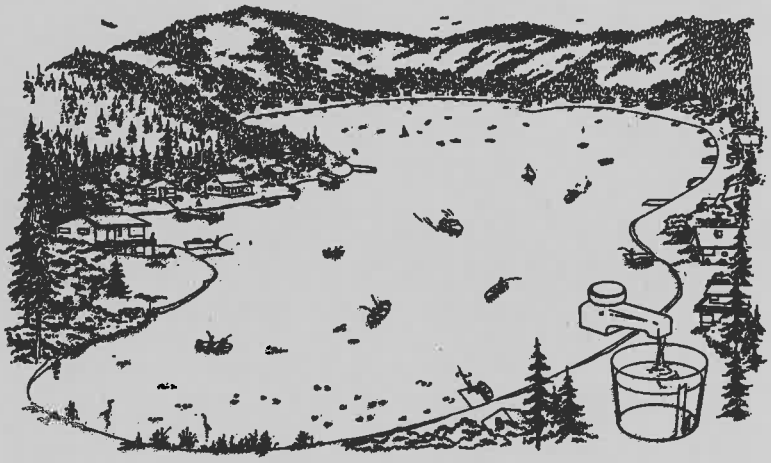
Thurston County Environmental Health
2000 Lakeridge Dr. S.W.
Olympia, WA 98502

FINAL

SUMMIT LAKE
WATER QUALITY PROTECTION PLAN



August 1991

Prepared by Members of the Summit Lake Management District Advisory Board

Staffing of the Summit Lake Management District Advisory Board was provided by the Thurston County Environmental Health Division

The preparation of this document was funded by a grant from the Centennial Clean Water Fund administered by the Washington Department of Ecology and by the property owners at Summit Lake through the Summit Lake - Lake Management District.

THURSTON COUNTY
Since 1852

WASHINGTON STATE
DEPARTMENT OF
ECOLOGY

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DOE Grant Tax No. 90028

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Prepared by the Summit Lake Management District Advisory Board:

NAME	REPRESENTING
Bob Christensen, Chair	Lake-side full-time resident
Ruth Barber	Lake-side seasonal resident
Eva Cole	Lake-side recreational property owner
Jack Cullen	Upland resident
John Freeman	Washington Dept. of Wildlife
Robert Griesel	Upland resident
Robert Leahy	Lake-side seasonal resident
Gerald Lester	Simpson Timber Company
James Phillips	Boy Scouts of America
Tom Poch	Washington Dept. of Natural Resources
Jeff Sharp	Upland property owner
Del Sutterfield	Lake-side full-time resident
Earl Swanson	Lake-side full-time resident
Lora Walker	Lake-side full-time resident

Primary staff support was provided by Sue Davis, Environmental Health Division. Other contributing staff were Tom Clingman and Doug Cooke, Public Works Department.

Many thanks to the Advisory Board members for the many hours they dedicated to the completion of this plan, to speakers who took the time to provide valuable information, and to the many Summit Lake property owners who attended the meetings, provided input to the planning process and supported the effort.

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I. INTRODUCTION

The Summit Lake Management District Advisory Board, appointed by the Board of County Commissioners, was charged with developing a Summit Lake water quality protection plan which outlines a strategy for controlling nonpoint pollution within the watershed. The development of the plan was part of a larger lake protection/clean-up effort undertaken by the County and community at the urging of the property owners to protect their drinking water source. The Advisory Board decided very early in the process that the goal of the plan ought to be to prevent degradation of the lake water quality and improve it as much as possible toward drinking water standards, based on the assumption that the lake is the only feasible drinking water source for the community now and probably in the future. Over a year after the Advisory Board established this goal, a report entitled "Water System Feasibility Study for Summit Lake in Thurston County Washington" prepared by Gray and Osborne, Inc., Consulting Engineers, presented information which supports their assumption that the lake is the only reliable source of domestic water. The Advisory Board considered the ramifications of the study, specifically the costs associated with establishment of a community drinking water supply. They recognize that cost-effective steps to maintain or improve the lake water quality can only help - perhaps substantially - the property owners to obtain potable water.

The Advisory Board spent seventeen months examining types of human activities which are contributing or have the potential to contribute pollutants, listening to experts on various topics related to pollution control and water quality, reading regulations, case studies, and research literature, and discussing, sometimes heatedly, the problems, needs, and implications of taking various actions. The recommendations that follow apply to many different types of activities within the watershed, and will affect every property owner within the watershed in some way. The types of recommendations range from raising public awareness through education programs to changing regulations to increasing taxes to fund the effort.

Through the whole process, it became apparent that the single largest threat to water quality and public health was probably from sewage disposal practices. Board members acknowledged that the ideal solution would be to have a community sewage system which pumped the sewage out of the lake basin. If a community sewer system with treatment plant was proposed, a major requirement would be to locate a discharge or disposal site for the resulting effluent. A Washington State Department of Ecology report entitled, "Discharge Zone Classification System for Southern Puget Sound" lists Totten Inlet as eliminated for consideration by a discharge ban and shows Eld Inlet as an unlikely area based on the inability to meet dilution requirements and the impacts to existing beneficial uses and the existing water quality classification. Any land application system would require a large area of land to dispose of the estimated 732,000 gallons of sewage per day.

This is the design volume NOT the actual amount generated

The possibility of connection to the Lacey, Olympia, Tumwater, and Thurston County (LOTT) sewage treatment plant was considered. The "Thurston County Sewerage General Plan" adopted on April 17, 1990 by the Board of Thurston County Commissioners shows that sewers are **not** planned for the Summit Lake area through the year 2013, but exceptions are allowed to correct identified health hazards or water quality problems. For those exceptions, the sewerage plan states that the property owners would be responsible for bearing the full cost of their sewer service. A rough cost estimate for a sewage collection system around Summit Lake and a sewer trunk line to the nearest LOTT sewer line, assuming 455 connections, is $ 9.5 million. This translates to approximately $21,000 per connection (or approximately $168 per month if amortized over 20 years at eight percent interest) plus the added monthly charge to operate the LOTT system. (See Appendix A for details of cost estimate.)

It is the opinion of the Advisory Board that discharge/disposal site limitations and economic impacts to property owners of a connection to LOTT or other sewage system make a large sewerage project unfeasible at this time. Therefore, the Advisory Board has recommended an on-site sewage disposal management strategy, in Section IV.B. of this plan, with a clear statement that *this plan should not preclude any opportunities which may arise in the future for inclusion in any septic or sewer systems that may be considered by Thurston County or any relevant governmental agencies.* The Board also recognizes that *these recommendations will not be the final answer to all concerns or future concerns in the Summit Lake watershed, and that this plan will need to be re-evaluated and changed over time to reflect successes, failures, changing conditions, and new opportunities and information.* The other sections of this plan include recommendations which are relevant regardless of the sewage disposal issue because they pertain to impacts from human presence in the watershed and from uses of the land and lake.

II. PROJECT HISTORY

Protecting water quality is not a new issue at Summit Lake. It has been a concern of the property owners and the County Health Department for many years.

In 1975, County Health staff and Summit Lake Community Club members began monthly water sampling which continued through 1978. Discussions of a sewer system and possible grant funding followed the completion of the sampling, but funding for sewer systems at that time was available only to solve water quality problems, not prevent them. In Fall 1982, the Summit Lake Community Club began a monthly water quality sampling program, and requested that the County Health Department conduct septic system inspections around the lake. In response to the request, the County contracted with a consulting firm to do a leachate survey along the shoreline during the summer of 1984. County Health Department staff collected bacteria samples at the same time. In April 1985 septic system surveys were conducted by Health Department staff in specific problem areas identified by the survey.

In October 1986, the County Health Department began a ten-month investigation of both tap water quality and near shore water quality. The immediate result was the issuance of a Health Advisory in February 1987 advising residents against consumption of untreated lake water. The results of the study are reported in a document called "Summit Lake: Water Quality Investigation; Evaluation of its Use as Drinking Water". The study findings and recommendations were presented at public meetings in June and August 1988.

Through comments and questionnaires, it became evident that the community was willing to support and help pay for efforts to identify and control sources of contaminants to the lake. They also indicated that property owners needed information on alternatives to using untreated lake water as their domestic water supply. County staff and a citizen committee began meeting to devise a strategy on how to carry out the needed activities. A grant application was made to the Washington Department of Ecology in September 1988 for funding of pollution control efforts. Local money was needed to provide twenty-five percent of the cost of the proposed effort, lake residents determined that a lake management district would be a reasonable way to generate the match money needed.

In March 1989, a petition was submitted to the Board of County Commissioners requesting the formation of a three-year lake management district with the boundaries being the Summit Lake watershed. A public hearing was held on May 30, 1989, and Ordinance #9259 was signed by the County Commissioners in July 1989 creating the Summit Lake-lake management district (LMD). In October 1989, a grant contract was signed between the Washington Department of Ecology and Thurston County, thereby completing the funding package needed to go forward with pollution control efforts within the watershed.

The grant/LMD funded project has three tasks: 1) nonpoint source pollution survey; 2) public involvement/education and; 3) source control alternatives. Tasks 1 and 2 were done primarily by County staff. Task 3, the purpose of which was to develop a practical plan for controlling sources of pollution into the lake, was to be done by a committee of Summit Lake property owners.

Volunteers to serve on the committee were solicited through a mailout to all property owners in the watershed in November 1989. From the responses, the Board of County Commissioners selected and appointed fifteen volunteers to serve on the Summit Lake LMD Advisory Board. The membership is composed of property owners within the watershed and represent a diversity of views and interests. The Advisory Board began meeting in January 1990 and spent nearly a year educating themselves on the problems facing Summit Lake. The over-riding goal of the Summit Lake Management District is protection and enhancement of Summit Lake water quality with reference to its use as drinking water. This document reflects the efforts and findings of the Advisory Board and presents their recommendations for accomplishing the goal of protecting Summit Lake water quality.

