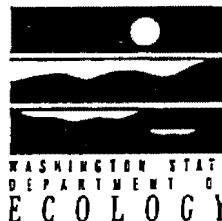




# ISLAND COUNTY GROUND WATER MANAGEMENT PROGRAM

Funded in part by Washington Department of Ecology's Centennial Clean Water Fund  
February 1992



## ISLAND COUNTY GROUND WATER MANAGEMENT PROGRAM

### SUPPLEMENT

On October 7, 1991, the Island County Board of Commissioners adopted the Island County Ground Water Management Program (GWMP) as an element of the Comprehensive Plan.

On February 19, 1992, the Washington Department of Ecology certified the Island County Ground Water Management Program. Per WAC 173-100, Ecology was required to consider the recommendations of the Ground Water Advisory Committee (GWAC) in the review and certification of the Program. Because the GWAC recommended certain changes to the document as adopted by the Board of Island County Commissioners, the Program as certified by Ecology differs slightly from the Program as adopted by the Board of Island County Commissioners. This supplement describes these differences and serves to avoid the wasted expense of producing two versions for distribution.

The text in the body of this document is that certified by Ecology. Following are the line-by-line differences that distinguish the document adopted into the Island County Comprehensive Plan from that certified by Ecology.

<u>Page</u>	<u>Island County Comprehensive Plan version</u>
VI-54, paragraph labeled "Personnel:"	Last sentence deleted.
VI-86, "Recommended Strategy:"	Revised to read: "Strategy 1 is recommended for implementation. Designating the Focus Areas as Environmentall Sensitive Areas is defensible and viable ground water management option. Such designation, accompanied with the appropriate elimination of exemptions, will provide significant protection to Island County ground water resources. The Environmentally Sensitive Areas should be refined or expanded as additional ground water information is gathered."
VI-102, fourth bullet	The phrase "water level monitoring" deleted.
VI-108 to VI-112	Section F deleted.

ISLAND COUNTY  
GROUND WATER MANAGEMENT PROGRAM

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## GLOSSARY OF ACRONYMS

AFY	Acre-feet per year
APA	Aquifer Protection Area (RCW 36.36)
BICC	Board of Island County Commissioners
CWSP	Coordinated Water System Plan (Chapters 70.116 and 90.54 RCW)
Ecology, DOE	Washington State Department of Ecology
DCAP	GWMP Data Collection and Analysis Plan
DCMP	Data Collection and Management Program
DMP	Data Management Plan
DOH	Washington State Department of
Health	
EPA	Environmental Protection Agency
gpd	Gallons per day
gpm	Gallons per minute
GMA	Growth Management Act (SHB 2929)
GWMA	Ground Water Management Area
GWMP	Ground Water Management Program
GWAC	Ground Water Advisory Committee
ICC	Island County Code
LAWS	Local Association of Water Systems
MCL	Maximum Contaminant Level
MGD	Million gallons per day
ICED	Island County Engineering Department
ICHD	Island County Health Department
ICPD	Island County Planning Department
ICPW	Island County Public Works
Department	
OFM	Office of Financial Management
ppm	Parts per million
RCW	Revised code of Washington
RWA	Regional Water Associations
SSMA	Satellite System Management Agency
SCS	Soil Conservation Service
SEPA	Washington State Environmental Policy Act
WAC	Washington Administration Code
WHP	Wellhead Protection
WSU	Washington State University
USDA	United States Department of Agriculture

ISLAND COUNTY  
GROUND WATER MANAGEMENT PROGRAM  
EXECUTIVE SUMMARY

This executive summary provides a concise overview of the recommended strategies for ground water management in Island County. The summary is intended to state the reasons why the Ground Water Management Program was undertaken, how it was developed, and its philosophy and goals. Elements of the preferred program, funding sources, environmental impacts, and program certification are outlined.

**A. BACKGROUND**

Island County is located within the Puget Sound lowland, between the Cascade Range and the Olympic Mountains and north of Seattle. The County includes Whidbey and Camano Islands in addition to several smaller islands. Together Whidbey and Camano Islands comprise approximately 210 square miles.

With the exception of the City of Oak Harbor and the Naval Air Station Whidbey Island, ground water is the primary source of drinking water in the County. Existing evidence does not indicate the presence of underground water sources emanating from the Cascade or Olympic mountains. For these reasons, ground water in Island County is obtained from sole source aquifers with a finite water supply.

Numerous cooperative water resource investigations in Island County involving the United States Geological Society, Department of Ecology, Department of Health, and Island County Health and Planning Departments indicate the need to manage the resource to adequately protect ground water from adverse affects resulting from increased withdrawals and land use.

In response to the results of water resource investigations indicating the potential for ground water shortages and quality problems and pursuant to the existence of a finite ground water supply in Island County, Ecology declared Island County to be a Ground Water Management Area (GWMA) under the authority of WAC 173-100. The designation of Island County as a GWMA initiated the development of a Ground Water Management Program (GWMP).

## B. PROGRAM DEVELOPMENT PROCESS

The development of the Island County Ground Water Management Program began with the formation of a Ground Water Advisory Committee (GWAC). The GWAC represents a broad spectrum of interests including representatives from the state, county, and local government agencies; water systems; development interests; citizen organizations; and the general public.

The Island County Planning Department was granted the lead agency role with the responsibility for undertaking activities necessary for Ground Water Management Program development.

The early stages of GWMP development involved GWAC evaluation of existing local and state programs pertaining to water resources. Areas where deficiencies existed were identified and strategies to rectify those deficiencies were developed and evaluated. Recommended strategies constitute the preferred program. Ongoing options are subject to continued review for possible incorporation into the preferred program at a later date.

## C. PROGRAM PHILOSOPHY

The Island County Ground Water Advisory Committee, in its approach to the development of a Ground Water Management Program, recognizes the finite nature of Island County's groundwater resource and the increasing pressure, through growing population, on this resource.

The philosophy of the Ground Water Advisory Committee is consistent with Comprehensive Plan policy of living within the capacity of the natural resources of the County.

The Comprehensive Plan recommends that Island County should:

- o "Encourage managed and balanced utilization of all natural resources" (page II-10),
- o "Protect, maintain and enhance the quality and quantity of Island County's water resources for recreation, fish, wildlife, and domestic utilization" (II-15),

More specific policy elements of the Comprehensive Plan state that:

- o "Environmental and land use policies should be consistent with the need for proper water resource management" (II-15),

- o "The capability of air, land, and water resources to support development should be a determining factor in making land use decisions" (II-5),
- o "The location and design of urban development should be carefully guided in order to minimize potential adverse impacts on the quality of ground and surface waters." (II-6), and,
- o "Areas with limited ground water quality or quantity should be restricted to low density unless adequate domestic supplies are available" (II-6).

These policy elements comprise a framework upon which the policies of the Ground Water Management Program can be constructed.

#### **D. PROGRAM GOAL**

The goal of the Island County Ground Water Management Program is to protect and enhance the quality, quantity, and recharge of ground water supplies in Island County.

#### **E. PROGRAM OBJECTIVES**

The following objectives are necessarily broad in scope. Specific policy elements to be implemented as part of the GWMP can be identified only after sufficient research and evaluation of management options has taken place, and no attempt to present these specific options is made in this section.

Preventative management of ground water is ultimately more effective and efficient than restorative or remedial measures. The objectives of the Island County GWMP are generally oriented towards prevention of ground water problems; however, it is recognized that current and future problems will require remediation.

Objectives of the Island County GWMP are:

#### **EDUCATION**

- o Educate the public and ground water managers about the characteristics of ground water resources and about confirmed and potential impacts on the resource.

#### **CONSERVATION**

- o Establish a water use efficiency program, coordinated with the Island County Coordinated Water System Plan and

the Comprehensive Plan, to help:

- A. reduce existing usage,
- B. maintain current ground water levels,
- C. alleviate salt water intrusion problems,
- D. ensure sustained supplies of ground water are available for Island County residents, and
- E. optimize the efficiency of future ground water usage.

#### MONITORING

- o Through data collection and analysis programs, increase knowledge of the limitations and characteristics of the County's groundwater resource. To provide useful information, such ground water monitoring must recognize regional, seasonal, tidal, and other variables which affect ground water characteristics throughout the County. An ongoing ground water monitoring program will help to:
  - A. determine the extent of any seasonal and long-term trends in seawater intrusion;
  - B. determine the extent of any seasonal and long-term trends in water level changes;
  - C. refine estimates of rainfall, runoff, and recharge;
  - D. refine County-wide ground water usage estimates; and
  - E. identify any areas in which agricultural activities, domestic activities, hazardous waste disposal, chemical use, industrial/commercial activities, landfills or other land uses which have or may cause groundwater contamination.
- o Maximize the accumulation and use of information from new and existing wells.

#### REGULATION

- o Develop land use approval criteria based on ground water quantity, quality, recharge, the vulnerability of the resource, and risks associated with proposed land uses.
- o Prevent contamination of ground water through control of potentially contaminating activities or land uses.
- o Evaluate the effectiveness of existing County codes in protecting ground water and recommend changes, or the creation of new codes, where appropriate.
- o Explore other regulatory avenues in ground water

protection which are reasonable and effective.

#### COORDINATION

- o Define the responsibilities and capabilities of all local, state, and federal agencies in the long-term management of groundwater in Island County.
- o Ensure that planning efforts in the County which may impact ground water are coordinated with the Ground Water Management Program.
- o Ensure that Island County ground water issues are considered in State efforts to develop new water resource policies and regulations.

#### F. ISLAND COUNTY GROUND WATER POLICY

It shall be the policy of Island County that all proposed actions be consistent with the goals and objectives of the Ground Water Management Program. The following statements will implement elements of these goals and objectives, and the recommendations of the Ground Water Advisory Committee.

Water Rights: Any action which involves or leads to a change in ground water usage, including distribution, should be accompanied by appropriate changes to water rights. These actions include, but are not limited to, water system expansion, annexations by water districts or municipalities, and water system planning. Water rights no longer in use may be relinquished under the authority of Ecology.

Water Use Efficiency: Inefficient use of Island County water resources shall be inconsistent with this policy. Any proposed actions leading to or involving uses of Island County water resources should be evaluated in terms of water use efficiency, and approval withheld until a finding is made that reasonable efforts have been made and appropriate technologies used to ensure that water use practices will be consistent with the goals of the Ground Water Management Program.

Ground Water Recharge: Recharge of ground water is the preferred method of surface water disposal from a site, except where such recharge could contaminate ground water or otherwise cause adverse environmental impacts, such as depletion of downstream flows. Any action which involves the

creation of impervious surfaces should be carefully evaluated in terms of the effect on recharge. Where appropriate and as necessary, total impervious surface should be limited to protect recharge.

