

South Thurston County Aquifer Protection Strategy

Adopted by the Board of County Commissioners for Thurston County
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Executive Summary

In July of 1992, the Thurston County Commissioners directed county staff to develop a strategy to protect ground water resources in south Thurston County. This was done because of concerns the Commissioners and citizens had about the susceptibility of the areas ground water to contamination. Ground water is the only source of drinking water for most residents and businesses in south county. Given that ground water is the primary source of drinking water it is the intention of this strategy that it be managed just as any other public water supply with appropriate monitoring, pollutant prevention and identification efforts, and regulatory compliance.

The Aquifer Protection Strategy Is A Blueprint For Directing County Efforts to Protect Ground Water Supplies In South Thurston County:

"An Aquifer Protection Strategy for Southern Thurston County" was developed in order to help direct Thurston County governments efforts in protecting ground water supplies in south Thurston County. The strategy identifies key issues and concerns related to ground water protection in south county, what is already being done to address these issues, and recommends actions to fill in the gaps.

Citizen and Business Involvement Important In Shaping Strategy And Needs to Continue To Ensure That The County's Protection Effort Is Carried Out Effectively And That Ground Water Issues Get Resolved At The Community Level:

In developing this strategy staff met with citizens and business leaders from south county to identify their concerns and ideas on ground water protection. This document attempts to reflect those concerns as well as the concerns identified by County staff from various departments. It is not however the final word on how the county should go about protecting ground water supplies in south county. More work needs to be done in refining the strategy and addressing new issues. Thus the strategy recommends formation of a "South County Ground Water Protection Committee" to provide oversight in implementing and refining the strategy.

We Have Adequate Regulations In Place Or In Process of Adoption They Just Need To Be Adequately Enforced:

This strategy is not a regulatory document. There are already many regulatory efforts either in place or in process of adoption to adequately protect ground water resources in south county. The strategy does however identify the regulations that are in place and the need to adequately enforce them. It identifies regulatory and protection efforts that are in process and how these efforts such as the proposed "Critical Areas Ordinance" can address ground water issues.

The strategy also recognizes that part of gaining regulatory compliance involves providing technical assistance and working cooperatively with potential polluters.

Ground Water Monitoring And Pollutant Source Identification Essential to Ground Water Protection Efforts/ County Commissioners Act Early to Initiate Program:

Another core element of the strategy is the establishment of an adequate monitoring and pollutant source follow-up program. Clearly, early detection of contamination and accurate source identification is needed in order to direct effective actions to prevent and stop contamination. This task has been deemed so important by the Board Of County Commissioners that the Board decided to fund it in early 1993 in order to advance ground water protection efforts in south county.

Adequate Sewage Disposal For Growth Areas Needed/Several Programs To Address Issue In Process:

Sewage disposal issues were identified early on as important by community leaders. The south county growth areas need to develop alternative sewage disposal methods in order to protect their drinking water supplies and achieve their growth potentials. Yelm is in the process of developing their sewer system and the communities of Rainier, Tenino, and Bucoda in partnership with Thurston County, the PUD, and the Port have initiated a study to examine sewer options.

The county is also assisting residents in the Grand Mound interchange area in development of a sewer system. The strategy recommends all these efforts proceed. In addition the strategy recommends that the county should reexamine the growth designation for those areas within the Grand Mound/Rochester Growth Area that are not planned for sewer in order to address potential contamination from on-site sewage systems.

Livestock Waste Disposal Needs Improvement/Cooperative Solutions For Compliance Recommended:

Animal waste disposal was another important issue brought forth by the community. At least 1 million pounds of animal waste per day is generated in south county livestock operations. These operations are important to the areas economy and farming heritage and many are working hard to address their manure disposal problems. This issue is addressed by the strategy with recommendations on providing an appropriate mix of technical assistance, cooperation, and consistent firm enforcement.

Concerns About Effects Of Surface Mining On Ground Water Result In Moratorium/And New Mineral Extraction Code:

In July of 1992 the county enacted a year long moratorium on new gravel mines because of concerns about the effects that gravel mining can have on ground water. Under the moratorium the county did a study of gravel mining impacts on ground water, identified gaps in current regulations, and enacted a new mineral extraction code. The new code provides best management practices for mines to follow when carrying out extraction activities in ground water sensitive areas.

Aquifer Protection Efforts Need To Consider The Interaction Between Ground And Surface Waters:

Recent technical information and the practical experience of long time residents indicate that ground and surface waters in south county are interconnected. Because of the probable interaction between these two water systems, pollutants reaching surface waters may migrate into surrounding aquifers and potentially pollute drinking water supplies. Thus an important factor to consider in protecting ground water is the protection of surface waters and wetlands. Additionally the ground water monitoring and other protection efforts by the county need to be integrated with surface water protection efforts to assure complete protection and avoid duplication.

Funding Aquifer Protection Services and Actions Is Needed.

Many of the recommendations discussed above can occur without additional funding since they are part of existing programs and permit processes. However some of the most important aquifer protection services, such as monitoring, alternative sewerage planning and technical assistance will need to be funded with new dollars. These "unfunded" service needs are estimated to cost in the range of \$200,000 to \$500,000 per year. Currently the County does not have the authority to charge a fee for aquifer protection services. Indeed, to date most of the current work being done to protect ground water in both north and south Thurston County is funded through short-term grants. Even the recent action by the Board to fund monitoring for south county is from a fund that is considered only short term.

One potential source of funding is creation of an Aquifer Protection Area. Such an area is created by a vote of residents in the area for assessing specific fees to fund specific protection measures and services.

In the final section of the strategy an over view of these issues and ongoing actions is given and the efforts or tasks to implement the strategy are listed with costs and discussion on potential funding sources.

Section I: Introduction

Ground water is the only source of drinking water for nearly all residents in southern Thurston County. It is a very precious resource but it is also susceptible to contamination from activities at the lands surface.

In response to citizen concerns that more needed to be done to protect south county ground water resources and several incidents of ground water contamination, the Thurston County Commissioners initiated in July 1992 the development of an Aquifer Protection Strategy for south Thurston County. The Board initiated this effort in order to organize and set priorities for the county's effort to protect drinking water supplies of southern Thurston County. The strategy contained in this document identifies what the problems are, what is already being done and what new protection measures are needed. The strategy also directs these efforts to be carried out in the "South County Ground Water Protection Area" as depicted on Map 1.

A: Why Is An Aquifer Protection Strategy Needed?

A strategy is a way for the county to identify what its priorities should be for directing its efforts to protect ground water in south county. It is also a way to clearly identify what the county is already doing and what new initiatives are needed for the future.