In addition to the water quality efforts undertaken around the lake, a watershed action plan was prepared for the larger Totten-Little Skookum Inlet, of which Summit Lake is a part. The plan, completed in October 1989, was prepared by a citizen committee, including a representative of the Summit Lake community.

III. WATERSHED DESCRIPTION

A. Physical Characteristics

Summit Lake is a 528 acre lake in the northwestern corner of Thurston County. It has a mean depth of 53 feet and a maximum depth of 100 feet. Water enters the lake via numerous springs, seeps, seasonal streams, and streams which flow only in response to rainfall. The outlet of the lake is Kennedy Creek, which flows to the north and discharges into Totten Inlet. The outlet is regulated by flashboards.

The drainage area of the lake is 2.8 square miles, and the terrain is steep and rugged with slopes up to 80 percent. The lake elevation is approximately 500 feet, and the surrounding ridges are as high as 1200 feet. The lake basin was formed by volcanic activity during the geological period called the Tertiary Period from 55 million to one million years ago. During the Quaternary Period, the Salmon Springs glacier moved into the Summit Lake area. When the glacier retreated, an ice dam formed at the west end of what is now the lake. As the trapped ice block slowly melted it formed Summit Lake. The meltwater from the retreating glacier deposited sand and gravel in much of the area to the west of the lake through which Kennedy Creek now flows. Kennedy Creek is a major tributary to Totten Inlet, and the Summit Lake basin is a sub-basin of the larger Totten-Little Skookum Inlet watershed. Totten Inlet is a major shellfish growing area in Southern Puget Sound.

The basalt bedrock formation in the Summit Lake area produces very little groundwater. Wells drilled in this formation produce between 0 to 10 gallons per minute. The recessional gravel to the west form a more productive aquifer that can produce from 10 to 50 gallons per minute. Because groundwater is generally not available in quantities sufficient to fulfill household requirements throughout much of the basin, approximately 75 percent of the residences (approximately 335) have lake water as the domestic water source. A survey done in early 1990 found that only 11 percent of the residents known to be drinking lake water disinfect it.

B. Activities Within The Watershed

The land use information summarized in the table on the following page was collected during a 1990 survey of the developed properties within the watershed. The map on page 7 shows the lake, its watershed, and the pattern of development within the watershed.

LAND USES WITHIN THE WATERSHED

SITE CLASSIFICATION	WATERFRONT LOTS	UPLAND LOTS	TOTAL
Garage	0	5	5
Full-time Home	149	30	179
Seasonal Home	195	20	215
Vacant Dwelling	14	12	26
Multi-family	1	0	1
Recreational	23	6	29
* Undeveloped Properties	32	est. 170	--
TOTAL DEVELOPED	382	73	455

* This row is not included in the column totals.

Three of the waterfront recreational lots counted were community parks for Summit Lake lot owners. The only public access to the lake is provided by the Washington Department of Wildlife property on the southwestern shore. The lake is used intensively during the summer months for fishing and other water recreational activities. The Boy Scouts of America owns and operates a 150 acre scout camp at the west end of the lake, which is used primarily in the summer months.

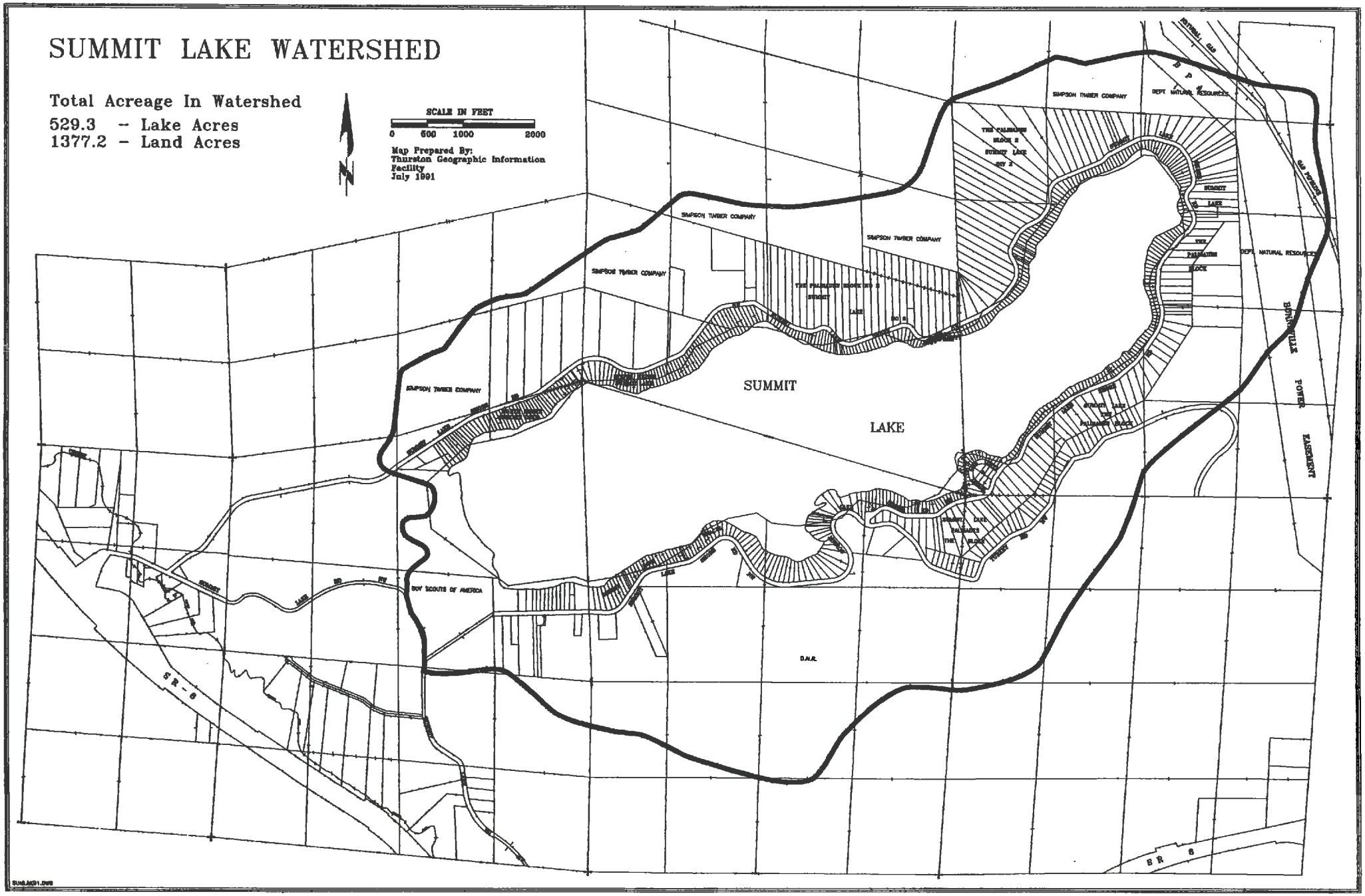
The remainder of the watershed, approximately 45 percent, is owned by Simpson Timber Company and Washington Department of Natural Resource and is used for commercial timber production. In addition to the timber harvest activities on these lands, increasing timber harvesting activities are occurring on the upland lots as they are being converted to residential use.

SUMMIT LAKE WATERSHED

Total Acreage In Watershed
529.3 - Lake Acres
1377.2 - Land Acres

SCALE IN FEET
0 500 1000 2000

Map Prepared By:
Thurston Geographic Information Facility
July 1991



C. Sources of Nonpoint Pollution

Nonpoint pollution sources are numerous and dispersed forms of contamination that enter the waterbody either directly or indirectly with runoff and from water-based activities such as boating. Individually the sources may be insignificant, but taken together they can have a substantial effect on water quality (Puget Sound Water Quality Authority, 1987). Because of the steep, bowl-shaped topography and fractured bedrock overlain by shallow soils in the Summit Lake basin, many of the land-based activities are impacting or have the potential to impact the water quality of the lake.

The Summit Lake watershed has undergone many changes in the past 100 years. In the early 1900's there were just a few cabins on the north shore of the lake. Now the lake is ringed with roughly 180 full-time residences and 215 seasonal residences. The population has increased from a handful of people to approximately 1600 (Ref. Thurston County Regional Planning Council, March 1991), and there is a trend toward conversion of the seasonal homes to full-time residences and increasing development of the upland property. The slopes of the basin were covered with old-growth forest until the 1930's and 1940's when the entire watershed was logged. Also in the 1940's Weyerhaeuser Timber Company divided the shoreline property into 408 narrow lots and the land immediately above the road into 199 lots. Now the remaining commercial timber acreage, which is approximately forty-five percent of the watershed, is mature and ready for harvest again.

According to the hydrologists and lake specialists consulted, timber harvesting can be accomplished with minimal impacts to water quality when done with the proper type of equipment and in accordance with carefully designed plans, which include proper placement of roads and drainage systems. However, even small scale timber harvest activities, such as those occurring on the residential upland lots, has recently resulted in localized flooding problems and significant inputs of sediment to the lake. The soil that washes into the lake with each rain event provides a good substrate for aquatic weeds to take root. It also provides additional nitrogen and phosphorus to the water, which encourages algae growth.