Contamination of Ground Water: Any proposed action should be evaluated in terms of potential for ground water contamination, and approval withheld until a finding is made that appropriate measures have been taken to avoid such contamination. Such contamination shall include, but not be limited to, seawater intrusion and the introduction of harmful chemicals or other substances, by any means, into the ground water. Existing policies and regulations, such as SEPA, should be used as appropriate to address contamination concerns. Any remedial measures to correct ground water contamination resulting from past actions should be consistent with the GWMP.

Well Abandonment: Any action leading to or involving the abandonment or discontinued use of any water well should not be approved until assurances are made that all such abandoned wells will be located and identified and that such abandonment will follow appropriate procedures as provided for in State law.

Well Identification: Any proposed action which involves the preparation or exchange of information on real properties should not be granted final approval until the location and status (active or abandoned) of any wells, along with status of any water rights associated with such wells, are properly identified and documented.

Ground Water Withdrawals: Any proposed action which involves or leads to withdrawals of ground water should not be granted final approval until reasonable assurances are made that such withdrawals will not adversely impact existing ground water uses.

Watershed Protection: Island County should work closely with municipalities and large water systems to provide comprehensive protection of the water resources serving these systems, especially where such protection is needed on lands outside the jurisdiction of these systems. This should include joint protection of watersheds, wellhead protection, and other efforts where cooperative

action would most effectively provide the necessary protection.

Coordination with State Agencies: State and federal agencies, including the Department of Ecology, the Department of Health, the Department of Natural Resources, the Department of Fisheries, the Federal Emergency Management Agency, and other applicable agencies, when exercising their authority in Island County, should make every effort to ensure that the policies of the Ground Water Management Program are not contradicted. Furthermore, these affected jurisdictions should review their applicable policies and regulations and consider amendments, as appropriate, to ensure consistency with the goals and objectives of the GWMP.

#### **G. ELEMENTS OF THE PREFERRED PROGRAM**

The GWAC has recommended fourteen management strategies that constitute the Island County Ground Water Management Program. These strategies are recommended for implementation in Island County by the GWAC. It is further recommended that affected local agencies, such as incorporated areas, support these recommendations (see Section VI). The following recommendations comprise the preferred program for comprehensive ground water management in Island County:

1. Implement a comprehensive Education Program in Island County to elevate awareness of water resource issues.
2. Implement a Technical Assistance Program in Island County to assist and provide technical support to water system managers, private well owners, and any other citizens at large requesting assistance.
3. Implement a County-wide Conservation Program to encourage efficient use of ground water.
4. Implement a long-term Data Collection and Management Program to allow for early detection of unfavorable trends in either ground water quality or quantity and to refine existing ground water recharge estimates.
5. Implement a Ground Water Development Classification Matrix to provide an objective and technically sound basis for permitting withdrawals in Island County and to protect existing and potential users from adverse affects to ground water quality or quantity.
6. Revise Island County's water resource ordinance,

Potable Water Source and Supply, ICC 8.09, to strengthen its testing requirements for ensuring adequate water supply.

7. Revise Island County Land Development Standards (Chapter 11.01 ICC) to require consideration of recharge as an alternative to directing water offsite.
8. Designate Island County an Environmentally Sensitive Area pursuant to SEPA to provide for environmental review of certain activities which could have adverse effects on ground water quality and quantity.
9. Designate Island County as a critical aquifer recharge area pursuant to the Growth Management Act (SHB 2929), develop criteria to estimate aquifer susceptibility, and implement regulations to preclude land uses incompatible with these areas. These activities are currently underway.
10. Designate Areas of Special Concern pursuant to WAC 248-96 On-Site Sewage Systems. The legislative change to WAC 248-96 is in draft form; the designation will occur following finalization of the draft.
11. Consider levying the conservation futures tax, pursuant to RCW 84.34, to provide funds to purchase or otherwise protect lands important to water resources protection in Island County.
12. Develop specific performance standards for land uses which potentially threaten ground water quality. Promote safe agricultural and waste disposal practices to prevent ground water contamination.
13. Implement a coordination program in Island County to promote effective communication with local, state, and federal agencies regarding water resources management.
14. Continue implementation of the Memorandum of Understanding between the Department of Ecology and Island County.

After the certification of the GWMP by Ecology, the GWAC will continue to evaluate several vital options concerning ground water protection in Island County. These options have been deferred due to economic, political or technical reasons, or simply due to incomplete legislative guidance at the time the

plan was completed. These options include:

1. Effectiveness and impacts of the State Building Code Amendments.
2. Development of guidelines for the construction of artificial recharge facilities.
3. Feasibility of designating a Water Resource Overlay zone.
4. Feasibility of designating Special Protection Areas (WAC 173-200).
5. Advisability of sponsoring an election ballot issue asking voters to designate Island County an Aquifer Protection Area.
6. Feasibility of establishing a Wellhead Protection Program.

#### **H. FUNDING**

Potential sources of funding for the Ground Water Management Program are identified in the Preferred Program and Implementation Plan. The Centennial Clean Water Fund (CCWF) is identified as the most appropriate source of short-term funding for GWMP implementation. Because of the CCWF application and funding schedule, interim funding will be required to initiate implementation of the GWMP. It is recognized that an alternate funding source is necessary to provide support for ongoing implementation of the GWMP.

#### **I. ENVIRONMENTAL REVIEW**

The Ground Water Management Program is subject to review pursuant to the State Environmental Policy Act (SEPA). Evaluation of potential adverse environmental impacts was an integral part of the selection of the preferred management strategies and was conducted for each management option.

A threshold determination will be made following public review of this document.

#### **J. PROGRAM CERTIFICATION**

According to WAC 173-100, once the GWMP has been completed and approved by the GWAC, it will be submitted to Ecology for certification. During the certification process, all affected local governments will be asked to express their concurrence or non-concurrence with the elements of the

preferred program. If an affected government does not concur with a portion of the program, they will notify the lead agency in writing and tell the lead agency of desired changes necessary to achieve concurrence. The GWAC will be involved in the review of these comments.

Once the GWMP is certified by Ecology, state agencies and affected local governments must adopt or amend existing policies, regulations, ordinances, and/or programs to be consistent with the elements of the preferred program.

## SECTION I

### INTRODUCTION

The development of the Ground Water Management Plan has been the result of cooperative efforts of County agencies and dedicated members of the Ground Water Advisory Committee (GWAC). This section introduces the events which led to the formulation of the plan, the plan development process, and acknowledges plan contributors.

#### A. BACKGROUND

Increased ground water withdrawals associated with population growth have caused concern about ground water availability and seawater intrusion. Over the past 15 years, Island County has increased its efforts to better define and manage ground water resources.

In late 1979, the United States Geological Survey (USGS), in cooperation with the Island County Board of Commissioners and Washington State Department of Ecology (Ecology), began a comprehensive study of ground water resources in Island County. The study, Ground Water Resources and Simulation of Flow in Aquifers Containing Freshwater and Seawater, generated valuable information regarding the hydrogeologic setting of the islands, chemical quality of ground water, and ground water flow. The effects of increased ground water withdrawals on water levels and chloride concentrations were examined and areas with existing seawater intrusion problems were identified. The study indicated that seawater intrusion could increase in magnitude and become more widespread with additional ground water development. Additional data collection and monitoring was recommended to better manage the resource.

In the early 1980's, a preliminary survey of ground water resources in Island County conducted by the USGS, prepared in cooperation with the Island County and Ecology, indicated the increased potential for seawater intrusion with increased withdrawals associated with population growth. Sampling of chloride concentrations in July 1978, April 1980, and August 1980 indicated three problem areas, including northeastern and southern Camano Island and Central Whidbey Island.

The County Board of Commissioners petitioned the Environmental Protection Agency (EPA) in April 1981 to designate the aquifers underlying Whidbey and Camano Island as the sole or principal source of drinking water for the area. This petition was based on the aquifers' vulnerability

to contamination from industrial sources, subsurface sewage disposal, and seawater intrusion. Island County was designated a sole source aquifer by EPA in April 1982. The designation requires any federally funded project to be designed to ensure that it will not cause ground water contamination.

In July 1989, the Island County Sea Water Intrusion Policy was signed by the Island County Health Department and the State Department of Health. This policy established an important framework designed to regulate public water systems threatened by seawater intrusion, as indicated by chlorides and conductivity. This policy has set a precedent for the development of a State-wide seawater intrusion policy.

In July 1990, the Island County Coordinated Water System Plan (CWSP) was adopted by resolution of the Island County Board of Commissioners. The process was initiated in 1985 following the declaration that Island County as a critical water supply service area. This plan provides administrative procedures and a regional strategy for management and development of public water supplies.

The CWSP was prepared pursuant to the Public Water System Coordination Act (RCW 70.116) enacted by the Washington State Legislature in 1977. To achieve organized development of water utilities, to limit the proliferation of small, inadequate or poorly managed water systems, and to integrate water system development with land use planning, the County evaluated all aspects of water distribution to develop the CWSP. In evaluating various water resource management alternatives, the CWSP discussed 1) the reservation of water rights pursuant to WAC 173-590, and 2) the importation of off-island water to serve both Whidbey and Camano Islands. Neither alternative was recommended. The CWSP recommends that future growth be planned in an orderly fashion within the capacity of the islands to support that growth. The reservation of future water supply is not recommended in the CWSP as a viable management option to alleviate the ground water problems identified (CWSP, VI-24).

Following the philosophy of the Comprehensive Plan, the GWMP does not consider reservation or importation of off-island water supplies as viable ground water management strategies. Because the GWMP will be adopted as an element of the Comprehensive Plan, serious future consideration of these alternatives will require amendments both to the CWSP and to the Comprehensive Plan, and will also require complete environmental review pursuant to SEPA.

Although the CWSP and GWMP are inherently overlapping

documents, their purposes are distinct. The CWSP is designed to provide future direction and guidance for future planning, management, and operation of water systems, whereas the GWMP is designed to protect, preserve and enhance ground water quality, quantity, and recharge.

#### **B. PROJECT AUTHORIZATION**

The Ground Water Management Plan process was initiated under the Ground Water Management Act of 1985 to establish simultaneous and comprehensive planning policies related to ground water resources. In 1986, Ecology designated Island County a Ground Water Management Area under the authority of WAC 173-100 and a grant to develop a Ground Water Management Plan was obtained from Ecology under a 1987 contract.