The recently adopted North Thurston County Ground Water Management Plan (a five year effort) does not cover south county. The south county strategy, though not as detailed as a plan, provides an efficient way for the county to guide and direct its protection efforts. The strategy makes maximum use of already adopted laws and policies. It also identifies some new initiatives that are needed in order to secure the area's aquifers for the long term use of its citizens and other beneficial uses.

B: What's the Overall Goal of the Strategy and How Will The Strategy Protect Ground Water?

Given that ground water is the primary source of drinking water in south county it is the intention of this strategy that it be managed just as any other public water supply with appropriate monitoring, pollutant prevention and identification efforts, and regulatory compliance. The overall goal of the strategy is for Thurston County to provide cost effective and efficient protection of ground water supplies in South Thurston County.

Business leaders and citizens identified early on the need to be cost effective and to avoid duplication and new regulations. Thus, the strategy identifies key issues and concerns related to ground water protection in south county, what is already being done to address these issues, and recommends actions to fill in the gaps. In this way the strategy will help the county make the most effective use of existing resources and take effective actions to protect ground water.

One of important gaps identified by the strategy is that currently the county government has a limited capacity in terms of staff time and financial resources to carry out activities to protect ground water. This strategy identifies both short and long term measures needed to protect ground water, recommends priorities for protection efforts and identifies methods of funding those efforts.

The strategy will also serve as a key document from which the Board will direct staff to carry out ground water protection efforts, and from which the community can evaluate the county's efforts.

Section II: What's the Problem?/What are the Issues?/What's Being Done Now?/What Needs To Happen?

A: The General Setting: Plentiful and Essential Ground Water Supplies But Susceptible to Contamination

Southern Thurston County is blessed with relatively large aquifers containing large quantities of ground water. It is a critical resource here. There is no alternative source, since surface waters are almost completely appropriated. Ground water supplies almost all drinking water in south Thurston County and also provides water for irrigation, industrial processing, and aquaculture. Much of the water flowing to streams, rivers, lakes, wetlands, Puget Sound, and other surface water bodies comes from ground water. This natural ground water discharge is particularly important during the summer, when it may supply up to 100 percent of the total or base flow in a stream.

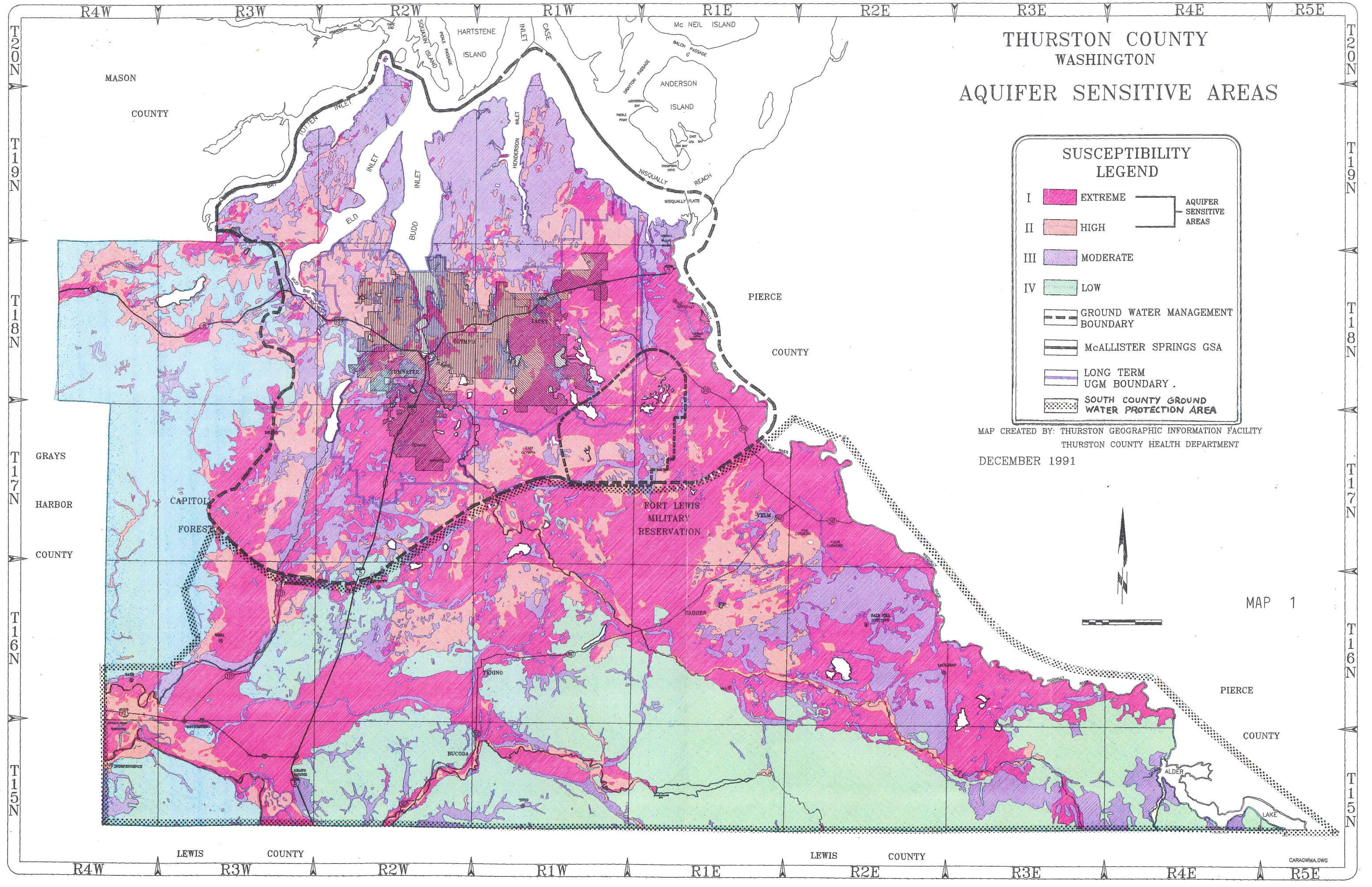
The major aquifers in south county consist largely of sands and gravels, from depths of several hundred feet to the surface. Rainfall easily permeates these sands and gravels and, not surprisingly, rainfall is the primary source of water for these aquifers.

Unfortunately, the highly permeable nature of the soils that overlay the aquifers makes them susceptible to contamination. As rainfall infiltrates into the ground, it may carry with it contaminants deposited within, or on the ground. In general the degree of susceptibility can vary depending upon the specific local geologic characteristics. A map of relative susceptibility, the Aquifer Sensitive Area Map (Map 1) is shown on the following page. In south county the areas with the most significant aquifers and water supplies are also the areas most susceptible to contamination.

