyphosate Material Safety Data Sheet.

DATE: March, 1993

SUPERSEDES: February, 1992

MSDS NO.: S00010153

---

**FOR ADDITIONAL NON-EMERGENCY INFORMATION, CALL: 1-800-332-3111**

---

Although the information and recommendations set forth herein (hereinafter "Information") are presented in good faith and believed to be correct as of the date hereof, Monsanto Company makes no representations as to the completeness or accuracy thereof. Information is supplied upon the condition that the persons receiving same will make their own determination as to its suitability for their purposes prior to use. In no event will Monsanto Company be responsible for damages of any nature whatsoever resulting from the use of or reliance upon Information. NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR OF ANY OTHER NATURE ARE MADE HEREUNDER WITH RESPECT TO INFORMATION OR THE PRODUCT TO WHICH INFORMATION REFERS.

Rodeo® is a registered trademark of Monsanto Company

MSDSr.11  
MAC-4036Printed on recycled paper (10% postconsumer waste) 