#### **C. GROUND WATER MANAGEMENT PROGRAM DEVELOPMENT**

One of the first activities of the program was the selection of an Island County Ground Water Advisory Committee (GWAC) to oversee in the development of Island County Ground Water Management Plan and to assure its development is both technically and functionally sound. Membership on the GWAC is from a broad spectrum of interests, including representation from state, county and local agencies, water systems, community organizations, and citizens at large. Current Committee members and sectors of representation are listed at the beginning of this document.

The Island County Planning Department was established as the lead agency with the responsibility for coordinating activities necessary for the development of the Ground Water Management Program. These activities include delegating activities to the GWAC and coordinating SEPA review.

The County retained Economic and Engineering Services, Inc. of Olympia in 1987 to conduct Part A of the Island County contract with Ecology. Part A efforts included gathering technical information, reviewing applicable policies, laws and ordinances, and starting a public information program. These activities were carried out by the Technical, Policy and Public Involvement subcommittees of the GWAC. Specific tasks related to hydrogeologic characterization were subsequently sub-contracted to Hart Crowser and Associates, Inc. and Pacific Groundwater Group, Inc., both of Seattle. Funding for Part A of the contract was provided by a grant from Ecology and the Centennial Clean Water Fund, which was matched by funding from Island County, including volunteer contributions.

Part A of the contract was completed at the end of 1989. It

was decided to concentrate and accelerate efforts of the GWAC to complete Part B tasks, namely the development of the Ground Water Management Program. Development of the program was accomplished by the GWAC and County staff with limited assistance from consultants.

The GWAC analyzed existing local and state policies and procedures which relate to ground water management to identify where improvements could be made. Twenty management options were evaluated, of which fourteen were recommended for immediate implementation in Island County. These recommended options are considered the preferred program (See Section VI). The remaining options, or the ongoing options, will be subject to periodic review for feasibility of incorporation into the GWMP at a later date.

#### **D. ENVIRONMENTAL REVIEW**

The GWMP is subject to environmental review pursuant to the State Environmental Policy Act (SEPA, RCW 43.21C). Each option discussed in the Alternatives Section (Section V) includes a discussion of possible significant adverse environmental impacts. These discussions are intended to assist the responsible official (the Island County Planning Director) to decide whether a significant, adverse environmental impact will result from implementation of the GWMP (a threshold determination). The final draft of this document may be modified following public input; thus, the Planning Director will issue the threshold determination following these possible modifications.

#### **E. ACKNOWLEDGMENTS**

The development of the Ground Water Management Plan would not have been possible without the cooperation and dedication of the membership of the Ground Water Advisory Committee and that of the Planning and Health Department staff. Non-GWAC County staff deserve special thanks for their patience and accuracy in responding to questions and for their putting up with many hours of waiting for copying machine time. The assistance from consultants and various state and local agencies is also greatly appreciated. The development of the GWMP was an enormous task, and all who contributed have earned the appreciation of all of Island County.

## SECTION II

### AREA CHARACTERIZATION

#### A. INTRODUCTION

The intent of this chapter is to provide a summary characterization of what is currently known about ground water resources of Island County. The hydrogeologic assessment presented in the Island County Ground Water Management Plan Part A Technical Memorandum - Hydrogeologic Characterization and Background Data Collection Relating to Ground Water Protection and Management (Economic and Engineering Services, Inc., 1990) is condensed and summarized in this chapter (This document is referred to the Hydrogeologic Characterization for the purposes of this text). Since the Hydrogeologic Characterization and other ground water evaluations have been extensive and comprehensive (CWSP, 1990; Sapik et al., 1988), this summary is intended to consist of an overview of the main elements outlined in these reports. The reader is referred to the Hydrogeologic Characterization (Appendix A) for supporting information.

The Hydrogeologic Characterization is based only on existing data that were available at the time the study commenced during late 1987. The primary data sources included information in the files of the United States Geological Survey (USGS), water resource reports by the USGS, Department of Ecology (Ecology), and consultants. No additional data have been collected or analyzed. The Hydrogeologic Characterization is designed to serve as a resource document to be used for future evaluation of ground water management strategies in Island County.

The Hydrogeologic Characterization addressed the following elements: physical characterization, hydrogeologic characterization, historic and recent water quality and quantity trends, land uses potentially affecting ground water, projection of long-term ground water needs, and summary of management jurisdictions and existing policies which are relevant to ground water management. These elements are addressed separately but are interdependent.

#### B. PHYSICAL CHARACTERIZATION

Island County is situated in the Puget Sound lowland of western Washington, northwest of Seattle. The County consists of two major Islands, Whidbey and Camano, and several smaller islands. Land area in the County totals over

210 square miles. Both Whidbey and Camano Islands are long and narrow and are characterized by rolling uplands 100 to 300 feet above sea level and steep bluffs along the coasts. In a few places, uplands are 500 feet above sea level. A large percentage of the islands are forested, especially the inland areas. The remainder consists predominantly of urban and agricultural lands, range and barren land, wetlands, and lakes.

Island County has a temperate marine climate, typically consisting of warm, dry summers and cool, wet winters. Mean annual precipitation ranges from approximately 20 inches in Coupeville to 42 inches at Lake Goss. The rainfall rate is usually less than 0.5 inches per day. Mean annual temperature is 50 °F, with an average winter and summer temperature of 38 °F and 61 °F, respectively.

#### C. HYDROGEOLOGIC CHARACTERIZATION

Most of the surface of Whidbey and Camano Islands consists of till, glaciomarine drift, gravel, and sand deposited during the last glaciation, 14,000 years ago. Older glacial and interglacial deposits can be found exposed along sea cliffs. Deposits of at least three glaciations can be recognized in Island County (Easterbrook, 1968).

The ground water flow system in Island County consist of 5 aquifers zones (A through E), each consisting of a series of water bearing zones (aquifers) surrounded by zones of low permeability sediments (aquitards). Hydrogeologic cross sections (Hydrogeologic Characterization, Exhibit II.4-1 through 14) show the location of the aquifer zones.

Recharge of ground water flowing through the ground water system comes mainly from precipitation. No ground water data exists which supports the existence of a underground water source originating in the Cascade or Olympic mountains. A large percentage of this precipitation is lost by runoff, transpiration by plants, or evaporation, leaving only a small percentage to recharge ground water. Infiltration potential of the soil and hydraulic gradients are also important factors that control recharge. The role of forest canopy retention in ground water recharge has not been investigated in Island County and remains unclear. Ground water flows from recharge areas to discharge areas, generally towards the sea. Potentiometric contour maps indicate the direction of flow within each aquifer zone (Hydrogeologic Characterization, Exhibit AII.5-1 through 20).

A pumping well alters the natural ground water flow causing water to flow towards it. If a well is located near the

coast, pumping may induce the movement of seawater into the aquifer and resulting in flow inland towards the well.

There are 130 individual watersheds in the County. The role of watersheds in ground water management, although recognized, involves a complex interrelationship which in most cases remains poorly defined and understood.

#### D. WATER QUALITY AND QUANTITY TRENDS

The principal dissolved chemical constituents in ground water in Island County are calcium and magnesium. Naturally high calcium and magnesium concentrations are indicative of relatively hard water. The areas between Keystone and Ault Field at NAS Whidbey Island and northeast Camano Island are the principal areas with characteristically hard water; however, there does not seem to be any established geographic pattern to the occurrence of hard water in the County.

Seawater intrusion is documented in four of the Focus Areas identified in the County (Problem Definition, III-3). In areas affected by seawater intrusion, ground water contamination is predominantly by sodium and chloride ions. Although specific sources of chloride are undetermined, it is assumed that seawater surrounding the islands is the predominant source in Island County. Seawater intrusion can be reduced by modifying pumping rates, decreasing the concentration of wells, and locating wells inland and away from the coast.

Limited ground water data available in the County has made establishing water quality and quantity trends difficult. Seasonal changes in chloride concentrations of ground water have been documented (Garland and Safioles, 1988); however, existing data does not indicate long term trends (Sapik et al., 1988). Existing water level and quality data from 1978 to 1983 indicates only a few local trends in isolated wells. Visual and statistical analyses showed little correlation between water levels in the aquifers and water quality as indicated by chloride, except in Focus Area 1 and 3 (Problem Definition, Figure III-1). Limited water quality data of agricultural chemical concentrations are available to evaluate trends.

#### E. LAND USES

The impact of human activities on the quality and quantity of water resources in Island County has made ground water management a necessity. General effects on ground water are related to land use and population growth, agricultural activities, and ground water quality impacts. Section III-1

of the Hydrogeologic Characterization describes all land surface activities in the County to evaluate potential groundwater impacts. The location of these activities is identified on land and site use maps (Hydrogeologic Characterization, Exhibit III.A-1 and III.A-2). The inventorying and evaluation of land uses in Island County has been significant in identifying sites which are of particular significance to ground water protection.

#### F. PROJECTION OF GROUND WATER NEEDS

Island County has experienced a growth rate which has increased its population by 30% in the last ten years. Growth is expected to continue in both permanent and seasonal populations. The sole source aquifer designation is supported by the existence of a finite ground water supply in the County. The Hydrogeologic Characterization summarizes all ground water demand projections, including municipal and domestic, single domestic, irrigation, and other water demands, and compares them to water rights. Based on population and usage estimates, the total ground water demand is projected to increase by 181% in the next 50 years.

#### G. LAND AND WATER USE MANAGEMENT AUTHORITIES

Ecology, the Department of Health (DOH), and Island County are the key jurisdictions and authorities in managing and protecting ground water resources in Island County. Specific water resource authority granted to these agencies are described in the Hydrogeologic Characterization (Section III.2). Ecology has the primary authority over water resources by state law. Their authority resides in both the allocation of water to beneficial uses, and protection of water quality. DOH has the authority to approve water systems and enforce compliance of water quality standards for potable water supplies. In addition, DOH has the authority to ensure that public water systems are properly managed in the public interest. The County has direct authority over water resources through local planning and health jurisdictions. Some of these authorities include the implementation of SEPA and the regulation of on-site domestic waste disposal.

## SECTION III

### PROBLEM DEFINITION

This chapter contains a summary of the confirmed and potential ground water quality and quantity problems in Island County. The discussion also identifies various water and land use activities which impact ground water, and predicts the likelihood of future problems and conflicts if no action is taken. Areas where insufficient data exists to define the nature of existing and potential ground water problems are documented. Various ground water policy issues to be examined and developed during the Ground Water Management Program (GWMP) are also discussed.