Susceptibility alone however will not result in contamination. A contaminant source also must be present. Unfortunately, in our increasingly complex society, there are many substances that can threaten human health or environmental quality and many sources for those contaminants.

In south Thurston County the high potential for contamination has been realized in some specific areas. The Thurston County Health Department has identified numerous wells with elevated levels of nitrate. Several of these wells have nitrate levels over 5 ppm and a subset of these exceed the health standard of 10ppm. The highest levels of contamination are strongly associated with over application and improper storage of animal wastes. At least 1 million pounds of animal wastes per day are generated by area livestock operations (primarily dairy, poultry, and feedlot operations). Most of this animal waste is disposed of by land application in sensitive aquifer areas. Map 2 identifies some of the areas where high nitrates have been found as well as other known sites of soil and ground water concern.

Another identified source of contamination are on-site sewage systems. In areas where there is



THURSTON COUNTY
WASHINGTON

AQUIFER SENSITIVE AREAS

SUSCEPTIBILITY
LEGEND

I EXTREME

II HIGH

III MODERATE

IV LOW

AQUIFER SENSITIVE AREAS

GROUND WATER MANAGEMENT BOUNDARY

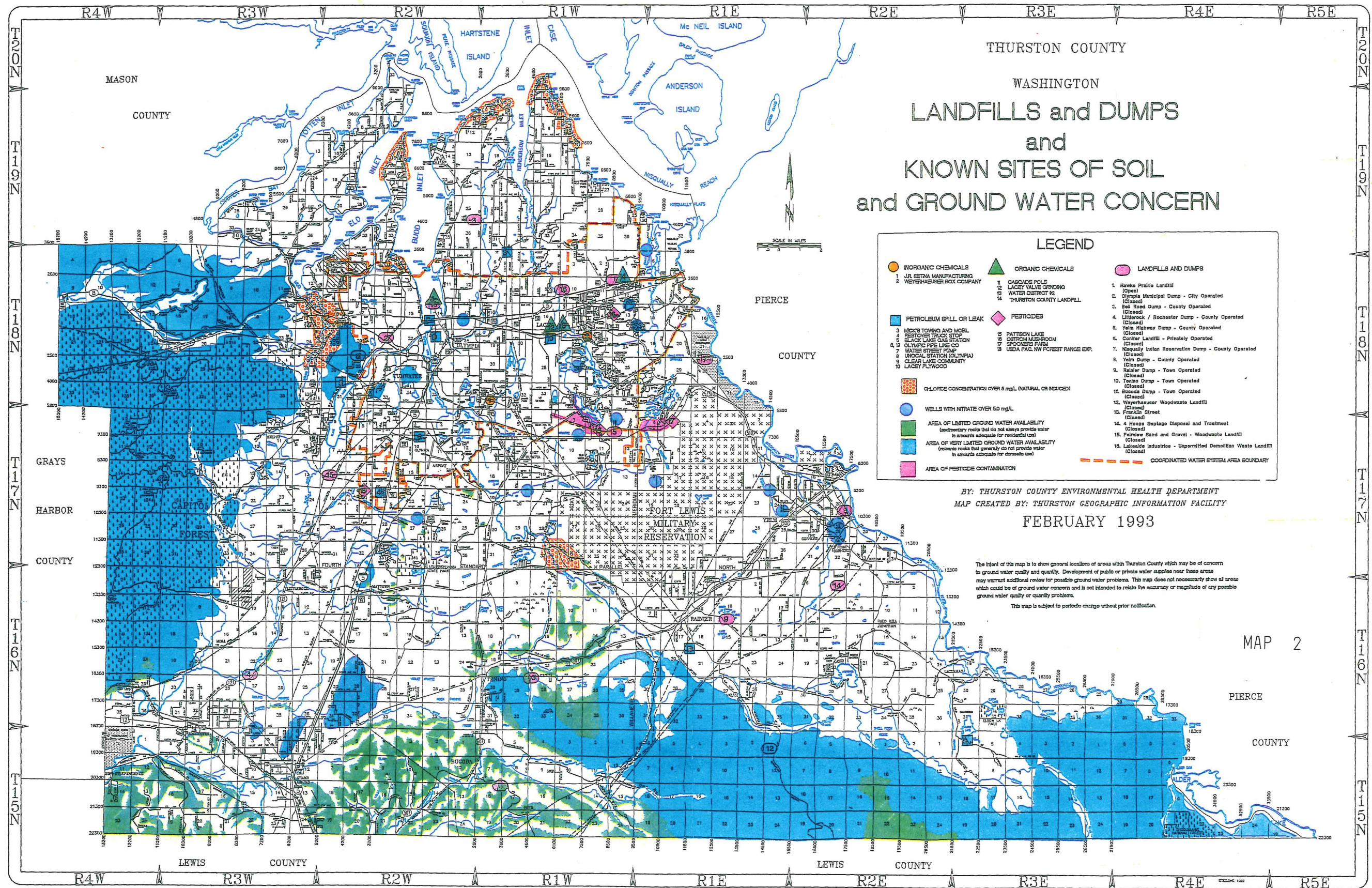
McALLISTER SPRINGS GSA

LONG TERM UGM BOUNDARY

SOUTH COUNTY GROUND WATER PROTECTION AREA

MAP CREATED BY: THURSTON GEOGRAPHIC INFORMATION FACILITY
THURSTON COUNTY HEALTH DEPARTMENT
DECEMBER 1991

MAP 1



a high concentration of such systems such as in the south county towns and around the Grand Mound I-5 interchange, well water nitrate levels have been found to be elevated beyond background levels. The concern here is not only with nitrate levels but with the other types of wastes that are disposed of in on-site systems such as chemicals used in households and businesses. Nitrates are usually only the first indication of a contamination problem.

B: Major Issues and Problems/What's Being Done Now/And Recommendations For Future Actions

In south Thurston County there is a range of specific problems and issues that need to be considered in protecting ground water resources. The following, attempts to identify these issues and offer a review of what's being done now, where gaps exist and lists recommendations for action.

SEWAGE DISPOSAL

Issue:

Use of septic tanks and conventional drain fields to dispose of sewage can have the potential for contaminating ground water when used for high density residential and some industrial and commercial uses in aquifer sensitive areas. The Thurston County Board of Health has had to restrict development densities in south county growth areas and towns to one dwelling unit per acre to insure that on-site sewage disposal systems do not over saturate the aquifer. Thus the towns of Bucoda, Yelm, Rainier and Tenino are in the process of developing alternative methods of sewage disposal in order to prevent ground water contamination and reach their potential for growth.