The hydrologists also acknowledge that annual runoff production will increase after timber harvesting because trees can intercept and remove up to 20 to 25 inches of rainfall per year. According to a computer analysis of the Department of Natural Resource's sixty-year harvest plan in the Summit Lake watershed, total water flow into the lake would gradually increase to more than four percent above current runoff levels. However, the flow in individual drainages may increase much more than the estimate for the whole watershed. For example, the computer analysis predicted an increase of 30 percent in the total annual water production in one particular drainage. It is expected that the increased flow will occur primarily in the Spring and Fall, and that the high winter flows will not be significantly greater. The water quality concern related to timber harvesting is to control runoff so it does not carry sediment and other contaminants from

the harvest site or generate an increased runoff which results in flooding, erosion, and assimilation of contaminants from off site such as downstream septic systems.

One other water quality concern related to timber production is the large-scale application of herbicides and fertilizers. While these activities are regulated by the forest practices act, they are not regulated for the purpose of protecting a domestic drinking water supply.

A study conducted by the Thurston County Health Department in 1986 and 1987 found that fifty-five percent of the water samples collected from water faucets did not meet the state bacteria standard, and twenty-two percent of the faucet samples contained evidence of fecal contamination. Samples collected near the shore showed sixty-nine percent did not meet the drinking water and fifty percent had evidence of fecal contamination. (Davis, May 1988) The drinking water standard for bacteria is no more than one total coliform bacteria per 100 milliliters of sample.

There are many sources of the total coliform bacteria group, including soil. The sources of fecal coliform bacteria, however, are primarily the intestines of warm-blooded animals. Analyses for fecal coliform bacteria gives ninety-three percent accuracy in differentiating between coliform found in the feces of warm-blooded animals and those from other environmental sources. (Standard Methods for Examination of Water and Wastewater, 17th Edition, pg 9-94)

Inadequate sewage disposal systems within the watershed probably pose the greatest public health risk to residents and guests drinking untreated lake water because people are a main source of human pathogens in the watershed. During a survey of developed properties within the watershed in 1990 by Health Department staff, 27 enforceable sewage disposal violations were identified and 62 systems were suspected of contributing to contamination of the lake either on a continuous or intermittent basis.

Water samples were collected from all creeks, drains, and seepages around the lake, and it was discovered that the background level for fecal coliform bacteria in the watershed is very low. For the purposes of the survey and investigation of contaminant sources, 5 or fewer organisms per 100 milliliters was considered natural levels and greater than 5 fecal coliform organisms in a sample warranted further investigation. New sewage tracing techniques were used by County staff to determine if the sources of the elevated bacteria levels were sewage systems. Through use of the tracing techniques seven "suspect" septic system were verified as "failing". The survey and follow-up investigation efforts clearly demonstrated that many of the sewage disposal systems around the lake discharge contaminants to the lake on a sporadic or intermittent basis, influenced by environmental factors such as rainfall and soil saturation conditions.

During the survey 138 drainage pipes to the lake from shoreline properties were identified. It was also discovered that many of these drainage systems, which were

installed to divert surface and subsurface water, are actually serving as direct conduits for seepage from sewage disposal systems on the lot or adjacent lots. In some cases, drainage pipes were installed too close to drainfields, or they became cracked which allowed sewage effluent to infiltrate and discharge directly to the lake.

Another threat to the water quality of the lake is the addition of nutrients, specifically phosphorus, to the lake. Like terrestrial plants, aquatic plants respond to the addition of nutrients with the result being undesirable aquatic weed growth and algae blooms. Certain algae types also have undesirable taste and odors associated with their presence, which could make consumption of lake water aesthetically unpleasant if nutrient inputs are left unchecked. Blue-green algae have also been known to produce toxins which have resulted in illness and death in domestic animals. While toxic blooms have not been common in Western Washington, toxic blooms have been documented in American Lake and Clear Lake in Pierce County in 1989 and 1990. A large source of phosphorus in the watershed is laundry detergents and other household cleaning products which can reach the lake with sewage effluent. Improper fertilizer application along the shoreline and within the watershed is also a phosphorus source to the lake. Even pressure-washing houses and roofs with high strength cleaners such as tri-sodium phosphate can contribute to increased phosphorus-loading of the lake above natural levels.

Pesticides, fuels, and other types of chemical contamination present a real public health and water quality concern. Just a few of the reported incidents include an accidental herbicide spill in 1972, 2 illegal aquatic herbicide applications to the lake in 1984 and 1986, and a diesel spill in 1990. Accidental gasoline spills and engine exhaust from boating activities, runoff from roadways and driveways, and leaching of wood preservative from treated wood docks and pilings are some of the more common ways that chemicals reach the lake.

The increasing popularity of the Summit Lake area as a residential community and recreational area heightens the need to take measures to protect the lake from unintentional water quality degradation.

IV. GOALS AND RECOMMENDATIONS TO PROTECT WATER QUALITY

A. OVERALL GOAL FOR PROTECTION OF THE LAKE

It is the intent of the residents and property owners in the Summit Lake watershed that the water quality within Summit Lake be protected from further degradation and, to the extent feasible and practical, improved towards levels which would meet present drinking water standards. This goal is adopted with the realization that no alternative supplies of drinking water are presently feasible, nor are practical alternatives expected in the foreseeable future. The table below outlines the present water quality condition of the lake and the water quality standards and goals to be used to measure our progress.

PRESENT WATER QUALITY CONDITION AND STANDARDS AND GOALS FOR FUTURE

PARAMETER	PRESENT CONDITION	GOAL
Total Coliform:		
Tap Samples	45% scored ≤1/100ml 55% scored >1/100ml Geometric mean - 2.8/100ml	100% of all samples scoring ≤1/100ml*
Near-Shore Samples	16% scored ≤1/100ml 84% scored >1/100ml Geometric mean - 6.2/100ml	
Fecal Coliform:		
Tap Samples	78% scored 0/100ml 22% scored >0/100ml Geometric mean - 1.4/100ml	100% of all samples scoring ≤1/100ml
Near-Shore Samples	50% scored 0/100ml 50% scored >0/100ml Geometric mean - 2.6/100ml	
Nutrient Concentration	(to be determined)	No measurable increase
Secchi Disk Visibility: Annual Range	5 - 8 meters	8 meters or more
Annual Mean	7.25 meters (Avg 1989/90)	
Turbidity:	0.9 NTU (based on 1 sample)	Annual average of <1.0 NTU*
Eurasian Milfoil	None	None

* Refers to Washington State Department of Health drinking water standards.

General Recommendations

A-1. Continue water quality monitoring of the lake to determine present conditions and monitor trends and measure the effectiveness of the plan.

A-2. Improve communications and community involvement, through methods such as a watershed-wide newsletter, questionnaires to solicit opinions and ideas, an annual report, and community meetings.

A-3. Appoint a citizen advisory board to oversee implementation of the plan.

B. SEWAGE DISPOSAL SYSTEMS

Problems

- Shallow soils over fractured bedrock, steep terrain, and small lot sizes make proper siting and functioning of on-site sewage disposal systems difficult.
- Antiquated and improperly functioning systems serve many existing residences, and are contributing to degradation of lake water quality.
- Conversion of seasonal residences to full-time residences is occurring, many without up-grading sewage disposal systems. Most of these systems were designed to "dispose" of sewage not "treat" it, and most were not designed to handle the volume of wastewater generated by full-time, year-round occupancy.
- Change of ownership and lack of awareness results in improper care of septic systems.

Goals

- To ensure that existing systems are not contributing to water quality degradation of the lake.
- To upgrade those systems that are inadequate.
- To ensure that all new sewage disposal systems are sited, designed, installed, and maintained in such a manner so as not to contribute to water quality degradation of the lake.

Recommendations

Education

B-1. Develop an on-going program to educate property owners on the proper use, maintenance, and protection of on-site sewage disposal systems, including ways to minimize the impacts on water quality. It is recommended that special efforts be made to educate those property owners having questionably functioning sewage disposal systems.

New Regulations, Programs, or Policies

B-2. Establish an Operation and Maintenance Program (O & M) outlined as follows:

(NOTE: Once an O & M program is in place at Summit Lake, it will continue indefinitely. If the Lake Management District program is discontinued, the program would likely be incorporated into the existing county-wide O & M program which is funded by permit fees.)

1. 100 percent inspection of all sewage disposal systems within the watershed, to be phased in over a four year period. Twenty-five percent of the sewage systems within the watershed will be inspected each year.
    - Inspection requires pumping of the septic tank and exposing a portion of the drainfield. Longer pumping intervals may be allowed if it is not necessary for conducting a thorough inspection of the system and is not necessary for proper functioning of the system. (The property owner will be responsible for the cost of pumping the tank and opening the system for

the inspection.)

- During the initial inspection, diagrams of the system location and configuration and pertinent lot characteristics must be prepared and made part of the Health Dept. record.
- The use of the system is documented at the time of inspection, for example, seasonal or full-time residence, sized for X number of bedrooms, and X number of people occupy the residence.
- Inspection ports in the drainfield area may be required for some systems which require more frequent inspections to verify proper functioning.

2. Reinspections will be conducted at least at intervals of once every four years.
   - Reinspection period can be set as frequently as annually for systems found to be marginally functioning or suspect, or those systems requiring more intensive maintenance such as sand filter systems.
   - All property transfers require reinspections, except those inspected within one year of the property transfer.
3. Uncertifiable sewage systems must be abandoned or repaired.
   - Uncertifiable systems include: Systems which require correction under the provisions of the Thurston County Sanitary Code such as systems discharging sewage to surface water or upon the surface of the ground (Ref. Article IV, Section 1.2) and systems which are constructed, operated, and maintained in a manner which is unsafe or unsanitary (Ref. Article IV, Section 1.2.1 and Section 17.1). Specific types of systems that will be uncertifiable include: pit privies, cesspools, seepage pits, steel septic tanks, systems with no vertical separation between the bottom of the drainfield and the bedrock or water table, systems installed in the seasonal water table.
   - Systems found to be failing or requiring correction as defined above must comply with the correction schedule outlined in B-5 below.