#### A. INTRODUCTION

Ground water is vital to all inhabitants of Island County. Assuming the City of Oak Harbor relies primarily on pipeline water and using 1990 population estimates (Washington State Office of Financial Management, OFM, April 1990), approximately 75% of the residents of Island County depend exclusively on ground water as their sole source of drinking water. The City of Oak Harbor, Naval Air Station (NAS) Whidbey, and the North Whidbey Water District are served by two parallel pipelines providing water from the Skagit River. The City of Oak Harbor supplements this source with well water from three deep wells, with a combined capacity of 480 gallons per minute (gpm). These wells are used for leveling peak day demand as needed.

Island County has experienced considerable growth with an 1990 population of 60,195 permanent residents (US Census Bureau, 1990) and approximately 14,190 summer and/or weekend residents (Island County Planning Department (ICPD), Island County Coordinated Water System Plan (CWSP), January 1990, Table III-1) served by over 650 public water systems and an unknown number of private wells. In 1983, approximately 84% of ground water demand was for residential, industrial and commercial uses and the remaining 16% was for agricultural irrigation purposes (Sapik et al., 1988).

With increasing demand due to rapid population growth and evidence of a finite supply, a problem facing residents is ensuring the future availability of ground water. To assist in understanding the complexity of the ground water situation it is helpful to divide the problem into the following six components:

**B. CONFIRMED GROUND WATER PROBLEMS**

1. Seawater Intrusion

**C. POTENTIAL GROUND WATER PROBLEMS**

1. Waste Disposal Sites
2. Hazardous Waste
3. Nitrate Contamination
4. Bacteriological Contamination
5. Chemicals and Pesticides
6. Underground Storage Tanks
7. Transport of Hazardous Materials
8. Climate Changes

**D. GROUND WATER USAGE**

**E. GROUND WATER RECHARGE**

**F. HYDROGEOLOGIC AND OTHER DATA DEFICIENCIES**

**G. GROUND WATER POLICY ISSUES**

1. Land Use
2. Water Resource Regulations

**SUMMARY**

**REFERENCES**

## B. CONFIRMED GROUND WATER PROBLEMS

The following confirmed ground water problem category is supported by data collected by the Island County Health Department (ICHD), the Washington State Department of Health (DOH), the Department of Ecology (Ecology) and the United States Geologic Survey (USGS). Presently, there is insufficient information to determine the precise geographic and hydrogeologic extent of seawater intrusion in the County. For example, the existing data are inadequate to conclude whether seawater intrusion is a result of regional stresses on the overall hydrogeologic system, or of localized stress on the ground water system. Background chloride concentrations may be as high as 40 parts per million (ppm) in some areas and may suggest that chlorides occur "naturally" in ground water.

### 1. Seawater Intrusion

Seawater intrusion is the most widely recognized problem in Island County and has been confirmed in a number of areas (identified below). Oceanic island environments like Whidbey and Camano Islands are particularly susceptible to seawater intrusion, where increasing development and pumpage may cause aquifers to be subject to contamination due to the migration of seawater (Sapik et al., 1988).

Seawater intrusion is due to the movement of the freshwater-seawater boundary, or the zone of diffusion, in response to fluctuations in the water table. Water table fluctuations are caused by changes in recharge, pumping of wells, discharge into springs and streams, and tidal fluctuations. Possible mechanisms of seawater intrusion can be either lateral migration of the zone of diffusion or upconing of the zone of diffusion toward the well intake (Garland and Safioles, 1988). Fluctuating chloride and conductivity levels, which are indicators of seawater intrusion, may occur seasonally, especially in wells with water levels close to or below sea level. As withdrawal of ground water increases, well water levels can be expected to fall. With lowered water levels, the zone of diffusion adjusts by migrating landward producing a greater potential for seawater intrusion. Seawater intrusion tends to occur in narrow parts of islands, coastal areas and lowlands (Walters, 1971).

Aquifers which are present below sea level in practically all shoreline areas are susceptible to contamination by lateral movement of seawater toward pumping wells, and deep wells inland are subject to contamination by upconing of seawater.

The degree of pumping and the distance from shoreline that will cause seawater intrusion by either mechanism varies with local conditions (Walters, 1971).

There have been numerous USGS/Ecology cooperative investigations of the occurrence of seawater intrusion in Island County. Walters (1971) and Dion and Sumioka (1984) examine the occurrence of seawater intrusion in coastal areas of Washington and summarize the concentrations of chlorides in ground water collected from wells within one mile from the coast. Cline et al. (1982) describe the hydrogeology of the ground water flow system and present maps showing the extent of seawater intrusion. Jones (1985) presents maps and cross sections showing the extent and thickness of aquifers and confining units, and the extent of seawater intrusion. Most recently, Sapik et al. (1988) evaluate seawater intrusion on a regional scale in Island County using simulation of ground water flow in aquifers containing seawater and freshwater.

Seawater intrusion, as indicated by elevated chlorides and conductivity, has been documented in the following geographic locations, or Focus Areas (GWMP Technical Memorandum, September 1989). The Focus Areas have been defined based on existing data which indicate that water quality has deteriorated as the result of seawater intrusion and/or that over pumping of ground water may lead to quality and/or quantity problems (Exhibit III-1). The Focus Areas boundaries represent a group of adjacent watersheds defined based on their ground water quality history. The Focus Areas are defined as follows:

#### Focus Area No. 1 - Central Whidbey (See Exhibit III-1)

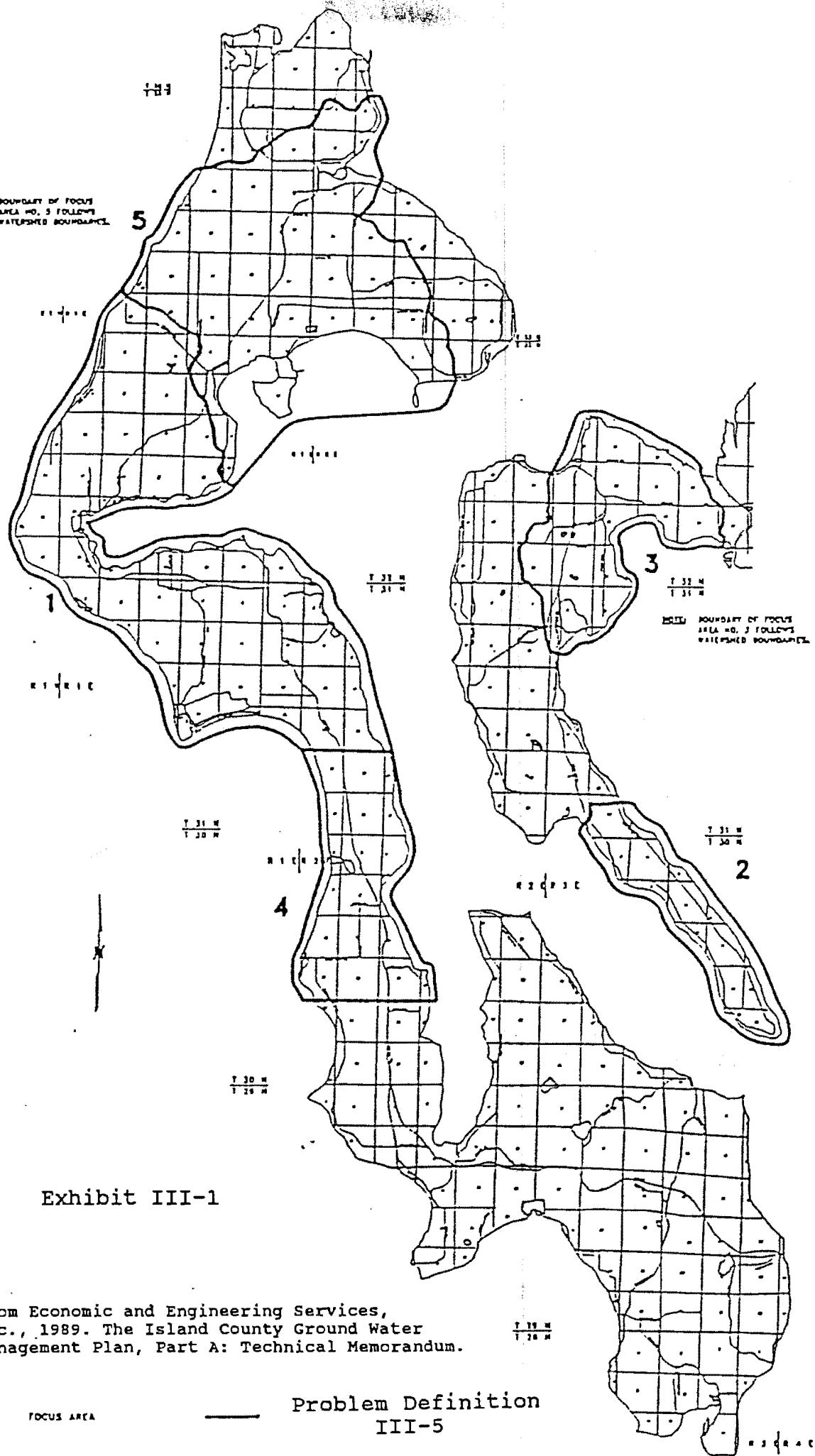
This area is defined by the area south and west of Oak Harbor and Crosby Watersheds, and including West Beach, Coupeville, Ebey's Prairie, and the area of central Whidbey north of Admiral's Cove.

Example: Several water systems in the area of West Beach have had a history of chloride levels exceeding 100 ppm. Water quality analysis for one water system for August 1987 and January 1988 showed 190 and 230 ppm chloride, respectively (DOH, Public Water Supply System Listing, Island-SWI, March 3, 1989).

#### Focus Area No. 2 - South Camano (See Exhibit III-1)

This area comprises the southern "Panhandle" of Camano Island, including the O-Zi-Ya Watershed to the southern tip of Camano Island.

FOCUS AREA NO. 5 FOLLOWS  
WATERSHED BOUNDARY



Example: From May 1985 to May 1987, Garland and Safioles (Ecology, 1988) investigated seasonal variations in chloride in eighteen water systems on Southern Camano Island. Eleven of these systems were found to have chloride levels exceeding 100 ppm during the study period. Chloride concentrations in the systems sampled ranged from 12 to 985 ppm. Variations in chloride concentrations followed a similar pattern in the affected water systems, with minimum levels recorded in November through April and maximum concentrations recorded around August. The relationship between pumpage and chloride concentrations and the erratic distribution of high chloride occurrences in the sampled wells suggests upconing of seawater is occurring beneath overpumped wells.

A water service connection moratorium exists on a water system on South Camano whose chloride levels exceeds the MCL seasonally (ICHD, Water System Moratorium List, July 1990). A summer chloride concentration of 250 ppm has been reported for this system (July, 1985).

#### Focus Area No. 3 - Northeast Camano (See Exhibit III-1)

This area consists of northeast portion of Camano Island, from the Triangle and Arrowhead Watersheds, inclusive.