In Grand Mound, sewer and water systems are being designed. These systems are planned to serve only a portion of the larger growth area which encompasses Grand Mound and Rochester. The rest of this areas growth area zoning could be problematic given the sensitivity of the aquifer, causing potential for conflicts over land use and drinking water needs.

What's Being Done Now:

- Development projects are reviewed on a case by case basis and only approved if on-site sewage disposal is acceptable.
- County zoning and plans attempt to direct this kind of development to areas with utilities. For instance most, though not all of the aquifer sensitive areas in south Thurston County are currently zoned for low density residential and commercial uses.
- Yelm is in the advance stages of sewer system construction. Bucoda, Rainier, Tenino and the county are in the initial phases of considering sewers for the towns.
- The county is developing sewer and water systems for the commercial area at the I-5 interchange in Grand Mound. Though as noted above this system is planned to support only a portion of the larger growth area in that region (less that one square mile of the approx. 15 square mile growth area).

Recommendations For Sewage Disposal:

- ◆ S-1: Alternative sewage disposal methods for south county towns and identified growth

areas should be developed.

- ◆ S-2 In growth areas where on-site systems are the only likely method of sewage disposal, an operation and maintenance program for water and sewer should be considered. Such a program is needed to insure that drinking water wells are protected from the density of on-site systems.

The private water associations, along with citizens and businesses in the community should be involved in any such consideration.

Issue:

On-site Sewage disposal has potential for contaminating ground water when such systems are placed too deeply into the ground, when soils are too coarse (highly permeable), and when dwelling unit density is too great (too much sewage per acre).

What's being Done Now:

- In addition to state standards, on site systems on coarse (highly permeable) soils are required to have shallow trench and pressure distribution systems to reduce affects on ground water.
- The interim rezone to five acre density covers much of south county aquifer recharge areas. However the rezone did not apply to the Ground Mound/Rochester Growth Area. The draft Critical Areas Ordinance attempts to address this issue.
- Thurston County has developed a loan program using state and federal funds to assist homeowners in repairing their failing on-site systems.

Recommendations for Sewage Disposal:

- ◆ S-3: Continue pressure distribution and enhanced treatment for on-site systems in aquifer recharge areas.
- ◆ S-4: Continue the on-site sewage system repair loan program.
- ◆ S-5: Consider using sewage system operational permit revenue to monitor water quality associated with on-site sewage disposal systems.

AGRICULTURAL SOURCES:ANIMAL WASTES,PESTICIDES AND FERTILIZERS

Issue:

Increased nitrate in ground water appears to be strongly associated with land application of animal waste (manures) when applied in excess of crop needs or when applied when crops aren't growing. (see previous discussion on page 3)

Land application of manure and other livestock wastes is a recommended and practical method of disposal and of turning that waste into a useful fertilizer. These wastes are good sources of nitrogen and other crop nutrients. Of course crops can only take up the amount of nutrients they need to grow, and can only use these nutrients during the growing season. Unfortunately, like with many things, too much of a good thing can have negative effects. Over the last several years research from around the country has shown that ground water can be contaminated with nitrates by excessive applications of livestock waste. This can occur when livestock wastes are applied to fields in excess of the ability of a crop to take up the nitrogen (in excess of agronomic rates). Waste applications during the non-growing season can be especially troublesome. During the winter most grasses or other crops take up very little nitrogen and the winter rains can hasten the leaching process, especially on highly permeable soils.

In several of the aquifer sensitive areas of south county, land application of livestock wastes has occurred at excessive rates. Wells in close proximity to these application areas have shown higher than background levels of nitrates. Other possible sources of nitrates such as on-site sewage disposal are not in high enough density to be a probable cause of the high nitrates, although in other areas on-site sewage disposal systems are suspected of contributing to elevated nitrates.

Some wells have been found with nitrates in the 10 - 15 ppm level. The health standard for drinking water supplies is 10 ppm.

County Legal Authorities Over Animal Waste Discharges To Ground Water: There are three potential regulatory authorities that the county may use when seeking to protect ground water from animal waste disposal.

1) Solid Waste Regulations - State Law and Article V of the Sanitary Code.

It is a violation of this code to apply manures in excess of agronomic rates. This code specifically exempts agricultural wastes that are applied at agronomic rates. If application is above agronomic rates, a solid waste permit is required and conditions can be established for such applications.

2) Non-Point Pollution Ordinance - Article VI of the Sanitary Code

This ordinance becomes effective in May 1993. It provides enforcement authority in situations where manures are allowed to discharge to surface waters or when manures are applied to the ground in excess of agronomic rates. The ordinance specifically exempts: farms which are implementing approved Conservation Plans, discharges

permitted under Ecology's NPDES program, and operations which are under an active enforcement process by Ecology. The non-point ordinance enforcement provisions describe a process and allow for specific time frames for an operation to come into compliance with the ordinance prior to any penalties being levied.

3) State Nuisance Abatement Law - WAC 246-203

This law describes as a violation: the disposal of manure when it becomes a menace to health. The law contains no specific enforcement options. Since this law is so vague it has not been routinely used as an enforcement tool by the county, however it is an available tool to consider in certain situations.

What Is Being Done Now?:

- Historically, the county has chosen to approach compliance issues by using technical assistance and cooperation first, and resorting to legal penalties and court orders as a last resort. This approach fits with a general philosophy that the ultimate desired outcome is correction of a problem, not penalizing and punishing individual residents. Legal penalties continue to be used only in those instances where it is apparent that voluntary compliance is not and will not occur.
- Technical assistance is available from the Thurston Conservation District and federal Soil Conservation Service to help livestock owners develop best management practices and design waste facilities. This assistance can help them dispose of animal wastes in ways that prevent contamination of ground and surface water. Cost share assistance is also available from the federal government.
- Washington State Department of Ecology has primary responsibility to enforce state water quality standards as they relate to animal waste contamination. Currently there is an agreement between the Department of Ecology and Thurston Conservation District to refer animal waste complaints to the Conservation District for technical assistance prior to enforcement action. If a livestock owner adopts and implements a district approved plan, enforcement action is not taken.

Gaps in this program exist however. There is limited staff time available to DOE to investigate and enforce state laws regarding animal waste violations. Secondly, until recently, the Conservation District program was severely limited by lack of funds. However, Thurston Conservation District will begin receiving special assessment funds to provide staff time for technical support to farmers. One of the districts priority areas will be to provide support to livestock operations in south county.

- Recently the Conservation District developed a program to assist dairies in developing adequate waste disposal practices in the Chehalis Basin part of the South County Ground Water Protection Area

- A Group of dairy farmers, citizens and agencies has formed to develop a regional bio-waste facility that would take livestock wastes and other organic wastes and process it into electricity, fertilizer, and soil.