B-3. All permit applications will require a review by the Health Dept. to evaluate potential impacts of the proposal to the existing sewage system and potential repair area. If a permit application is submitted on a property which has not yet had a sewage system inspection under this program (in other words, within the first four years of this program), an inspection will be required. Site inspections will be conducted where it is necessary to evaluate the impacts of the proposal.

*B-4. Require an evaluation of the septic system when remodelling is proposed and upgrade when appropriate. Remodelling, for this purpose, is defined as any proposal to expand a dwelling vertically or horizontally beyond the existing building envelope, or to substantially rebuild, reconstruct, or replace the outer structure of an existing dwelling, or to increase the capacity and therefore sewage flow from the house. Replacement of the system would be required if the existing drainfield area is not sufficient to properly dispose of the sewage, if there is not at least minimum horizontal setbacks from surface waters and minimum vertical separation between the bottom of the drainfield and the seasonal water table, impervious layer, or fractured rock to provide adequate treatment of the sewage, or if the system is otherwise not constructed or operating in a manner which protects public health.

[* *The Advisory Board members agreed that the remodel issue was a critical one for Summit Lake and that direction should be provided to the County. Within the time*

available to develop the plan, the Advisory Board was not able to reach agreement on what the thresholds should be for when to require replacement of a sewage system with one that meets current standards, or when replacement of an existing system with one that meets repair standards is appropriate, or when continued use of an existing system is acceptable. This issue needs to be revisited prior to inclusion in any plan implementation actions such as designation of Summit Lake as a geologically sensitive area. The language above is County staff's best attempt to record the concerns and intentions of the Advisory Board on this issue.]

B-5. Accelerate the time frame for repairing failing septic systems within the basin as follows:

1. Stop the flow of sewage or mitigate the situation in accordance with a County Health Department approved mitigation plan within 3 days after receipt of failure notification from the County Health Department;
2. Proceed with civil penalty if the situation is not stopped or mitigated;
3. Allow one year to repair system to current standards or to the maximum extent allowable by the lot using best available technology;
4. Impose civil penalty if system is not repaired within one year time limit.

B-6. Allow voluntary upgrades of non-failing septic systems through the repair permit process. The upgraded systems must meet current standards or be repaired to the maximum extent allowable by the lot using best available technology.

B-7. Request the County Health Department to waive permit fees for septic systems repairs for the duration of the proposed lake management district, which is discussed in Section V.A. of this document.

Enforcement of Existing Regulations

B-8. Conduct consistent and rigorous enforcement of all sewage disposal regulations.

B-9. Direct the County to aggressively enforce all relevant health and public decency laws at the Washington Department of Wildlife public access to prevent people from urinating and defecating in the lake.

B-10. Require the Washington Department of Wildlife to provide restroom facilities at the public access adequate to meet the maximum daily demand, and improve restroom maintenance to encourage the public to use them.

B-11. County Health Department shall devise a mechanism to insure that all septic systems are inspected upon transfer of property, including owner contracts.

Other Actions Needed

B-12. Develop sewage system inspection techniques which are effective for identifying systems that are contributing either biological contaminants or chemical contaminants to the lake.

B-13. Use the information gathered from an inspection program to coordinate efforts to jointly solve area sewage disposal problems.

B-14. Research sources of financial assistance for funding individual sewage system repairs, such as a revolving loan fund.

County Programs Underway in the Area of On-Site Sewage Disposal

The Thurston County Environmental Health Department has a grant funded project underway to examine financing alternatives and research the feasibility of creating a water quality improvement loan fund for sewage disposal system owners. It is possible that a low interest loan program will be in place by the end of 1991. The grant is also funding educational activities, including a packet on septic system care and maintenance which is available. The grant expires March 31, 1992. The County Office of Water Quality and Resource Management also has a water quality education program through which educational displays, models, and materials are continually being produced. Through this program County staff is available to help organize neighborhood workshops, attend special events, or provide other types of support when requested.

The County Environmental Health Department has implemented an operation and maintenance (O & M) program for on-site sewage disposal systems. Under this program, all new and repaired systems are issued a renewable permit. All systems involved in property transactions are inspected to ensure that they are operating properly, and then they are issued renewable permits. At the end of the permit period, the tank must be inspected and pumped, unless it is shown to be unnecessary, and the drainfield must be inspected to ensure that it is still operating properly before the permit is reissued.

The County has recently added a full-time staff person dedicated to helping communities with sewage disposal problems develop strategies for correcting their problems. The first area where this resource is being utilized is in the Cooper Point area where the septic systems failure rate is 50 percent.

The Environmental Health Department will be instituting a civil penalty ordinance beginning April 1, 1991 for violations of the County sewage disposal regulations and the solid waste regulations. This ordinance allows for the issuance of citations for violations where the property owner is not making progress toward resolution of the problem. This ordinance will be reviewed by the County Commissioners after one year to evaluate its effectiveness and proper use.

County staff from the Environmental Health Division, the Building Division, and the Planning Department are jointly working on definitions of a remodel, rebuild, expansion, and repair. Once adopted, construction proposals within the Summit Lake basin will be evaluated based on these definitions and policies.

The Washington State Department of Health is currently in the process of rewriting the on-site sewage regulations, W.A.C. 246-272. Once adopted by the State Board of Health, local government regulations must be revised to be at least stringent as the state regulations, and may be more stringent if needed. The draft state regulations propose some changes that may be of benefit to protecting Summit Lake water quality. These changes should be considered for incorporation into the plan at a later date.

C. TOXICS, NUTRIENTS, AND PESTICIDES

Problems

- Improper use, storage, and disposal of toxic chemicals within the watershed has impacted water quality, and continues to be a threat.
- Increased nutrient concentrations in the lake will result in degraded lake water quality in the form of undesirable algae blooms and aquatic weed growth. Evidence of enrichment has already been observed at various segments along the lake shoreline.
- Excessive and improper use of lawn fertilizers is occurring.
- Large scale use of herbicides and fertilizers can threaten water quality.

Goal

- To reduce the use of toxics, pesticides, and fertilizers within the watershed or ensure their proper use to prevent water quality degradation.

Recommendations

Education

C-1. Develop a continuing education program for property owners and contractors working in the watershed on ways to minimize the impacts of toxic chemicals, pesticides, and nutrient-laden products. This program should accomplish the following:

1. Raise awareness about the use of Summit Lake as a drinking water supply and the need to consider the potential impacts of using toxic products and fertilizers;
2. Provide instruction, in both group settings and on an individual basis, on how to minimize the need for toxic and nutrient-rich products, such as landscaping with native plant species;
3. Develop and distribute lists of non-toxic alternatives;
4. Provide advice on how to use pesticides and fertilizers so that the desired result is attained without impacting water quality.
5. Emphasize use of non-phosphorus-containing fertilizers.

New Regulations

C-2. Require the use of only non-treated, non-toxic pilings in Summit Lake. Request the County and/or State to change the regulations to allow the use of non-treated wood for docks and dock pilings in Summit Lake (Currently the building code requires that wood used in construction which will be in contact with water or soil must be treated.).

C-3. Require the County Planning Department to deny permit applications for businesses within the watershed which store, use, or produce toxic chemicals or wastes in a manner which poses a high risk of release to the environment.

C-4. Ban the use of phosphate-containing detergents within the watershed.

Other Recommended Actions

C-5. Establish a toxic collection site at the Summit Lake garbage transfer site.

C-6. Develop an emergency containment plan for spills of toxic materials.

County Programs Underway in the Area of Toxics, Nutrients and Pesticides

Educational activities on the use of toxics, nutrients, and pesticides are part of the newly established County Moderate Risk Waste Program and the Cooperative Extension Service's Master Gardener Program. Some of the educational tools available or being developed through these programs are a brochure entitled "Clean Water Begins At Home", a list of alternatives to use of toxic chemical products, a display, and workshops put on by the Master Gardeners.

The County holds an annual household toxic waste collection day, usually in May, at a location in the Olympia area. A household hazardous waste collection facility is operated year-round on Saturdays at the Thurston County landfill site off Marvin Road.

D. DRAINAGE AND STORMWATER

Problems

- Pollution from activities on the land, such as roads, residences, domestic animals, etc. is routed directly to the lake via drainage ditches and culverts without any treatment.
- Run-off and erosion from land clearing and building activities are contributing to sedimentation and increased nutrient concentrations in the lake.
- Localized flooding (including drainfield sites) and erosion are caused by inadequately sized and maintained drainage facilities and increased run-off from changes in uphill land uses.
- Individual subsurface drainage systems often transport sewage effluent from drainfields directly to the lake.

Goals

- Prevent stormwater quality and quantity problems through use of best management practices (BMP's).
- Improve drainage facilities, where feasible, to reduce flooding and erosion and improve the water quality before discharging to the lake.

Recommendations

Education

D-1. Develop and implement an education program on how to reduce runoff to the lake and improve the quality of water directed to the lake. The program should include education on such things as reducing the amount of impervious surfaces, value of vegetated ditches for treating runoff, use of vegetative buffers along the shoreline and creeks, proper handling and disposal of domestic animal waste, and things to consider when installing drainage structures.

New Regulations

D-2. Request the County Building Division to require diversion or treatment of downspout water on new construction.

Enforcement of Existing Regulations

D-3. Request the County to consistently and diligently enforce run-off and erosion control requirements on construction and cleared sites, and include conversions from timber production to residential use in their enforcement efforts.