Example: Several public water systems in this Focus Area have chloride concentrations exceeding 100 ppm. A moratorium on the issuance of water service connections has been placed on a water system in this area due to chloride levels above the MCL (ICHD, Water System Moratorium List, July 1990). A chloride concentration of 595 ppm has been reported for this system during the summer (June 1987).

#### Focus Area No. 4 - Greenbank Area (See Exhibit III-1)

This area is located near Greenbank, comprising Sections 31, 32, and 33 of T31N R2E, and south to Sections 19, 20, 21, and 22 of T30N R2E, inclusive.

Example: A number of wells in Greenbank and vicinity are characteristically elevated in chlorides and conductivity. South of Greenbank, along the coastline, one well has chlorides ranging from 850 (June 1986) and 1500 ppm (October 1987) and is regularly monitored as part of the ICHD Chloride Monitoring Program.

### Focus Area No. 5 - North Whidbey (See Exhibit III-1)

The area comprised of Dugualla, Navy, Clover, Crescent, Oak Harbor, and Crosby watersheds.

Example: Waste disposal activities associated with NAS Whidbey Island are of primary concern to ground water in this Focus Area. Lab analysis of USGS test well #2 indicated chloride levels of 2200 ppm at 430 feet (USGS lab results, 1983).

Most areas affected by seawater intrusion are located near shorelines, and increases in chloride content appear to occur in aquifers C and D, both primarily below sea level (Sapik et al., 1988).

Seawater intrusion has impacted the quality and quantity of potable water supplies in at least four out of the five Focus Areas, and therefore, has been identified as a priority concern in ground water management. Heavy ground water pumping is not always the prerequisite for the occurrence of seawater intrusion. Additional development can further impact seawater intruded areas and could initiate the occurrence of seawater intrusion in areas which are presently unaffected.

### C. POTENTIAL GROUND WATER PROBLEMS

The following problem categories are described as "potential" threats to the quality and quantity of ground water in Island County. Although these have not been confirmed to be actively degrading the quality of the resource, they should be treated with similar considerations with which confirmed problems are treated in ground water management. Because of the cost and effort involved in ground water remediation, coordinated prevention activities are preferred.

#### 1. Waste Disposal Sites

Active and inactive land disposal facilities (solid waste landfills, landspreading operations, waste piles and surface impoundments) pose potential threats to ground water quality through the leaching of contaminants. There are two active (Naval Air Station and Coupeville disposal sites) and seven abandoned or closed landfills in Island County (Exhibit III-2).

A report on the Island County Ground Water Assessment and Monitoring Program (Sweet, Edwards & Associates Inc., 1986)

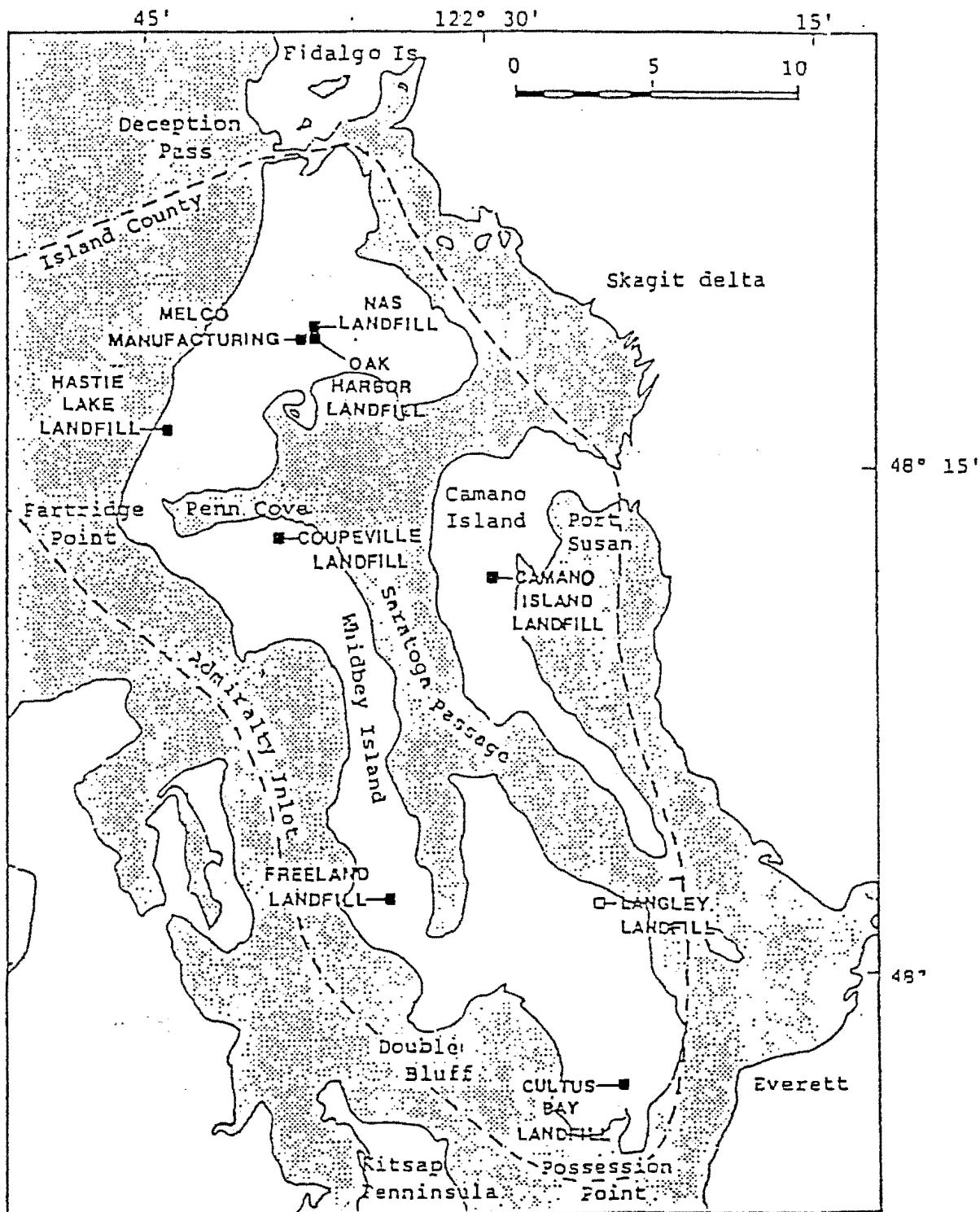


Exhibit III-2

From Sweet, Edwards & Associates, Inc., 1986.  
 Island County Ground Water Quality Assessment  
 and Monitoring Program Final Report. Based on  
 Island County map from Water Supply Bulletin  
 25.

evaluated the contamination potential in areas in the vicinity of current or former land disposal facilities on Whidbey and Camano Islands. The study characterized ground water conditions in the vicinity of nine current and former waste disposal facilities and recommended monitoring strategies for each site. The study indicates that the potential for contamination at the eight landfill sites studied is increased by the lack of effective landfill cap and other engineered measures to reduce leachate generation.

The study resulted in the drilling of two monitoring wells at the Coupeville Landfill and three at the Freeland site. Nine additional ground water monitoring wells have been installed at the Coupeville Landfill. The monitoring network at both sites consists of quarterly sampling of parameters outlined in the Minimal Functional Standards for Solid Waste Handling (WAC 173-304). Results of ground water analysis indicate both sites meet EPA primary drinking water standards (ICHD, Quarterly Ground Water Monitoring, 1990).

In February 1990, two sites on Naval Air Station (NAS) Whidbey Island (Ault Field and the Seaplane Base) were nominated to the National Priorities List of the U.S. Environmental Protection Agency (EPA) due to the severity of the toxic contaminants identified. These sites include thirty one areas at Ault Field and thirteen areas at the Seaplane Base.

NAS Whidbey Island is conducting an investigation at the NAS Whidbey Island Landfill located north of Oak Harbor to determine how past disposal activities have affected ground water. Disposal operations involving the burial of waste in trenches located on relatively flat terrain has been ongoing since 1956. Although a contaminant plume from this site does not appear to pose an imminent ground water threat, the area is being monitored regularly by DOH to determine water quality of nearby wells. Pursuant to State and Federal policies regarding ground water remediation programs, remediation at these sites may include a pump and treat program with the reinjection of the treated water back into the aquifer. These treatment technologies may involve the treatment of substantial amounts of ground water over long periods of time.

State locational standards for solid waste land disposal facilities prohibit the siting of land disposal facilities in areas designated sole source aquifers (WAC 173-304-130(2)(b)(ii)). Accordingly, the construction of a new Island County landfill requires a variance for the Minimum Functional Standards for Solid Waste Handling. Instead, by 1992, the County plans to develop a transfer facility to

transport solid waste materials out of the County to one of several regional landfill disposal facilities in Washington or Oregon.

Significant capital improvements and upgrade facilities are being planned for the Island County and NAS Whidbey Island landfills in the future. An expansion of the Coupeville Landfill has been recommended so the facility may accommodate the Island County waste stream through the year 1992. The landfill facility has obtained a variance from the Minimum Functional Standards for Solid Waste Handling (WAC 173-304) until November 1991. The variance requires the County to adopt a compliance schedule to satisfy the minimum standards. The County plans to install a cap on the cell and install a drainage system. A permit application for use of a new cell for inert and demolition waste has been submitted to the local health department.

Island County's Comprehensive Solid Waste Management Plan (August 1990) develops a plan for managing municipal solid waste, inert waste, sewage sludge, infectious waste, and septage. A proposed interlocal agreement is in process with Snohomish County for a plan to dispose of the Camano Island waste stream in Arlington.

In 1985, a County policy was established which promotes the beneficial use of sewage sludge for agricultural, forestry, and land reclamation purposes. Although generally acceptable as a viable management alternative, there have been difficulties in identifying potential utilization sites.

Current estimates suggest that 1.2 million gallons and 200,000 gallons of septage are generated annually on Whidbey and Camano Islands, respectively. Temporary septage handling practices on Whidbey Island involves the transport and disposal of septage to the City of Bellingham's wastewater treatment facility. Septage generated on Camano Island is transported to the City of Stanwood's municipal wastewater treatment facility. Island County is attempting to formalize this arrangement and participate in an evaluation of the plants capacity to accommodate septage through a specific planning period (Kwarsick, 1990).

Engineering and design plans are presently underway for the development of a septage treatment and utilization facility on Whidbey Island. An Environmental Impact Statement (EIS) is being prepared concurrently.