Recommendations for Animal Waste:

- ◆ AW-1: Continue, and expand, the Thurston Conservation Districts technical assistance and education program for managing livestock waste including poultry, dairies, and other intensive livestock operations.
- ◆ AW-2: Public education about the non-point ordinance to alert livestock owners of potential violations and where they can go for assistance.
- ◆ AW-3: Livestock owners and handlers of livestock wastes should be encouraged to adopt animal waste management practices which will prevent contamination of ground and surface water. Where possible the County and Conservation District should help develop cooperative innovative solutions with livestock operators, adjacent land owners and other interested parties in order to prevent an "Us vs. "Them" situation from developing.
- ◆ AW-4: Thurston County should consider developing a low interest loan program for farmers to assist them in making pollution control improvements and adopting best management practices. Such a program is being tried in Whatcom County. Washington State has special funds available to local governments to make such loans. Currently Thurston County runs a loan program to assist homeowners in making repairs to their on-site sewage systems.
- ◆ AW-5: Thurston County should enforce the non-point ordinance or other effective compliance methods if education and offers of technical assistance fail to gain compliance.
- ◆ AW-6: The county should monitor ground water in areas of known or suspected excess manure application. By having accurate information both livestock operations and concerned parties can identify appropriate actions.
- ◆ AW-7: Encourage the development of alternative technologies that turn livestock wastes into products

Issue: Agricultural, residential, institutional, and commercial uses of pesticides and fertilizers in Thurston County are potential sources of ground water contamination. In south Thurston County it is difficult to assess the impact of pesticides on ground water due to a lack of

information, caused in part by the high cost of monitoring for pesticides. But several instances have been documented in the north Thurston County. The best known cases of pesticide contamination of ground water appear to have resulted from agricultural use of fumigants EDB, shown to be a potent carcinogen in tests on laboratory animals. In 1984 EDB, DCP, and DBCP were detected near the Yelm Highway in the Lake S. Clair area. All three of these pesticides are no longer allowed to be used. In 1990, these same pesticides were found again in wells serving 200 homes along Fair Oaks and Kelly Beach roads. Recently in south Thurston County one well was found to have very low level of the herbicide atrazene .

It is also difficult to assess the magnitude of local problems due to fertilizer use. Fertilizer impacts usually appear in ground water as an increase in nitrate levels, but nitrates can come from other sources as well such as animal wastes and on-site sewage disposal systems.

What's Being Done Now:

- The Washington Department of Agriculture is doing a well monitoring study to assess impacts to ground water from the pesticide atrazine. Some wells in South Thurston County have been included in this project.
- Commercial applicators of pesticides must follow application criteria to reduce the risk of pesticides migrating into ground water.
- WSU Cooperative Extension assists in applicator training sessions and provides information and education to the general public and farmers about the safe use of pesticides (Master Gardener Program).
- Thurston County has developed a "Common Sense Gardening" program which provides alternatives to using pesticides.
- WSU Cooperative Extension is doing a study of the mobility of pesticides to ground water using local soil conditions.

Recommendations for Pesticides and Fertilizers:

- ◆ P-1: Provide information to homeowners, farmers, and others about the potential negative impacts of pesticides and fertilizers on ground water.
- ◆ P-2: Develop locally appropriate integrated pest management techniques for crops grown in Thurston county and provide technical assistance to local growers in applying these techniques.
- ◆ P-3: Monitoring for pesticides in south Thurston County aquifers should be carried out in order quantify the extent of pesticide contamination in this area.

MONITORING

Issue:

In order to detect and monitor water quality problems and long term trends, a monitoring program is needed. Early detection of problems may give time for action(s) before water supplies are lost or water has become unusable.

What's Being Done Now:

- Currently area-wide water quality monitoring occurs on a grant funded project basis. Public water supplies are required to sample water quality to determine whether the water is fit to serve to their consumers. Though this information is available, it is not yet organized in ways that maximize its use for tracking area wide water quality trends.
- Recently, Thurston County Commissioners authorized funding for a comprehensive monitoring and pollutant source follow-up program for south Thurston County.
- Some individual systems are sampled by their owners. This water quality information is not part of the available data base.
- Thurston County Health Department is doing an aquifer characterization study of south Thurston County. This study will identify generally the quality of the ground water in south county. Major products include maps depicting the direction of ground water flow, areas of contamination, and potential pollutant sources. The final report is expected in early 1994.

Recommendations for Monitoring:

- ◆ M-1: Continue the county's recently funded monitoring and pollutant source follow-up program. When possible, the monitoring goals and objectives of the Northern Thurston County Ground Water Management Plan should be used. The County should pursue grant funding to expand its monitoring program to include pesticides and other priority pollutants.
- ◆ M-2: Where practical involve citizens in monitoring water quality. Citizen participation can help broaden understanding of the need for monitoring and utilize volunteer assistance and expertise in gathering water quality information.
- ◆ M-3: Water quality information should be shared with agencies with jurisdiction (Department of Ecology and Department of Health) and affected parties.

GRAVEL PITS and MINES

Issue: Mineral extraction into the water table may have a negative impact on ground water quality and quantity.

What's Being Done Now:

- In July of 1992 the county enacted a year long moratorium on new gravel mines because of concerns about the effects that gravel mining can have on ground water. Under the moratorium the county did a study of gravel mining impacts on ground water, identified gaps in current regulations, and enacted a new mineral extraction code. The new code provides best management practices for mines to follow when carrying out extraction activities in ground water sensitive areas.

Recommendations:

- **ME-1:** All mines should have appropriate best management practices in place to protect ground and surface waters from contamination
- **ME-2:** The county should develop efficient and effective methods for gaining compliance to its mining regulations to insure that permit conditions are met.
- **ME-3:** Mining operations should have state discharge permits to insure that storm and process waters do not degrade ground and surface waters.

SURFACE WATER/STORM WATER

Issue:

In south Thurston County ground and surface water interact, and are in some ways interconnected. In dry summer months ground water is sometimes the only source of water for many of the areas streams and lakes. During the winter rainy season the reverse can occur. Many of the wetlands, creeks and lakes in south county serve as windows to the aquifer. Pollutants reaching these water bodies can easily migrate into the surrounding aquifer and potentially pollute drinking water supplies. Thus, an important factor to consider in protecting ground water is the protection of surface waters and wetlands.

Similarly many of our flooding and storm water problems are also a ground water problem. Wells can become turbid and unusable for short periods of time during flood and storm events. If pollutants are also being washed into run-off waters during storms, then there is a potential for more serious contamination. Stream restoration efforts and other flood prevention techniques can benefit ground water protection.