Other Actions Needed

D-4. Work with the County Public Works Department on development of a regular road and drainage system maintenance schedule.

D-5. Request the County Public Works Stormwater Utility and Road Department staff to work with the LMD committee to prepare and implement a plan which sets priorities for repairing, upgrading, and improving drainage facilities in problem areas. The goal is to treat stormwater prior to discharge to the lake and correct or prevent flooding and erosion problems. The types of problems that should be evaluated include flooding due to inadequate facilities to handle the flows, erosions and sedimentation, and areas of septic system problems due to saturated soil conditions which may be alleviated by area interceptor drains or improved drainage facilities.

D-6. Conduct water quality monitoring of run-off into the lake.

<u>County Programs Underway in the Area of Drainage and Stormwater</u>

The Thurston County Public Works Department stormwater utility program has expertise and resources which might be used to initiate some of the actions highlighted above, particularly identifying problem areas and developing and implementing a long-term strategy to improve facilities. The Road Division of the Public Works Department presently has a grant to evaluate the effectiveness of vegetation for improving stormwater quality in drainage ditches.

The Thurston County Planning Department is drafting a vegetation protection ordinance for adoption in 1991. The objective is to prevent erosion from land clearing and construction activities. A drainage and erosion control manual has been developed through the Thurston County stormwater utility program and is scheduled for adoption in 1991.

E. BOATING AND RECREATION

Problems

- Intensity of use of the Washington Department of Wildlife public access causes impacts to the site itself and threatens water quality.
- Boating regulations, which are primarily safety oriented but could also help reduce water quality impacts, are not adequately enforced.
- The exotic aquatic plant, Eurasian milfoil, could have deleterious effects on the uses of the lake. Eradication of the plant could be very difficult, once introduced, due to the use of the lake as a drinking water source.

Goals

- To have the Washington Department of Wildlife public access site managed in such a way as to minimize the impacts to water quality with specific recognition of the use of the lake as drinking water.
- To prevent the introduction of Eurasian milfoil into Summit Lake.
- To utilize existing boating regulations as much as possible to minimize water quality impacts from boating activities.

Recommendations

Education

E-1. Develop and implement a public education program for the boating public on Summit Lake to inform them about good boating practices that help prevent water quality impacts and about the potential impacts of Eurasian water milfoil. The milfoil education program should include the following:

- Information/warning signs should be posted at all road entrances to Summit Lake, and at all major boat launch sites.
- An annual springtime information/warning mailing should be sent to all property owners and/or tenants in the lake management district.

E-2. Request state agencies and Thurston County to enhance and expand their milfoil education programs through boat registration, fishing regulations, and other available means.

Enforcement of Existing Regulations

E-3. Conduct more rigorous enforcement of existing County boating regulations, especially those which may benefit water quality, such as reduced boating speed within 200 feet of the shore.

E-4. Develop and implement a strategy for enforcing County Code Chapter 16.04.370 which prohibits the transport of aquatic weeds.

Other Actions Needed

E-5. Request the Washington Department of Wildlife to control runoff and shoreline erosion at the public launch site.

E-6. Request the Community Club to organize a community milfoil watch program on the lake.

County Programs Underway in Boating and Recreation

Thurston County Public Works Department staff conducts Spring and Fall milfoil surveys by boat on all lakes in the County with public access. They also fund an annual aerial milfoil survey. An inspection station has been established at Long Lake, where all boats leaving the lake are inspected for milfoil fragments and washed if necessary. Long Lake is the only Thurston County lake with a public boat access that is known to have Eurasian milfoil infestation. The County Public Works Department, in conjunction with lake associations and the Washington Department of Ecology, sponsor numerous public education activities throughout the year related to preventing the spread of milfoil. In addition, the Long Lake - Lake Management District and Thurston County are implementing a plan to eradicate milfoil from that lake.

F. FORESTRY ACTIVITIES

Problems

- Some property owners and contractors do not fully comply with the Forest Practices Act and best management practices, thereby creating erosion, increased runoff, and sedimentation problems.

- Agencies responsible for permitting and enforcing forest practice activities are not setting permit conditions and enforcing permit requirements to the degree necessary to protect the water quality of the lake.

- Forty-five percent of the watershed is owned by Simpson and Washington Department of Natural Resources (DNR). Most of the timber on that acreage is of harvestable age. There is the potential to adversely impact the water quality if there is no coordination of the harvest plans of the two entities.

Goals

- To raise the awareness of the regulatory agencies to the sensitivity of the Summit Lake watershed, so that permit conditions and monitoring and enforcement of the permit requirements are adequate.

- To ensure that all harvest plans and forest management activities are reviewed, coordinated, and conducted in a manner that will minimize impacts to water quality.

Recommendations

Education

F-1. Work with DNR, as both regulator and timber land owner, Simpson Timber, and other timber land owners to provide them with local knowledge of the watershed so that they can conduct their forestry activities with increased knowledge and appreciation of the local concerns.

F-2. Request DNR to consider placing seasonal restrictions on logging, and limiting fertilizer and pesticide applications beyond current forest practice regulations, based on the sensitivity of the watershed and the drinking water use of the lake.

New Regulations

F-3. Request Washington Department of Natural Resources to apply Class III stream buffer requirements to Class IV and V streams within the watershed or require implementation of some other approved plan which serves the purpose of preventing siltation and water quality degradation.

Enforcement of Existing Regulations

F-4. Impose forest practice permit conditions specific to each site that require appropriate stream buffers, appropriate logging techniques for the site conditions, and erosion and runoff controls.

F-5. Request DNR to rigorously enforce the forest practice regulations and forest practice permit conditions.

Other Actions Needed

F-6. Reduce unauthorized vehicle access to forest roads and lands to help reduce erosion and runoff from those roads.

V. IMPLEMENTATION STRATEGY FOR ACTION RECOMMENDATIONS

A. Funding

The Summit Lake Management District Advisory Board recommends that an eight-year lake management district (LMD) be formed to provide the primary funding source to implement the plan. Through an LMD, the revenue needed to implement and support the plan will be raised by an assessment to property using a formula similar to the existing LMD assessment formula, which reflects the degree of benefits to, services provided to, and degree of impact from various property types. It is proposed that developed residential property would pay 74 percent of the cost of the program, and undeveloped residential property would pay 21 percent. Timber lands (20 acres parcels or greater) would pay on a per acre basis, and would pay one percent of the cost. The public access would pay four percent of the cost. Funding of the whole plan through an annual LMD charge, collected through property tax billings, was viewed by the Advisory Board members as preferable to funding the plan with a variety of fees and charges. The table on the following page shows the annual budget requirements to put this plan into effect. The pie chart on page 27 shows how the money would be spent.

The following table shows the proposed cost per property per year, based on the need to generate an average of $94,300 per year over the life of the eight-year program. All property under 20 acres in size would be charged a fixed amount, $162 dollars developed property and $92 for undeveloped property. For the purpose of the LMD charge, developed property is defined as those parcels with a building value of $1000 or greater or those parcels having an on-site sewage disposal system. Timber lands 20 acres or more in size would be charged one dollar per acre. The Boy Scout camp would be charged at the dollar per acre rate.

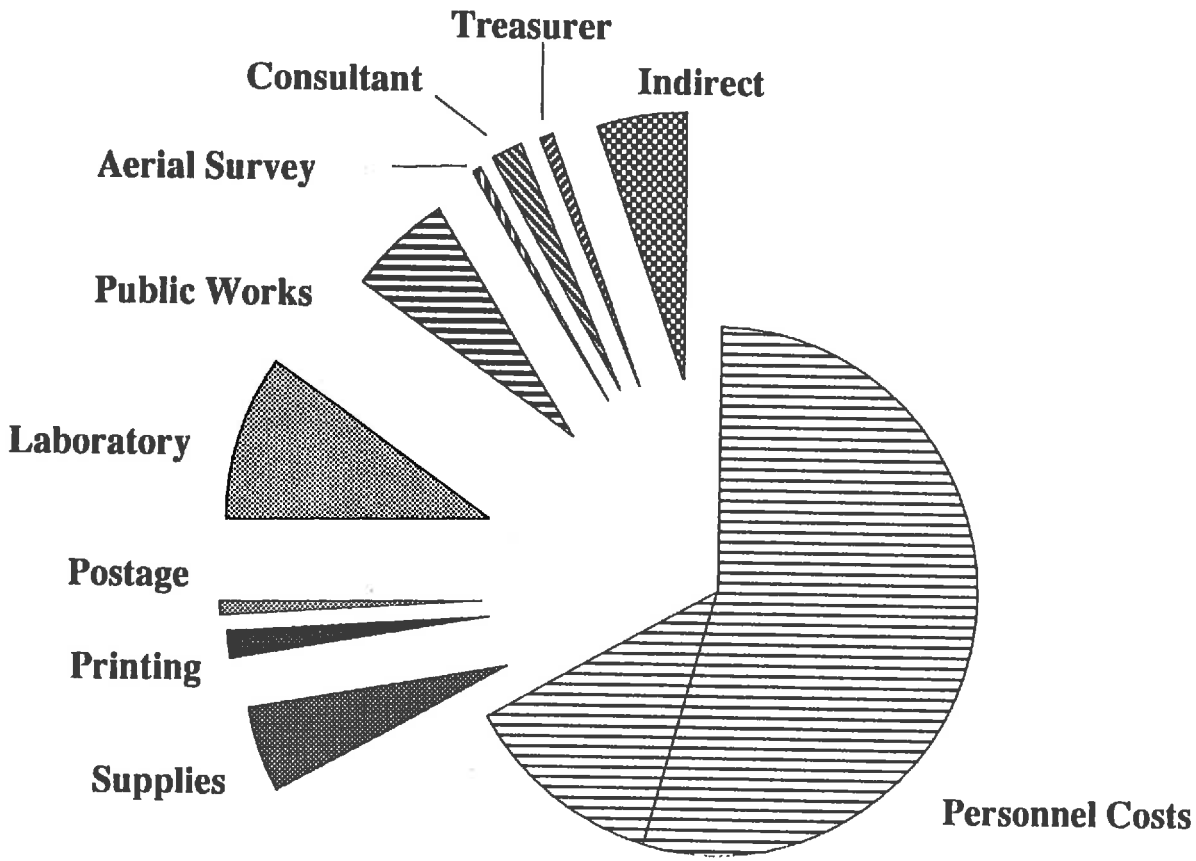
Category	Annual Charge	Estimated Revenue	Estimated Percent of LMD Revenue
Developed Residential	$162 per parcel	$70000	74%
Vacant Residential	$92 per parcel	$20000	21%
Public Access	$3500/parcel	$3500	4%
Timberlands	$1/acre	$791	1%