## 2. Hazardous Waste

During 1989-1990, Island County refined the Moderate Risk Waste Management Plan which outlines a strategy for removing most hazardous waste from the solid waste and wastewater streams based on planning guidelines developed by Ecology. Presently, the Moderate Risk Waste Management Plan is in the final stages of adoption. The recommended moderate-risk waste management strategy for Island County includes three elements:

- o Public and business information and education,
- o Collection of unregulated quantities of hazardous waste using a permanent drop-off collection and storage facility at the Coupeville Landfill and a mobile collection station, and
- o Treatment and disposal of the collected waste materials.

The plan also recommends a County policy assigning responsibility for proper handling of moderate-risk waste to waste generators.

Three household hazardous waste collection programs held in the County between 1986 and 1987 were successful in educating the public about the potential problems associated with small quantities of hazardous waste and in identifying the types of household wastes generated. The results of collection-day events and other community studies indicate that about 37,000 gallons of household hazardous wastes are generated each year in Island County. A large percentage of this is motor oil and paint which can be relatively easy to handle and recycle. The Solid Waste Department collects oil at its recycle parks.

In a 1988 survey, the majority of commercial and industrial generators were found to manage their moderate-risk wastes in an acceptable manner and they have been more successful than the public in understanding the problem. Some commercial generators are unaware of the State and Federal regulations that defined waste materials as dangerous or hazardous, and others may not subscribe to collection services. Other businesses and institutions chose to store waste on-site instead of participating in collection and disposal programs. This is permissible if an accepted procedure for eventual disposal is followed.

Although the disposal of hazardous waste is controlled under the Federal Resource Conservation and Recovery Act (RCRA) and the applicable State law, a continued local effort to protect ground water from adverse public health and environmental impacts relating to small quantities of hazardous waste

is necessary and presently underway in Island County.

### 3. Nitrate Contamination

The movement of nitrate into ground water is a potential threat to ground water supplies in Island County. Nitrate can originate from on-site sewage systems in densely populated areas, excessive fertilizer applications, poorly designed high-density animal confinement operations, and topsoil production operations. Nitrate is a highly soluble resistant product of aerobic degradation of wastewater and consequently can be readily transported by ground water. Excessive amounts of nitrate in drinking water can cause a blood disorder in newborn babies called methemoglobinemia, a condition which prevents the normal uptake of oxygen in the blood. Infants (less than one year old) are especially susceptible to methemoglobinemia (DOH, Toxic Substances Fact Sheet, January 1989).

The ICHD has identified several water systems with nitrate levels above the MCL (Maximum Contaminant Level) set by EPA (10 ppm). For example, a number of wells in the Mutiny Bay area have had a history of nitrates at or exceeding the MCL. Concentrations of up to 25 ppm nitrate (August, 1988) have been reported in this area. The cause of elevated nitrates in this area remains unidentified.

Development density can be directly related to nitrate contamination of ground water. If wastewater is distributed over a larger geographic area, the localized buildup of contaminants like nitrates can be avoided. Sewage Waste Disposal (ICC 8.07B) establishes minimum gross land area for subdivisions proposing to utilize on-site sewage systems. In residential areas with ideal soil types, no more than 3.5 dwellings or sewage systems are permitted per acre. The minimum requirements are conservative and are designed to adequately protect ground water and preserve and promote public health.

Although nitrate contamination of drinking water supplies has only been confirmed in isolated water systems in Island County, population growth trends indicate the need to control various land uses which may introduce nitrates into ground water.

### 4. Bacteriological Contamination

No occurrences of bacteriological contamination to ground water have been reported in Island County, though, bacteriological contamination of ground water has been linked to intrusion of sewage from on-site sewage systems (Cogger,

1988). ICC 8.07B provides specific sewage system design requirements to control and prevent bacteriological contamination of ground water in Island County. Generally deep wells that are cased and sealed to state specifications have few organics (American Water Works Association, Opflow, July 1990).

### 5. Chemicals and Pesticides

Residential, agricultural, institutional, and commercial uses of chemicals and pesticides in Island County are potential sources of surface water and ground water contamination. Water quality data for pesticides have not been collected widely in Island County and to date it is unknown if they are present in ground water. It has been estimated that annual private household pesticide use in the Puget Sound Basin represents 20% of the total urban/suburban use; whereas agricultural uses appear to represent just over 10% of the total urban/suburban use (Tetra Tech, 1988 in Issue Paper: Pesticides in Puget Sound, March 1990).

A July 1987 EPA survey of pesticide use in vulnerable ground water areas in the State of Washington designated Island County as a region which may be susceptible to contamination from the use of agricultural chemicals based on local geology and irrigation practices. The study involved an inventory of leachable pesticides used in the County which EPA has identified as having a high potential to leach through the soil based on chemical characteristics.

Previous and current pesticide use combined with natural climatic and geologic conditions in Island County support the need to protect ground water supplies from the impacts of chemical and pesticide contamination.

### 6. Underground Storage Tanks

In a March 1988 EPA inventory, 303 underground tanks were reported in Island County. According to Ecology, there are 265 regulated underground storage tanks (USTs) in the County (April 1990). These tanks are associated with gas stations, air fields, agricultural operations, and small industries. The inventories exclude residential home heating oil storage tanks and may not take into account those tanks that have been abandoned. All may pose a potential hazard of undetected leakage to ground water. According to DOH (Toxic Substances Fact Sheet, November 1988), UST characteristics which are most commonly associated with leaks are:

- o Over 15 years old
- o Of singled-walled construction

- o Have no leak detection system
- o Have no internal or external protection against corrosion

There are no data conclusively demonstrating that USTs are presently a source of ground water contamination in Island County. The sole source aquifer designation for Island County, however, indicates that the islands possess physical characteristics which make them especially vulnerable to threats from leaking USTs.

#### 7. Transport of Hazardous Materials

Although only minor spills have been reported to date, spills of hazardous materials from pipeline leaks and along public, private, and military installation roadways could impact surface water quality with possible contamination of ground water supplies. Information on the amount and variety of hazardous waste transported along the County's roadways is not available at present. Other problems related to vehicular traffic is the possibility of lead buildup and other contamination in roadway drainages. Ecology and the Island County Engineering Department are presently developing highway drainage and surface water programs to address the potential for contaminants being introduced along roadways in the County.

The Island County Comprehensive Plan (p. II-17, 2f) has provisions which discourage the construction and operation of major energy facilities, including the transport or storage of petrochemicals or petroleum in the County. This policy was initiated because of the potential for adverse environmental impacts to ground water and the marine environment of Puget Sound associated with industrial facilities and other activities of this nature.

#### 8. Climate Changes

The Intergovernmental Panel on Climate Change, a panel representing 39 countries, is presently charged with reporting on the state of scientific knowledge about the greenhouse effect. In their May 1990 report, the Panel indicated that unless emissions of greenhouse gases are cut immediately by more than 60%, global mean temperature could increase up to 5.4 degrees Fahrenheit by the end of the 21st century. Computer simulated models predict a 2 to 6 foot sea level rise by the year 2100. A sea level rise of this magnitude could result in significant adverse environmental impacts associated with ground water, including seawater intrusion, inundation of shoreline environments, and displacement of wetlands.

The potential long-term impacts of the greenhouse effect on ground water resources in Island County need to be recognized. Current research evidence indicates sea level is rising, and the rate of rising may increase substantially in the future. There is uncertainty, however, as to both the exact timing and magnitude of accelerated sea level rise (Canning, 1990).

#### D. GROUND WATER USAGE

Increased withdrawals associated with a growing population increase the potential for seawater intrusion and other ground water problems. Population growth trends and estimated water usage figures have generated cause for concern in planning efforts to safeguard and maximize the ground water available for present and future uses. Although estimates may vary as to the specific growth trend, it is important to emphasize that the status quo of ground water supply and demand can not be used to accurately estimate future ground water needs. While somewhat site specific, the ground water demand accompanying population growth is inversely related to the ground water available for use, where increasing demand may accompany a decreasing supply.

Since 1980, Island County has been one of the fastest growing counties in Washington State (OFM, Population Trends, 1989). The 1990 U.S. Census population count for Island County indicates a population of 60,195. Exhibit III-3 represents population projections through the year 2000 published by OFM. According to Island County Planning Department high growth projection, the residential population was forecasted to increase 41% from 1980 (44,000) to 1990 (62,100) (Note: April 1990 OFM census data indicates a 1990 population of 59,200; see Table III-1). During this same period, seasonal population was forecasted to increase 27% (from 11,200 to 14,190).

Table III-1 represents more current estimates of water consumption in the County based on OFM population projections (August 1989 and April 1990), ICPD seasonal projections, and a factor of 100 gallons per capita per day (CWSP accepted value of average daily use). The total annual ground water demand for Island County in 1980 was approximately 1785 MGY (million gallons per year) or 5,477 AFY (acre feet per year) and is projected to increase to 2,897 MGY or 8,889 AFY by the year 2000. This represents a 62% increase in water consumption in 20 years.

Certain fundamental hydrogeologic concepts associated with

Exhibit III-3

## ISLAND COUNTY POPULATION TRENDS

From Economic and Engineering Services, Inc.,  
1990. The Island County Coordinated Water  
System Plan Volume I.