There is also concern that as a result of protecting ground water, surface water quality may be damaged. We know from past experience that sometimes in our solutions to protect one water source we may damage another. For instance, in the past, in order to avoid discharge to a stream, storm water has been discharged into what are called dry wells, thus allowing ground water degradation risk. Just as this practice is now no longer recommended, we need to be aware that in our concern to protect ground water we don't do things that could damage surface waters.

Lastly there is sometimes inadequate information regarding the interaction between streams and ground water and not good information regarding pollutant loading on both ground water and surface water components.

What's Being Done Now:

- County staff reviews development applications for compliance with the County Storm Water Manual. This manual provides best management practices for handling storm water and design criteria for constructing storm water facilities. The County's storm water manual exceeds Department of Ecology guidelines.

Recommendations for Storm and Surface Water:

- ◆ SW-1: Both surface and ground water and their interactions should be considered during the evaluation phase(s) of pollution management options and permit reviews. Emphasis should be given to management practices that prevent spills and discharges to avoid costly clean-up actions.

- ◆ **SW-2: Surface water and ground water protection efforts need to be integrated. If possible the county should consider developing stream restoration and other flood prevention programs as part of a ground water protection program for south county.**
- ◆ **SW-3: The water quality monitoring program should be employed to increase our understanding of the relationship between surface water and ground water.**

ENFORCEMENT AND COMPLIANCE

Issue:

Numerous laws exist to protect water quality and require correction of identified problems. Compliance with these laws is not complete and enforcement can also be incomplete or inadequate.

On the issue of enforcement and compliance there is at least two general impressions at work in the community. One is that if the existing laws were just enforced vigorously, that problems would be solved.

The other major concern that is expressed is that government may have too much power, that persons assigned enforcement responsibility may be too "trigger happy" or fail to understand the economic impacts of aggressive enforcement actions.

Another related chronic issue or problem is that of tight or limited budgets at both state and local levels to support enforcement and compliance efforts. An example of this is the Department of Ecology having a single person to respond to dairy waste water quality complaints in 12 counties.

What's Being Done Now:

At the County level, the following enforcement strategies have been employed.

1. Due to budget constraints, the County has relied on grant funding for pollutant source identification and beginning enforcement actions. These grants have been awarded based on state priorities for specific areas, such as shellfish protection or Puget Sound protection and clean-up. Thus much of the source detection work and follow-up has been focused on discrete priority areas. Technical assistance has also been provided on a grant funded basis.
2. The second strategy that has been employed is to set standards at times of permit approval. This method allows for review of a particular application and the granting of a permit only when the applicant agrees to meet standards to protect water quality. Thus water quality protection is achieved through permit conditions. However this strategy does little for existing facilities in the same category, some of which may not be following current best management practices. Land-use laws and permits generally follow this pattern.
3. A third strategy has been adopted for the regulation of sewage disposal systems. At the state level, Washington State or National Discharge permits may be applied to facilities with known discharges, and water quality standards applied. At the local level the Environmental Health Division issues operational permits that are renewable and under

which operation and maintenance issues may be examined and the water quality impacts from these systems can be monitored.

4. In recent years additional time and budget has been devoted to enforcement issues. The County Planning Department now has a full-time enforcement person for forest practices and land-use permit violation issues. To the extent that land-use permit violations affect ground water, this program can help achieve compliance with water protection standards.

The Environmental Health Division has a full-time person to follow and enforce reported septic system failures. The Operational Permit system has not been fully implemented, but shows promise of detecting failures prior to severe water quality impacts.

- 5: As noted in the section on animal waste, recently a nonpoint pollution source ordinance was adopted by the Thurston County Board of Health with an effective date of May, 1993. This ordinance gives the county another tool in bringing persons who are causing nonpoint pollution into compliance
6. The Washington State Department of Ecology has primary responsibility in responding to water quality complaints and violations. Where appropriate Ecology is called to assist the county in responding to a complaint or violation. As noted above however, water quality problems of local significance may not meet the same priority for Ecology.

Recommendations For Enforcement and Compliance:

- ◆ E1: Cases identified as having high potential for health effects should be given high priority for enforcement action.
 - ◆ E2: Cases which have similar characteristics but which fall into State jurisdiction should be actively tracked to assure that the state takes effective actions.
 - ◆ E3: The County should provide assistance to help citizens in voluntary compliance. The Thurston Conservation Districts technical assistance for animal waste disposal is an example of such a program.
 - ◆ E-4: The following policy directives will be given to appropriate County staff to help insure that extra attention be paid to ground water protection when staff are carrying out their duties such as during development reviews, complaint follow-ups and the drafting of new laws.
1. Implement all reasonable ground water protection standards as part of SEPA determinations, mitigation of projects with DNS's, and within existing EIS process.

2. Be aware of the already distributed Aquifer Recharge Areas Map in consideration of projects that require permit evaluation.
3. Fully consider the Thurston County Comprehensive Plan when applicable, as it relates to ground water resources.
4. Fully implement the Stormwater Design Manual by including its requirements into projects during usual permit process.
5. The Environmental Health Division will continue to implement enhanced sewage disposal standards for aquifer sensitive areas. The Sanitary Code shall continue to be used for the review of permits and the protection of public health and water quality.
6. Cooperate with State agencies toward the most effective implementation of laws that protect public health and water quality. Water quality information should be shared with agencies with jurisdiction (Department of Ecology and State Department of Health) and affected parties.

COMMUNITY OVERSIGHT OF GROUND WATER PROTECTION EFFORTS AND ON-GOING REFINEMENT OF THE AQUIFER PROTECTION STRATEGY

Issue:

There is clearly a need for the residents and businesses who rely on the ground water resources of south county to be involved in developing and overseeing the county effort to protect these resources. Business and citizen groups have been involved in the development of this strategy, but there is no formal relationship established for ongoing contact with these groups. There is also a need for continued refinement of this strategy and for a forum to deal with issues this strategy has not dealt with.

While many of the issues and recommendations in this strategy have been developed out of meetings with business and citizen groups, there is a need for such involvement on an ongoing basis. The ground water protection effort in south county should represent a community consensus, and be guided by the community.

What's Being Done Now:

- Ground water concerns and issues are resolved on an ad hoc basis with county officials and staff meeting with interested parties as issues emerge.