SUMMIT LAKE "8" YEAR BUDGET PLAN

06-24-91

Year	1992	1993	1994	1995	1996	1997	1998	1999
Personnel	54,480	58,294	62,374	66,740	38,042	40,705	43,554	46,603
Benefits	12,530	13,407	14,346	15,350	8,749	9,362	10,017	10,718
Supplies,equip and etc..	5,448	5,829	6,237	6,674	3,804	4,070	4,355	4,660
Printing	1,200	1,284	1,374	1,470	1,573	1,683	1,801	1,927
Postage	570	610	653	698	747	799	855	915
Treasurer (for collection)	500	535	572	613	655	701	750	803
Public Works	4,622	4,946	5,292	5,662	6,058	6,483	6,936	7,422
Aerial	0	0	0	0	0	0	5,000	0
Consultant	1,500	1,605	1,717	1,838	1,966	2,104	2,251	2,409
Lab	7,000	7,490	8,014	8,575	9,176	9,818	15,007	11,240
Indirect	5,448	5,829	6,237	6,674	3,804	4,070	4,355	4,660
	93,298	99,829	106,817	114,294	74,576	79,796	94,884	91,358

assumptions: 1 FTE plus support staff for years 1-4
.5 FTE plus support staff for years 5-8
.07 inflation cost per year



Summit Lake LMD
Average Costs for 8 Years

It is proposed that the existing LMD boundary, which is the watershed boundary, be used for the new LMD. An LMD duration of eight years was chosen to provide four years to phase in the septic system operation and maintenance program and four years to evaluate the program through one complete inspection cycle.

Some of the other characteristics of an LMD which are viewed as favorable by the Advisory Board are the following:

- An LMD has a limited duration at the end of which it can either be re-created or not, by a vote of the property owners;
- Formation of an LMD requires a vote of the property owners;
- The work plan, rate structure, and budget are part of the LMD proposal requiring a vote of the property owners;
- The revenue generated by the LMD is dedicated to performing the work defined during the formation process;
- The County, which administers an LMD program, would require less money for overhead costs than use of some other funding alternatives, such as a sewer district, because much of the administrative needs are already in place; for example, the County already has a billing system.

B. Regulation Changes

Designation of the Summit Lake watershed as a "geologically sensitive area" (GSA) is the proposed mechanism for implementing the action recommendations which require new regulations or changes to existing regulations. The Advisory Board recognizes that some of the action recommendations needed at Summit Lake are not needed universally throughout the County, and efforts to change County-wide regulations to meet Summit Lake conditions are likely to be unsuccessful. A GSA is a useful tool to tailor regulations to the needs of a specific geographical area. The Advisory Board also believes that designation of the Summit Lake area as a GSA would heighten government agencies' awareness of the sensitivity of the area and may result in increased responsiveness to problems and concerns. (An explanation of the GSA designation is located in Appendix B.)

C. Lead Agency and Oversight

The Summit Lake Advisory Board recommends that the Thurston County Health Department be the lead agency for implementation of the plan, and that an advisory board be appointed to provide oversight and input as the plan is implemented.

The advisory board membership should represent the primary property types and interests within the LMD boundary, similar to the make-up of the existing LMD Advisory Board. The advisory board should be composed of up to 15 members. The members

should include:

- Full-time waterfront residents
- Seasonal waterfront residents
- Full-time upland residents
- Upland property owner, seasonal use or undeveloped property
- Boy Scouts of America
- Simpson Timber Company
- Washington Department of Natural Resources
- Washington Department of Wildlife

In selecting the members representing the individual private property owners, consideration should be given to attaining a geographic balance of representation around the lake, and representation of the long-time property owner views and the new property owner views. To assure continuity with the past and insight to the intent of the plan, at least one-third of the advisory board members should have served on the original advisory board. To promote consideration of other view points, at least one-third of the members should not have served on the original advisory board.

The advisory board should establish its own rules of procedure and governance, including frequency of meetings. Given the proposed LMD duration of eight years, the board should consider establishing a term of service for board members, after which new members are solicited and appointed to replace those having served the allotted time.

It is readily acknowledged that rapid advances are being made in the technology and regulation of sewage treatment and disposal and water quality protection. It is not our intent for the plan to remain fixed, but that it be a working document which should be modified as technology and regulations provide improved methods for protecting the water quality. It is also anticipated that implementation of some recommendations in the plan may require actions which were not previously considered. Therefore, the business of the advisory board should be to:

- Assure that the Summit Lake Water Quality Protection Plan is implemented as it is proposed and for the purpose it is intended, in a consistent and timely manner.
- Modify and up-date the plan as needed to recognize changing circumstances and improved technology.
- Consider actions which were not previously considered or anticipated but which would benefit the community and help implement the plan.
- Serve as the community body where water quality issues can be raised and discussed.
- Coordinate with other agencies and groups involved in water resource issues which overlap or affect water quality efforts at Summit Lake.

D. Implementation Strategy

The tables on the following pages identify the recommended actions, state whether regulation changes or administrative actions are required, identify potential funding sources, provide a time-frame for accomplishing the recommendations, and identify logical responsible agencies or groups.

* "Immediate" - within 2 years
"Short-term" - within 4 years
"Long-term" - within 8 years

IMPLEMENTATION STRATEGY -- GENERAL RECOMMENDATIONS

ACTION RECOMMENDATION	HOW IMPLEMENTED	POTENTIAL FUNDING SOURCE(S)	TIMETABLE *	RESPONSIBLE ENTITY
A-1. Continue water quality monitoring of the lake to determine present conditions and monitor trends and effectiveness of the plan	Administrative	LMD	Immediate	Thurston County Health Dept. (TCHD)
A-2. Improve communications and community involvement, through such methods as a watershed-side newsletter, questionnaires to solicit opinions and ideas, an annual report, and community meetings.	Administrative	LMD	Immediate	TCHD, Office of Water Qulaity, Community
A-3. Appoint a citizen advisory board to oversee implementation of the plan.	Administrative	LMD	Immediate	TCHD, Board of Co. Commissioners, Community

IMPLEMENTATION STRATEGY -- SEWAGE DISPOSAL

ACTION RECOMMENDATION	HOW IMPLEMENTED	POTENTIAL FUNDING SOURCE(S)	TIMETABLE	RESPONSIBLE ENTITY
B-1. Septic Sys Education Prog.	Administrative	LMD supplemented by existing Co. programs	Immediate	TCHD & Office of Water Quality
B-2. Establish an operation & maintenance program for all sewage disposal systems within the watershed	Geological Sensitive Area (GSA); adoption by Board of Health (BOH)	LMD	Begin immediately, with implementation completed by the 4th year	TCHD and County Board of Health
B-3. All permit applications will require a review by the Health Dept. to evaluate potential impacts of the proposal to the existing sewage system and potential repair area.	Change to TC Sewage Code, possibly through GSA	Permit fees	Immediately	TCHD and County Board of Health
B-4. Require evaluation of septic syst. when remodelling & upgrade when appropriate. (See discussion on page 14-15.)	New local regulation through GSA which requires adoption by BOH	Permit fees	Immediate	TCHD
B-5. Accelerate the time-frame for repairing failing septic systems	Administrative	Permit fees	Immediate	TCHD
B-6. Allow voluntary upgrades of non-failing septic systems through the repair permit process	Change TC Sewage Code, possibly through GSA	LMD & permit fees	Short-term	TCHD
B-7. Request Co. Health to waive permit fees for septic system repairs for the duration of the proposed LMD	Administrative	Existing Co. revenue	Immediate	TCHD

IMPLEMENTATION STRATEGY -- SEWAGE DISPOSAL (CONTINUED)

ACTION RECOMMENDATION	HOW IMPLEMENTED	POTENTIAL FUNDING SOURCE(S)	TIMETABLE	RESPONSIBLE ENTITY
B-8. Conduct consistent and rigorous enforcement of sewage disposal regulations	Administrative	Permit fees and existing revenue	Immediate	TCHD
B-9. Enforce relevant health & public decency laws at public boat access	Administrative	Existing Co. Revenue	Short-term	TCHD & TC Sheriff
B-10. Provide adequate restroom facilities at public boat access	Administrative	State revenue	Short-term	State Dept of Wildlife
B-11. Insure that all septic systems are inspected upon transfer of property, including those under private contract	Administrative	LMD & existing O&M program funds	Immediate	TCHD
B-12. Develop sewage system inspection techniques which are effective for identifying systems that are contributing biological or chemical contaminants to the lake	Administrative	Existing Co. revenue	Short-term	TCHD
B-13. Use information gathered from an inspection program to coordinate efforts to jointly solve area septic system problems	GSA which requires adoption by BOH	LMD	Immediate	TCHD
B-14. Research sources of financial assistance for funding sewage systems repairs, such as a revolving loan fund	Program underway	Existing grant revenue	Currently underway	TCHD