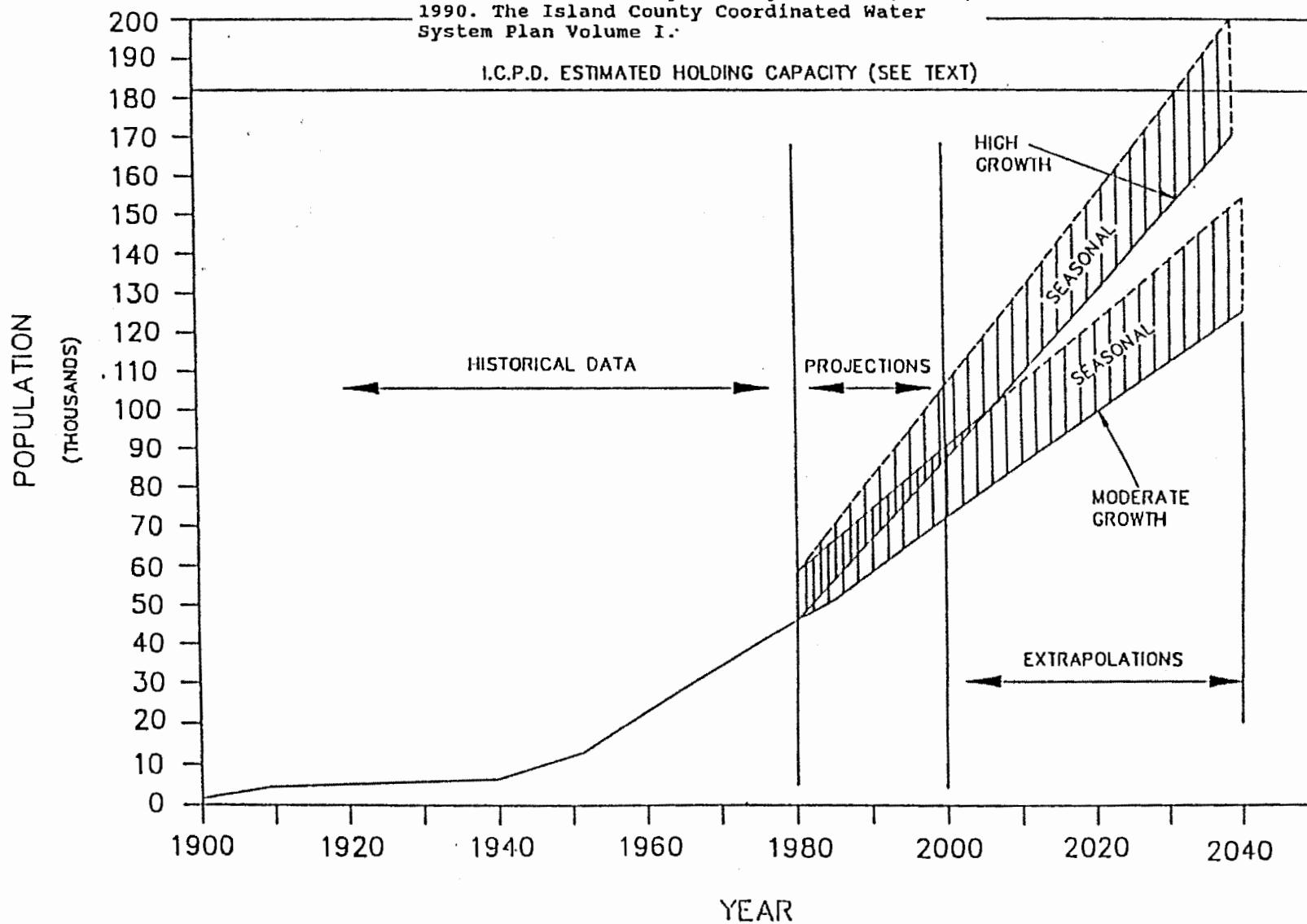


TABLE III-4  
Island County Water Consumption (1)

The following estimates are based on Island County Planning Department (ICPD) and Washington State Department of Financial Management (OFM) population projections. These water consumption estimates include water consumed by individuals served by the Anacortes pipelines providing water from the Skagit River.

	PERMANENT		SEASONAL		TOTAL
	Population OFM	Annual Consumption MGY (6)	Population ICPD (MGY) (3)	Annual Consumption (MGY) (4)	
1980	44,048 (2)	1,608	11,200	177	1,785
1985	49,201 (2)	1,796	12,650	200	1,996
1990	59,200 (2)	2,161	14,190	224	2,383
1995	64,548 (5)	2,350	15,895	251	2,601
2000	71,758 (5)	2,619	17,600	278	2,897
2010	86,808 (2)	3,168	21,010	332	3,500

Footnotes:

- (1) Average day consumption based on 100 gallons per capita per day.
- (2) Permanent population estimates, Washington State Department of Financial Management, April 1, 1990.
- (3) Seasonal population estimates, using data collected by ICPD in EIS for the Island County Comprehensive Plan which projects seasonal population from 1990 - 2000. Beyond 2000, a constant increase is assumed.
- (4) Consumption by seasonal population at same per capita rate as resident, but assumes only 15% of capacity during 4 months a year.
- (5) From OFM, State and County Population by Age and Sex 1980-2000, August 1989.
- (6) According to pipeline water usage figures obtained from the City of Oak Harbor, annual water usage by the City of Oak Harbor and NAS Whidbey ranged from 669 to 917 MGY in the last five years (1986-1990).

the finite ground water supply in Island County have generated concern. Ground water pumpage in certain areas has allowed the seawater-freshwater interface to migrate towards the freshwater aquifer, causing seawater intrusion. Seasonal chloride analysis of water from public water systems on South Camano (Garland and Safioles, 1988) suggests that the severity of seawater intrusion in individual wells is dependent on the magnitude of pumping.

Visual and statistical analysis of data from a few isolated wells in aquifer C in the greater Coupeville Focus Area and in aquifer D in the northeast Camano Focus Area showed a correlation between water levels and chloride changes (See Appendix A, Hydrologic Characterization, p. II-8) This may suggest that water use and recharge balance in these areas are critical. Because of the limited water level data available in the County, however, long-term effects of pumping on ground water levels are presently unknown.

Water use in Island County has not been measured adequately to generate accurate estimates of future ground water demands. Neither water level nor water pumpage data is collected on a regular basis. With the exception of usage figures for approximately 30 source-metered water systems in the County, data are not readily available to determine the relationship that exists between water levels and pumpage County wide.

Population projections suggest that the demand and withdrawals of ground water in Island County will continue to increase in the future. With population growth and the accompanying development, exists the potential for a decrease in ground water recharge and an increase in ground water contamination. The occurrences of ground water problems associated with seawater intrusion, nitrates, pesticides, and other contaminants may increase without proper ground water management.

#### E. GROUND WATER RECHARGE

In addressing ground water quality and quantity problems in Island County, significant emphasis needs to be placed on the protection and enhancement of aquifer recharge. In Island County, recharge is directly responsible for providing an adequate supply of ground water to meet the existing and future ground water demands.

In April 1982, underground water sources that supply drinking water to Whidbey and Camano Islands were declared to be "sole source" aquifers by the EPA. The basis of the federal designation was that the aquifers are recharged only by rain

or other forms of precipitation. For this reason, it is preferable to be conservative in considering recharge in the County by assuming all land area to be equally important in promoting recharge to the ground water aquifers.

Most recharge occurs during the winter and spring months when precipitation is greatest. On the basis of land use and precipitation estimates in the County, 20% to 70% of the yearly precipitation in Island County actually recharges the aquifers (Jones, 1985). The remainder runs off in streams or is lost by evaporation or plant transpiration. The Technical Memorandum and the USGS (Sapik et al., 1988) provide a computation of recharge in the County based on a detailed evaluation of recharge and evapotranspiration. The differing recharge values obtained in these recharge analyses are a direct reflection of the methods and assumptions used. Although there are numerous accepted methods of evaluating recharge to ground water, data are insufficient to apply the known methodology in Island County to obtain accurate estimates.

Recharge to ground water is reduced by paving and building in open spaces which formerly served as recharge areas. Man-made impervious surfaces and drainage structures redirect water off the islands and into Puget Sound, thus further reducing ground water recharge. Reducing recharge in one area may initiate negative ground water impacts (ex. seawater intrusion) in adjacent areas.

Presently, recharge area characteristics and limitations are not directly considered in quantifying the availability of ground water, nor does an accurate delineation of such areas exist. Furthermore, there is limited correlation between the amount of recharge area necessary for aquifer replenishment for existing water users and the amount required to provide for increases in population density. As a consequence, new developments may decrease the recharge capabilities to aquifers serving existing wells by encroaching on their recharge areas.

Considerations for recharge protection and enhancement in ground water resource planning efforts should be emphasized in development decisions. Limiting impervious surfaces (ICC 17.02.150.1) has indirectly helped preserve recharge in certain developments. Land Development Standards (ICC 11.01) encourages recharge of storm water into the ground and recognizes the function of wetlands as possible areas of ground water recharge. Although, the detailed drainage plan requirements of ICC 11.01.110.c include provisions for retention/detention and infiltration facilities to handle surface water in excess of peak discharge, consideration of

these facilities for recharge enhancement is not required in all proposed developments.

Protection and enhancement of recharge to Island County ground water is critical to maintain an adequate supply of potable water. Increased development could reduce ground water recharge capabilities of the land surface unless measures are taken to better manage and direct ground water recharge.

#### F. HYDROGEOLOGIC AND OTHER DATA DEFICIENCIES

The greatest challenge in setting public policy on ground water protection and management is to develop public awareness that ground water resources are finite. While water demands can be estimated, it is difficult to determine accurately the actual quantity of ground water that may be withdrawn from the aquifers without harmful impacts to the aquifers. A general hydrologic characterization of Island County is difficult due to the complex environmental and hydrogeologic parameters which needs to be factored into the equations. Due to the complex geology, broad-based assumptions from the existing limited ground water data result in unreliable conclusions.

The hydrogeology of Island County reflects a complex series of glacial events that have acted over the region for the last 40,000 years. During at least three glacial advances and retreats, sand and gravel were deposited to form aquifers and silt and clay were deposited to form aquitards. Instead of a simple layer configuration, deposits vary in thickness and are discontinuous. The complicated hydrogeologic framework has been a major obstacle in efforts to define and manage ground water resources.

In the recent regional ground water study by USGS, the hydrogeologic designation of "aquifer zones" is used to refer to the ground water characterization of Island County. They concluded that the hydrogeologic data collected to date could be greatly improved by refining it with additional detailed investigations evaluating site specific and local problems.

A specific example of the nature of the hydrologic complexities encountered is in characterizing recharge in Island County. The GWMP Technical Memorandum provides estimates of the amount of water available for large recharge areas based on the best, but limited data available at that time. Unfortunately, certain items in this data need to be refined and some data used were assumed since no specific data exist for much of the County.

The suggested needs and procedures for additional ground water quality and quantity data are described in the GWMP Data Collection and Analysis Plan. The following areas have been identified as lacking data or requiring additional data collection:

- o County wide rainfall patterns, variations and amounts.
- o Evapotranspiration patterns County-wide.
- o Runoff in various watersheds as well as to storm drains in residential areas.
- o Water usage, both private and public, as determined through metering or estimates based on a selected number and type of metered wells.
- o Identification of abandoned wells.
- o Aquifer capabilities based on aquifer or pumping tests.
- o Long-term water level trends.
- o Definition of recharge potential associated with various vegetative covers, topography, soil types, etc.
- o Ground water quality trends

#### G. GROUNDWATER POLICY ISSUES

This section identifies existing policies and policy deficiencies which directly or indirectly influence ground water management in Island County. In certain cases, these policies may need to be amended or additional policies created to comprehensively protect ground water resources in the County.