Recommendations For Community Oversight:

- ◆ CO-1: The County should work with citizens, businesses, tribal governments, the south county towns and state and federal agencies in protecting ground water resources in south county. In pursuit of this the county could consider establishing a formal South County Ground Water Protection Committee to oversee implementation and further refinement of this strategy.
- ◆ CO-2: Public involvement and education is an essential part of preventing pollution of ground water. Water pollution prevention workshops, outreach to schools, and other methods of informing citizens about the needs to protect ground water should be developed. The county should continue its existing efforts to involve citizens in protection efforts, and promote better public awareness of ground water protection issues, and what people can do to prevent pollution.

FUNDING AQUIFER PROTECTION SERVICES AND ACTIONS

Issue:

Funding is an important factor in the implementation of ground water protection. Many of the recommendations discussed above can occur without additional funding since they are part of existing programs and permit processes. However some of the most important recommended actions and services, such as monitoring and technical assistance will need to be funded with new dollars. Depending on the level of service desired, these "unfunded" service needs are estimated to cost in the range of \$200,000 to \$500,000 per year. Indeed, to date most of the current work being done to protect ground water in both north and south Thurston County is funded through short-term grants. Much has been accomplished through these programs but if we expect to have long term protection we need to find long term sources of funding.

Gaps:

- At present there is only short term funding through grants for area wide monitoring of water quality.
- Enforcement is underfunded in areas of detecting and tracking pollutant problems, and ensuring that those problems are corrected.
- Planning for specific technical solutions such as sewer planning for the towns.
- Broad based water quality management planning is currently not funded. There are several water quality planning efforts in various stages of completion in south county-- Budd/Deschutes nonpoint plan(starting in November 1992, completion date anticipated January 1994), Chehalis nonpoint plan(recently completed), Nisqually River management plan has some water quality goals. But there is a need for a planning process that knits these plans into a coherent overall strategy for water quality protection efforts in south Thurston County.

What Is Being Done Now:

Currently the following sources of funding are used to fund ground water protection efforts in south Thurston County:

Grants--A Department of Ecology grant is funding the aquifer characterization study for south county.

Real Estate Excise Tax (REET) contribution-- match for grant

Operational Permits-- oversight of on-site systems (this program is on hold pending the outcome of a lawsuit)

Drinking water program--public water system owners sample water quality to satisfy state law. Data is available to local government.

Conservation District Assessment--Funding for technical assistance to landowners for agricultural waste disposal plans.

On-site sewage disposal repair loan program-- loans to homeowners for repair of on-site

sewage disposal systems.

Recommendations for Funding Ground Water Protection Efforts:

- ◆ F-1: Thurston County should develop a funding source for supporting ground water protection services such as ground water monitoring, pollutant source compliance and clean-up activities, stormwater control projects that protect ground water, and information and education for the public on ground water protection. Aquifer Protection Areas, storm water utilities or other mechanisms should be considered. The public should be involved in developing both the kind of ground water protection services and method of funding the service.

Section III: An Overview of Ground Water Protection Issues, Program Needs and Costs For Ground Water Protection Efforts

Protection of ground water resources in southern Thurston County will involve many individual efforts. It is essential that these efforts are tied to real issues and work together to achieve maximum benefit and to avoid duplication. The county and other agencies such as the Conservation District have initiated key pieces of the effort and are working together to mold a complete effort.

The attached tables provide an overview of existing and future ground water protection efforts in south county. The tables identify key issues, what is being done to address each issue, and the strategy recommendation related to that issue. In addition, the tables identify additional efforts that are needed to carry out the strategy and protect ground water in south county.

Priorities

In the immediate future the priority effort of this strategy should be the development of a program water resource protection program with emphasis on detection, correction and prevention of ground water pollution. This effort should include:

- Creation of an area wide ground water monitoring system for early detection of ground water contamination
- Establishment of a program of pollutant source identification and correction-- assisting individuals and businesses in correction their water quality problems
- Provision of water pollution prevention information to citizens to assist them in protecting their water supplies and preventing pollution.
- Integrating the county's ground water protection efforts with surface water protection efforts to assure protection of the total resource in south county and avoid duplication of efforts.
- Development of a long term funding source for supporting county water protection efforts