IMPLEMENTATION STRATEGY -- TOXICS, NUTRIENTS, AND PESTICIDES

ACTION RECOMMENDATION	HOW IMPLEMENTED	POTENTIAL FUNDING SOURCE(S)	TIMETABLE	RESPONSIBLE ENTITY
C-1. Education program to minimize water quality impacts from toxic chemicals, pesticides, and nutrient-laden products	Administrative	LMD & County moderate risk waste program	Immediate	TCHD and/or Office of Water Quality
C-2. Require use of non-treated, non-toxic pilings in the lake; and change the regulations to allow the use of non-treated wood for docks & pilings	Variance to state building code or New local regulation, possibly through GSA	LMD	Short-term	TCHD or TC Building Div.
C-3. Require TC Planning Dept. to deny permit applications for businesses within the watershed which store, use, or produce toxic chemicals or waste in a manner which poses a high risk for release to the environment	New local regulation, possibly through GSA or zoning ordinance revision; which requires adoption by BOH or Board of Co. Commissioners	LMD	Short-term	TCHD and Thurston Co. Planning Dept. (TCPD)
C-4. Ban use of phosphate detergents within the watershed	GSA, which requires adoption by BOH	LMD	Immediate	TCHD or Office of Water Quality
C-5. Establish a toxic collection site at Summit Lake transfer site	Administrative		Long-term	TC Public Works
C-6. Develop emergency containment plan for spills	Administrative	LMD	Short-term	Community & TCHD

IMPLEMENTATION STRATEGY -- DRAINAGE AND STORMWATER

ACTION RECOMMENDATION	HOW IMPLEMENTED	POTENTIAL FUNDING SOURCE(S)	TIMETABLE	RESPONSIBLE ENTITY
D-1. Education program on how to reduce runoff and improve quality of runoff water reaching the lake	Administrative	LMD, TCPW-stormwater utility revenue	Immediate	Co. Office of Water Quality & TC Public Works (TCPW)
D-2. Request the Co. Building Division to require diversion or treatment of roof downspouts on new construction	New local regulation, possibly through GSA	LMD	Long-term	TCPW-Building Division
D-3. Request Co. to enforce existing runoff & erosion control requirements on construction & cleared sites, include conversions from timber to residential use	Administrative	Permit fees	Immediate	TCPW
D-4. Work with TCPW on development of a road & drainage system maint. schedule	Administrative	Existing Co. revenue	Immediate	TCPW
D-5. Request TCPW-Stormwater Utility & Road Div. to work with committee to set priorities for repairing, upgrading, & improving drainage facilities in problem areas around the lake. And schedule and act on the priority list developed.	Administrative	Existing Co. revenue	Short-term	TCPW
D-6. Conduct water quality monitoring of runoff into the lake	Administrative	LMD	Short-term	TCHD

IMPLEMENTATION STRATEGY -- BOATING AND RECREATION

ACTION RECOMMENDATION	HOW IMPLEMENTED	POTENTIAL FUNDING SOURCE(S)	TIMETABLE	RESPONSIBLE ENTITY
E-1. Education program on prevention of Eurasian water milfoil infestation	Administrative	Existing Co. revenue, Private resources, LMD, State funds	Immediate	TC Office of Water Quality, TCPW, and/or Co. Noxious Weed Control
E-2. Request state agencies & Thurston Co to enhance & expand their milfoil education programs	Administrative	State and Co. revenue	Immediate	Community
E-3. Enforce existing boating regulations	Administrative	Existing Co. revenue	Immediate	TC Sheriff
E-4. Develop and implement a strategy for enforcing Co. code chapter 16.04.370 which prohibits the transport of aquatic weeds.	Administrative	LMD	Short-term	TC Sheriff, TCPW
E-5. Request the State Dept of Wildlife to control runoff & shoreline erosion at the public boat access	Administrative	State revenue	Long-term	State Dept of Wildlife
E-6. Request the Summit Lake Community Club to organize a milfoil watch program	Community action	Volunteer resources	Immediate	Summit Lake Community Club

IMPLEMENTATION STRATEGY -- FORESTRY

ACTION RECOMMENDATION	HOW IMPLEMENTED	POTENTIAL FUNDING SOURCE(S)	TIMETABLE	RESPONSIBLE ENTITY
F-1. Work with DNR & Simpson to provide them with local knowledge of the watershed so they can conduct forestry activities in a manner that minimizes impacts to water quality	Administrative	Community resources and Existing Co. revenue	Immediate	Community Club
F-2. Request DNR to consider placing seasonal restriction on logging & limiting fertilizer and pesticide applications beyond current forest practice regs	Change state regulation	State revenue	Long-term	State Dept. Natural Resources (DNR)
F-3. Request DNR to apply Class III stream buffer requirements to Class IV and V streams within the watershed or require implementation of some other approved plan to prevent water quality degradation	Change state regulation	State revenue	Immediate	State DNR
F-4. Impose forest practice permit conditions specific to each site	Administrative	State revenue	Immediate	State DNR
F-5. Rigorously enforce forest practice regs & forest practice permit conditions	Administrative	State revenue	Immediate	State DNR

IMPLEMENTATION STRATEGY -- FORESTRY (CONTINUED)

ACTION RECOMMENDATION	HOW IMPLEMENTED	POTENTIAL FUNDING SOURCE(S)	TIMETABLE	RESPONSIBLE ENTITY
F-6. Reduce unauthorized vehicle access to forest roads & lands to help reduce erosion and runoff from those roads	**Property owner action**	**private resources**	**Long-term**	**State DNR & private timber land owners**

VI. CONSIDERATION OF OTHER COUNTY PLANS

The Totten-Little Skookum Watershed Action Plan, dated October 1989, was prepared in accordance with the Puget Sound Water Quality Management Plan. The Puget Sound Water Quality Authority designated the Totten-Little Skookum Inlet Watershed as an "early action Watershed", primarily because of its significance as a major shellfish production area. The Totten-Little Skookum watershed is a shared watershed in both Thurston and Mason Counties. Development of the plan was a cooperative effort of the two counties. Although Summit Lake interests were represented during development of the Totten-Little Skookum plan, it was felt that the recommendations in the plan were not specific enough to the unique characteristics and needs in the Summit Lake basin. There was also concern that the funding source(s) were not definite, which makes implementation of various aspects of the plan questionable. Therefore, the Summit Lake community felt it was important to draft a plan with recommendations specific to the needs of Summit Lake and to ensure implementation of the plan.

The recommendations in the two plans do not conflict, and in many cases are very similar. The main differences between the two are that the Summit Lake plan is stronger in the area of septic systems and focuses its recommendations on water quality protection for drinking water purposes, whereas, the Totten-Little Skookum plan has a wider range of recommendations to address a broader range of activities within the watershed and has a more complex implementation strategy, including coordination of two county governments.

The Thurston County Comprehensive Plan, dated June 1988, is a broad policy document which provides guidance on how land use planning and development activities should be conducted within the County. It addresses topics such as transportation, public utilities, urban growth and rural areas, and natural and historic resources. The Summit Lake Water Quality Protection Plan is consistent with the policies established in the Comprehensive Plan. Policy number 7 in the water supplies section says that water bodies used for drinking water should be regularly monitored and protected, which is consistent with the specific recommendations and the overall goal of this plan. Other recommendations in this plan are reinforced by the policies established in the "Natural Environment" section of the Comprehensive Plan. In the event the Summit Lake community would be interested in pursuing development of a central sewer or water system in the future, the Comprehensive Plan also provides policies on public involvement during utility planning, who pays the cost of utilities, and where sewering should occur.

APPENDICES

ROUGH COST ESTIMATE FOR SEWER SYSTEM AT SUMMIT LAKE

PART 1. ESTIMATE FOR COLLECTION SYSTEM AROUND THE LAKE

BASIS:

Assumption is that a STEP system would probably be the selected method of sewerage collection for this area, based on generally two long runs of pipe, either side of the lake, plus Turkey Road. The STEP system piping would not have to be buried more than 42 inches so that excavation into rock, if any, would be kept to a minimum. A second assumption is that there would be one house per tank even though many of the existing houses are relatively close together. However, many are seasonal use homes so that power may be off seasonally as well. The number of lots, and the lengths of piping are taken from the Gray and Osborn Summmit Lake Study, May, 1991. Unit prices are generally taken from the Boston Harbor contract, and slightly increased for inflation.

Use: 455 lots (627 potential lots)
34,000 LF + 6,000 LF = 40,000 LF (assume all at 4 inch PVC)

Estimated Cost:

1.	4" PVC pressure line, 40,000 LF @ $8/LF	= $ 320,000
2.	STEP Tanks, in place, 455 each @ $4,300	= 1,956,500
3.	Abandon existing tanks 455 @ $300	= 136,500
4.	Road repairs, 40,000 x 4/9 = 18,000 SY @$14	= 252,000
5.	Cleanouts, 3 @ $1,000	= 3,000
6.	Air release valves, 20 @ $900	= 18,000
	Subtotal	**= $2,366,300**
	25% Contingencies	= 591,575
	40% Design, Inspection & Administration	= 1,183,150
	Sales tax @ 7.8%	= 323,000
	TOTAL	**= $4,464,025**

Basis for Item 2 above:

Tank	= $3,000
Hookup to pressure line	= 50
Electric	= 700
Grav to each house @ $375/house	= 375
Subtotal	= 4,125
say	= 4,300

PART 2. ESTIMATE FOR SANITARY SEWER TRUNK TO LOTT TREATMENT PLANT FROM SUMMIT LAKE

GENERAL:

To connect a Summit Lake system to the closest LOTT point.