An Overview of Ground Water Protection Issues, Existing Efforts, Recommendations, and Additional Efforts Needed			
Issues and Concerns	What's Being Done Now	Strategy Recommendations	Additional Efforts Needed and Costs
<p>Only Source of Drinking Water: Ground Water is the only source of drinking water for nearly all south county residents</p> <p>Vulnerable to Contamination: Major Aquifers are vulnerable to contamination</p> <p>Elevated Nitrates In Some Wells: Nitrate contamination of drinking water wells is occurring now in several areas</p> <p>Need To Establish Program For Area Wide Monitoring of This Major Water Supply: South County Aquifers are the water supply for area residents, yet there is no on-going monitoring of ground water with which to achieve early warning of problems and proactive pollution prevention</p>	<ul style="list-style-type: none"> ● Limited grant funded monitoring (will end this year) ● Developing an overview of the quality, flow directions, and potential pollutant sources of ground water in south county (This study will be completed this year) ● County Commissioners recently established area-wide monitoring and pollutant source follow-up effort 	<ul style="list-style-type: none"> ● Establish a ground water monitoring system ● Involve citizens in monitoring water quality. Citizen participation can help broaden understanding of the need for monitoring and utilize volunteer assistance and expertise in gathering water quality information. ● Water quality information should be shared with agencies with jurisdiction (Department of Ecology and Department of Health) and affected parties. 	<ul style="list-style-type: none"> ◆ On-going, comprehensive area wide ground water monitoring (cost \$30,000, recently funded) ◆ Pollutant Source Follow-ups, Compliance, and Storm Water Remediation (cost \$60,000, recently partially funded)
<p>Inadequate Disposal of Livestock Wastes Threaten Drinking Water Supplies: Inadequate storage and disposal of livestock wastes have been correlated with high nitrate levels</p> <p>Technical Assistance and Cost Share Needed to Help Livestock Operations Comply With Water Quality Standards: Some of the major barriers to implementation of best management practices are adequate technical assistance and financial resources to pay for pollution control facilities such as waste storage lagoons.</p>	<ul style="list-style-type: none"> ● Several livestock operations in planning stages for improving disposal practices ● Conservation District has developed a program to assist dairies in developing adequate waste disposal practices in the Chehalis Basin part of the South County Ground Water Protection Area ● Group of dairy farmers, citizens and agencies has formed to develop a regional bio-waste facility that would take livestock wastes and other organic wastes and process it into electricity, fertilizer, and soil. 	<ul style="list-style-type: none"> ● Continue and expand Conservation District technical assistance program to include poultry and other intensive livestock operations ● Develop low interest loan program for operations making water quality improvements ● Use appropriate mix of education, technical assistance and enforcement of county non-point ordinance and other related regulations ● Encourage development of alternative technologies that turn livestock wastes into products 	<ul style="list-style-type: none"> ◆ Technical Assistance for development of animal waste best management practices for poultry and other intensive livestock operations (cost \$200,000 from a combination of Conservation District Assessment and grants. The District will be applying for grants to support this effort using assessment monies as match) ◆ Development of a low interest loan program for construction of best management practices. (cost \$800,000) ◆ Development of regional bio-waste facility (cost 16 million)
<p>Concerns About Gravel Mining in Aquifers: Major gravel resources also coincide with major aquifers, several proposals to mine gravel in water table.</p>	<ul style="list-style-type: none"> ● Study of the cumulative effects of gravel mining on ground water and overhaul of county regulations on gravel mining ● Based upon above study, the County Commissioners recently adopted new mineral extraction code to protect ground water from mining activities 	<ul style="list-style-type: none"> ● County should develop an inspection and compliance program to insure that new mining code is followed 	<ul style="list-style-type: none"> ◆ Registration, Inspection and Compliance Program for all mines (cost \$22,000, from registration fee)
<p>More Public Information and Education About Ground Water Needed: Prevention of ground water pollution is the most cost effective method of protecting ground water, and education is an important part of any prevention program. South county residents want to learn more about how the ground water system works and what they can do to protect it.</p>	<ul style="list-style-type: none"> ● The county provides area schools with curriculum and presentations about ground water and submits news articles on ground water to the south county weeklies. 	<ul style="list-style-type: none"> ● Maintain current program 	<ul style="list-style-type: none"> ◆ Public Information and Education (cost \$15,000, currently funded)
<p>Sewage Disposal Alternatives Needed for Growth Areas and Towns: Alternatives to on-site sewage disposal are needed for growth areas and towns. On-site sewage systems at too high a density can cause degradation of ground water, affecting drinking water wells.</p>	<ul style="list-style-type: none"> ● Grand Mound Sewer Planning ● Tenino, Rainier, Bucoda, Thurston County, the Port and PUD are collaborating on a sewage disposal options study for the three towns ● Yelm is developing a sewer facility for handling the towns waste water 	<ul style="list-style-type: none"> ● Continue to pursue alternative sewage disposal methods in partnership with towns and identified growth areas ● In growth areas, where on-site systems are the only likely method of sewage disposal, an operation and maintenance program for water and sewer should be considered. Such a program is needed to insure that drinking water wells are protected from the density of on-site systems 	<ul style="list-style-type: none"> ◆ Technical Support to small towns on joint sewer options study (cost \$10,000)
<p>Contaminated Storm and Surface Waters Directly Effect Ground Water Quality: The quality and quantity of ground water in south county is influenced by surface waters. Contamination of area streams, lakes and rivers can effect drinking water supplies</p>	<ul style="list-style-type: none"> ● Development projects are reviewed subject to the County Storm Water Manual 	<ul style="list-style-type: none"> ● Ground water monitoring and other protection efforts need to be integrated with storm and surface water protection efforts to assure complete protection and avoid duplication 	<ul style="list-style-type: none"> ◆ Pollutant Source Follow-ups, Compliance, and Storm Water Remediation (cost \$60,000, recently partially funded) ◆ Storm Water Operation and Maintenance Program (cost \$200,000)

An Overview of Ground Water Protection Issues, Existing Efforts, Recommendations, and Additional Efforts Needed

Issues and Concerns	What's Being Done Now	Strategy Recommendations	Additional Efforts Needed and Costs
There is clearly a need for the residents and businesses who rely on the ground water resources of south county to be involved in developing and overseeing the county effort to protect these resources. Business and citizen groups have been involved in the development of this strategy, but there is no formal relationship established for ongoing contact with these groups. There is also a need for continued refinement of this strategy and for a forum to deal with issues this strategy has not dealt with.	<ul style="list-style-type: none"> ●Ground water concerns and issues are resolved on an ad hoc basis with county officials and staff meeting with interested parties as issues emerge. 	<ul style="list-style-type: none"> ●The County should establish a formal South County Ground Water Protection Committee to oversee implementation and further refinement of this strategy. ●The South County Ground Water Protection Committee should serve as a forum for resolving ground water related issues as they emerge. 	<ul style="list-style-type: none"> ◆Citizen oversight and refining ground water protection policy and overall management of Program (cost \$30,000, can be funded from current work program)
We have adequate regulations in place or in process of adoption they just need to be enforced	<ul style="list-style-type: none"> ●Some enforcement capability on land use permits ●Grant directed enforcement on water quality violations ●Numerous regulations empowering county to gain compliance from violators but limited budget and staff resources to fully enforce laws 	<ul style="list-style-type: none"> ●Directives from the Board that staff implement all reasonable ground water protection standards as part of SEPA determinations, mitigation of projects with DNS's, and within existing EIS process. ●Cases identified as having high potential for health effects should be given high priority for enforcement action. ●Cases which have similar characteristics but which fall into State jurisdiction should be actively tracked to assure that the state takes effective actions. ●The County should provide assistance to help citizens in voluntary compliance. The Thurston Conservation Districts technical assistance for animal waste disposal is an example of such a program. 	
Key ground water protection services have no funding support: Monitoring, pollutant source tracking, technical assistance and education efforts are currently funded through grants or other short term funding sources.	<ul style="list-style-type: none"> ●Grants—A Department of Ecology grant is funding the aquifer characterization study for south county. ●Real Estate Excise Tax (REET)— used to fund initial monitoring and pollutant source tracking program ●Operational Permits— oversight of on-site systems (this program is on hold pending the outcome of a lawsuit) Drinking water program—public water system owners sample water quality to satisfy state law. Data is available to local government. Conservation District Assessment—Funding for technical assistance to landowners for agricultural waste disposal plans. On-site sewage disposal repair loan program— loans to homeowners for repair of on-site sewage disposal systems. 	<ul style="list-style-type: none"> ●Thurston County should develop a funding source for supporting ground water protection services such as ground water monitoring, pollutant source compliance and clean-up activities, stormwater control projects that protect ground water, and information and education for the public on ground water protection. Aquifer Protection Areas, storm water utilities or other mechanisms should be considered. The public should be involved in developing both the kind of ground water protection services and method of funding the service. 	<ul style="list-style-type: none"> ◆ On-going comprehensive monitoring (cost \$30,000) ◆ Pollutant source follow-ups and storm water remedial action (60,000) ◆ Public Information and Education(\$30,000) ◆ Citizen oversight, response to emerging issues and management(\$50,000) ◆ Remediation of storm water run off to protect ground water (\$200,000)