ASSUME:

Follow Highway 8 to Highway 101, then Mud Bay Road to manhole on Yauger Way SW (vicinity of hospital). Use highway right-of-way and county street right-of-way.

CHECK TOTAL FLOW REQUIREMENTS:

627 connections x 80 GPCD x 3 Bdrms = 150,480 GPD
peak flow (peak factor = 3.8) = 571,824 GPD
infiltration (estimated) 640 Ac x 250 GPA = 160,000

Total flow = peak flow + infliltration = 731,800 GPA
= 0.7 MGD

0.7 x 1.547L = 1.08 CFS
say 1 CFS

CHECK HEAD LOSS (H_L) in 6" PVC/MILE

$$H_L = \frac{4.73\ Q^{1.85}}{C^{1.85}\ D^{4.87}}\ L$$

WHERE Q = 1 CFS
C = 150 (PVC)
D = 0.5 FT
L = 5280 FT

$$H_L = \frac{4.73\ (1)^{1.85}}{(150)^{1.85}\ (0.5)^{4.87}}\ (5280) = 67\ FT$$

CHECK 4" PVC LINE/MILE

$$H_L = \frac{4.73\ (1)^{1.85}}{(150)^{1.85}\ (0.33)^{4.87}}\ (5280) = 523\ FT$$

TOO HIGH

Use 6" PVC Force Main
and Use 8" PVC Gravity

RUN #	PRES	GRAV	L (Ft)	ΔH (Ft)	PUMP STA (#)	MH (#)
1	X		15,800	45 ±	2	
2		X	32,760	175 ±		110
3	X		14,000 Σ = 62,560 (= 11.8 miles)	100 ±	2	

Cost Estimate (Initial):

System in Place:

8" PVC sewer line 32760 LF @ $35/LF	=	$1,146,600
6" PVC sewer line (press) 29,800 LF @ $33/LF	=	983,400
manholes: 110 @ $1,600 ea	=	176,000
pump station, backup power, 4 @ $150,000	=	400,000
Subtotal		**2,706,000**
design, administration @ 40%	=	1,082,400
Subtotal		**3,788,400**
contingencies @ 20%	=	757,680
Subtotal		**4,546,080**
tax @ 7.6%	=	345,500
TOTAL	=	**4,891,580**

say 5 million

Does **not** include:

- property purchase as required for pump stations
- additional costs for rock excavation, as needed
- highway crossing(s)
- bridge crossing(s)
- conflict with other utilities along route
- pavement repairs
- Summit Lake collection system (to highway)

PART 1.	Collection System Around the Lake	$4,500,000
Part 2.	Sewer Truck to LOTT Treatment Plant	5,000,000
	Total Sewerage Cost	**$9,500,000**

These estimates are included only to provide a general idea of the costs associated with a sewerage project. They are not intended to be used as the basis for a decision to proceed with a sewerage proposal.

Estimates were prepared by Thurston County Public Works, professional engineering staff.

GEOLOGICALLY SENSITIVE AREAS

WHAT IS A GEOLOGICALLY SENSITIVE AREA? A GSA is "an area of definite boundaries established by the Thurston County Board of Health, which, because of geological conditions, is subject to aquifer, drinking water or surface water contamination".

WHERE IS IT AUTHORIZED? Section 15 of "Article IV - Rules and Regulations of the Thurston County Board of Health Governing Disposal of Sewage" allows for the creation of "geologically sensitive areas". It reads, "In an area declared by the Board of Health to be 'geologically sensitive', the health officer shall require such additional reasonable standards adopted by the Board of Health as are necessary to prevent health hazards and water pollution."

HOW IS IT CREATED? An area is declared a "geologically sensitive area" (GSA) by the Board of Health. In Thurston County, the County Commissioners also act as the Board of Health.

WHAT AVENUES ARE THERE FOR PUBLIC INPUT? Creation of a "GSA" is an amendment or addition to Article IV (County Sewage Code discussed above). Section 4.1 of "Article 1 - General Provisions of the Thurston County Sanitary Code" requires a public hearing and notice of the public hearing prior to adoption of any changes to the County Sanitary Code. This includes creations of "GSA's".

Prior to adoption by the Board of Health, a "GSA" proposal must also comply with the State Environmental Policy Act (SEPA). This means that the proposal will be reviewed to determine if it will have any "probable significant adverse impacts". The "SEPA" process requires notice to the public and other agencies.

WHO WRITES THE SPECIFIC ELEMENTS IN A "GSA"? The specific language is typically written by County staff, but the drafting of what the "GSA" says can be done by a combination of County staff, residents within the proposed "GSA" designation, and possibly consultants. The "GSA" document usually provides information supporting the need to adopt the provisions proposed. The purpose of the provisions in the "GSA" must be to prevent health hazards and water pollution.

WHAT TYPES OF THINGS CAN BE ADDRESSED IN A "GSA"? The types of things which can be included in a "GSA" are fairly broad, as long as their purpose is to prevent health hazards and water pollution. There are 3 existing "GSA's" in Thurston County. All 3 documents are different in length and content. Each was tailored to the specific problems in each area. Two of the three documents have both regulatory changes and non-regulatory directives, such as coordination with other agencies and development of public education programs.

The "Lakes Area GSA" was adopted in 1981 and is one page long. It established stricter septic system standards for the purpose of increasing nutrient removal efficiency to help reduce water quality problems in the lakes.

The "Henderson and Eld Inlet/Watershed Regions GSA" was adopted in 1985. Its purpose was to help improve bacteriological quality of the water in those two inlets to protect the commercial and recreational shellfish resources present. It established different septic system standards, made recommendations for animal-keeping practices, and made recommendations regarding stormwater and wetland concerns.

The "McAllister GSA" was adopted in 1990. Its purpose is to prevent continued groundwater contamination of the McAllister Springs aquifer, which is the drinking water supply for approximately 52,800 people. It established stricter standards for installation and maintenance of septic systems, gave specific directives and requests regarding pesticide and fertilizer use, addressed stormwater and hazardous materials spills, and gave a directive to the County Office of Water Quality and Resource Management to conduct a public education program specific to the needs in this area.

WOULD A GSA HAVE TO BE THE SAME AS AN EXISTING ONE? If a "GSA" were developed for the Summit Lake Watershed, it would be written to meet the specific needs of the area. It could have regulatory changes, which for example could redefined when septic system up-grades are required. It could also have non-regulatory components, which for example could direct the County Health Officer to work with the Public Works Department and the community on drainage problems.

CAN A GSA BE CHANGED AFTER IT IS CREATED? Yes. Any changes to a "GSA" would require action by the Board of Health. A public hearing and notice of the public hearing is required before any action could be taken by the Board of Health to change it. The County Health Department staff's job is to enforce the provisions of the County Sanitary Code and the provisions in the GSA. Staff cannot change a "GSA".

WHO ENFORCES THE PROVISIONS IN A "GSA"? The County Health Officer or his/her appointees are responsible for enforcing the provisions in "GSA", unless other County Departments are specified.

For specific questions regarding an existing GSA in Thurston County or other questions regarding policies or procedures, please call Thurston County Environmental Health at 786-5455.

PUBLIC COMMENTS
MEETING - JUNE 27, 1991

60 people present.

- Is the county responsible for road runoff and are residents on the lake forced to pay dollars? Where would we send water from the road so it won't go to the lake? Are the landowners below the culvert responsible then?
- What is Simpson Timber going to do to alleviate runoff when they harvest the timber?
- There were 27 failing septic systems; have they been cleaned up?
- Is the cost of these inspections built into the $162?
- Logging across the road - who is responsible for that runoff?
- With unsatisfactory water and septic system - will it make it harder to get loan for property?
- Who is responsible for getting ditches cleaned?
- If you have an uncertifiable septic system - how long to fix it? A year might not be long enough if it is a financial hardship.
- Will there be a limit of animals on property?
- Could we request a county person to come to our house to check on ways to improve landscape practices, etc.?
- Could permit fees be waived for repairs and voluntary upgrades?
- On page 12, paragraph 2 - does that apply; not exclusive statements.
- $162 inspection fee - per unit. 4-plex should only be charged for one inspection, not as individual residences,
because there is only one septic system.

- What is definition of large parcel? Why only $1 per acre?
- How is the Boy Scout property charged?
- Required to attach piece across the road to lake property if a garage is built. Is that one piece of property (for purpose of LMD fee)? It should be.
- Will we be notified of the changes made in the final plan, so we know if our concerns were incorporated before we vote and it is presented to the Commissioners?
- On total $ cost, are those all we are spending? Is the county's general fund being spent?
- How are we going to have a secret ballot?
- Is there going to be anything done on drainage from road going over septic systems?

PUBLIC COMMENTS
MEETING - JUNE 29, 1991

9 people present.

- I have a palisades lot, do not have access to the lake for drinking water. I do not know why I should be taxed so highly when I don't have the use of the lake.
- An access for easement to the lake for water for the two layers of palisades lots should be investigated and considered.
- What about the power company. Their right of way roads could cause erosion, the spraying of herbicides. You have not mentioned the gas company or power company.
- Are we going to get to vote on this?
- Summit Lake as source of drinking water - can you now get a loan on Summit Lake property?
- We haven't had enforcement for anything. How are we going to get enforcement if this is implemented. Success of the program depends on enforcement.
- Is there any provision to have a private entity take care of stormwater other than the county? They could probably do it faster and cheaper.
- When is the presentation going to be made to the county and is it going to be an open meeting?
- Community easements - any provisions for re-establishing original flora?