##### 1. Land Use

The Island County Comprehensive Plan and Zoning Ordinance (ICC 17.02) regulate land use in the unincorporated areas of Island County. Optimal land use designations and policies to guide development are given in the Comprehensive Plan. The Zoning Ordinance divides the County into several land use classifications: Residential, Rural Residential, Agricultural, Forest Management, Non-Residential, Urban

Growth Areas, and Zones of Influence. Additionally, overlay land use classifications are provided to implement policies contained in the Comprehensive Plan and to protect sensitive features, including critical drainage areas and water resource management areas.

The existing Comprehensive Plan and the Zoning Ordinance were developed without benefit of recent studies indicating ground water limitations in Island County. The Comprehensive Plan outlines policy guidelines for management of water resources in the context of land use and environmental planning, but was not intended to provide specific guidance to future ground water planning efforts.

The Zoning Ordinance provides for the possible establishment of a water resource overlay zone, under which areas with limited ground water availability or which are important recharge areas would be subject to special development standards and densities. Due to lack of sufficient data required to identify and map these areas, however, water resource overlay zones have not been established.

The Comprehensive Plan states that "Aquifers and aquifer recharge areas should receive special protection." Limited procedures exist, however, for maintaining and enhancing recharge in the County. ICC 17.02.150 identifies maximum impervious surface ratio requirements for Planned Residential Developments (PRDs) based on gross site area of the property. For example, no more than 50% of a site area should be impervious in a PRD located in a residentially zoned neighborhood. The open space ratios were designed to help preserve the County's rural character and to protect sensitive and resource lands, including water resource lands. Due to the difficulty of establishing the amount of recharge area necessary to provide an adequate amount of water to existing and future uses, however, the effectiveness of the established ratios is undetermined.

## 2. Water Resource Regulations

### a. General

Federal, State and Local laws and ordinances are simultaneously involved in issues dealing with management and allocation of ground water. The abundance of rules and procedures has made it difficult to assure that maximum use is made of all existing ground water policies and program mechanisms.

Presently, a consistent state-wide definition of seawater intrusion does not exist. Ecology has formed a Seawater

Intrusion Team and is presently working on a draft plan to control and prevent seawater intrusion under the existing regulatory authority.

In July 1989, the ICHD and DOH adopted a Salt Water Intrusion Policy. The seawater intrusion evaluation process involves classifying new, expanding and non-expanding public water systems into one of three risk categories based on existing water quality parameters. Water systems which exceed chloride levels of 250 ppm, the Maximum Contaminant Level (MCL) established by State Drinking Water Regulations (1989), have moratoriums placed on all new hookups until mitigating measures are developed. Public water systems which contain 100 ppm or greater chlorides may be subject to further evaluation or conditions of approval including monitoring, design modifications, metering, conservation practices, and phased development. Through this policy it is hoped that the problem of degradation of drinking water quality or loss of a water system source due to seawater contamination will be reduced or eliminated.

Although the ground water supply in Island County is limited, the construction of additional wells occasionally precedes efforts to employ conservation as a primary alternative. The following comprise water conservation requirements for new and expanding water systems as outlined in the CWSP:

- o Installation of individual and source meters;
- o Implementation rate structures that encourage water conservation;
- o Develop and implement leak detection and repair program;
- o Outline water use restrictions for drought periods in Operation and Maintenance Agreements.

These requirements only apply to new and expanding systems, however. ICC 13.03A mandates minimum design requirements for public water systems (CWSP, Appendix G), including installation of source meters. ICC 8.09 requires the installation of source flow meters at the well head for each new potable water source, including individual and public water supply systems. The Salt Water Intrusion Policy recommends that water conservation practices be incorporated into the operation and maintenance agreement in medium and high risk seawater intrusion areas. These recommendations are remedial, however, rather than preventative.

In addition to source meters, ICC 8.09 requires all new

individual and public water systems to submit water quality analyses, including bacteriological, nitrate, chloride, and any other parameters deemed necessary. The ground water requirements outlined in ICC 8.09 are consistent with the overall GWMP effort of obtaining potential monitoring wells, and data on water use and quality.

b. Well Identification and Abandonment

Improperly abandoned wells provide an avenue for ground water contamination. The number of abandoned wells presently existing in Island County is unknown. Well abandonment procedures are outlined in WAC 173-160, but may not be followed in all cases due to lack of awareness of the regulations.

A unique well numbering scheme and a current well inventory does not exist in Island County. Ecology has formed a Well Identification Task Force which is currently developing an options paper to evaluate possible implementation schemes. The Well Identification Program will enable tracking of wells and will help to ensure proper abandonment procedures, but release of the Task Force recommendations may not occur for some time. Implementation of Task Force recommendations will occur if recommendations are feasible and the problem is deemed significant enough to warrant the effort.

c. Water Rights

Authority for issuance of water rights has, by State law, been vested with Ecology. However, water rights provisions are not adequately implemented. This can be attributed, in most cases, to a) a lack of adequate staff and resources, and b) a deficiency of supporting data on safe sustainable yield and existing uses.

At the State level, there is a lack of a standard policy for evaluating withdrawal proposals. Although State law (RCW 90.44) specifically states that "no withdrawal of public groundwaters beyond the capacity of the underground bed or basin to yield such water within a reasonable or feasible pumping lift" will be granted a water rights permit, a set of applicable criteria is not provided.

Over-appropriation of water rights may have occurred in several areas in the County (CWSP, Appendix K). If these estimates are correct, and water rights are fully exercised, water will be removed from the groundwater system at a rate far greater than that of estimated replenishment.

The CWSP identifies the following problems with the water

rights issuance process:

- o Certificates of water rights are often issued for amounts greater than the actual needs;
- o Water rights are often unused or those abandoned have never been relinquished so the right is still technically an active appropriation;
- o Originally developed capacities have diminished due to system deficiencies or source deterioration;
- o Applications for new permits have been filed instead of changing the existing water right.

In addition, geographic service areas associated with water rights are not always changed to reflect actual service areas. In Island County, problems have arisen when relying on a water right permit for evaluating withdrawal proposals. Without criteria for evaluation, water rights may be issued in areas currently over appropriated. This is especially prevalent in areas that have received past subdivision approval but have not fully developed. However, Ecology has the authority to reduce water rights allocation where water rights are not being fully used. Presently, standard pumping test and monitoring regulations are in place for evaluations in the County.

#### SUMMARY

In summary, the Island County "sole source" aquifer is a critically important water supply. As a result of population growth in the region, ground water demand is expected to rise sharply in the future. If seawater intrusion and the various potential ground water quantity and quality problems are to be avoided, usage of the existing ground water resources must be carefully managed, and conservation programs that employ effective demand reduction techniques must be established. The recommended ground water management program is designed to focus on the problems identified. The primary goal of this program is to provide a viable and realistic approach to manage and protect ground water supplies for existing and future uses.

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## SECTION IV

### GOALS AND OBJECTIVES

#### A. PROGRAM PHILOSOPHY

The Island County Ground Water Advisory Committee, in its approach to the development of a Ground Water Management Program, recognizes the finite nature of Island County's groundwater resource and the increasing pressure, through growing population, on this resource.

The philosophy of the Ground Water Advisory Committee is consistent with Comprehensive Plan policy of living within the capacity of the natural resources of the County.

The Comprehensive Plan recommends that Island County should:

- o "Encourage managed and balanced utilization of all natural resources" (page II-10),
- o "Protect, maintain and enhance the quality and quantity of Island County's water resources for recreation, fish, wildlife, and domestic utilization" (II-15),

More specific policy elements of the Comprehensive Plan state that:

- o "Environmental and land use policies should be consistent with the need for proper water resource management" (II-15),
- o "The capability of air, land, and water resources to support development should be a determining factor in making land use decisions" (II-5),
- o "The location and design of urban development should be carefully guided in order to minimize potential adverse impacts on the quality of ground and surface waters." (II-6), and,
- o "Areas with limited ground water quality or quantity should be restricted to low density unless adequate domestic supplies are available" (II-6).

These policy elements comprise a framework upon which the policies of the Ground Water Management Program can be constructed.

## B. PROGRAM GOAL

The goal of the Island County Ground Water Management Program is to protect and enhance the quality, quantity, and recharge of ground water supplies in Island County.

## C. PROGRAM OBJECTIVES

The following objectives are necessarily broad in scope. Specific policy elements to be implemented as part of the GWMP can be identified only after sufficient research and evaluation of management options has taken place, and no attempt to present these specific options is made in this section.

Preventative management of ground water is ultimately more effective and efficient than restorative or remedial measures. The objectives of the Island County GWMP are generally oriented towards prevention of ground water problems; however, it is recognized that current and future problems will require remediation.

Objectives of the Island County GWMP are:

### EDUCATION

- o Educate the public and ground water managers about the characteristics of ground water resources and about confirmed and potential impacts on the resource.

### CONSERVATION

- o Establish a water use efficiency program, coordinated with the Island County Coordinated Water System Plan and the Comprehensive Plan, to help:
  - A. reduce existing usage,
  - B. maintain current ground water levels,
  - C. alleviate salt water intrusion problems,
  - D. ensure sustained supplies of ground water are available for Island County residents, and
  - E. optimize the efficiency of future ground water usage.

### MONITORING

- o Through data collection and analysis programs, increase knowledge of the limitations and characteristics of the County's groundwater resource. To provide useful information, such programs must recognize regional, seasonal, tidal, and other variables which affect ground

water characteristics throughout the County. An ongoing ground water monitoring program will help to:

- A. determine the extent of any seasonal and long-term trends in salt water intrusion;
- B. determine the extent of any seasonal and long-term trends in water level changes;
- C. refine estimates of rainfall, runoff, and recharge;
- D. refine County-wide ground water usage estimates; and
- E. identify any areas in which agricultural activities, domestic activities, hazardous waste disposal, chemical use, industrial/commercial activities, landfills or other land uses which have or may caused groundwater contamination.

- o Maximize the accumulation and use of information from new and existing wells.

#### REGULATION

- o Develop land use approval criteria based on ground water quantity, quality, recharge, the vulnerability of the resource, and risks associated with proposed land uses.
- o Prevent contamination of ground water through control of potentially contaminating activities or land uses.
- o Evaluate the effectiveness of existing County codes in protecting ground water and recommend changes, or the creation of new codes, where appropriate.
- o Explore other regulatory avenues in ground water protection which are reasonable and effective.

#### COORDINATION

- o Define the responsibilities and capabilities of all local, state, and federal agencies in the long-term management of groundwater in Island County.
- o Ensure that planning efforts in the County which may impact ground water are coordinated with the Ground Water Management Program.
- o Ensure that Island County ground water issues are considered in State efforts to develop new water resource policies and regulations.

#### D. ISLAND COUNTY GROUND WATER POLICY

It shall be the policy of Island County that all proposed actions be consistent with the goals and objectives of the Ground Water Management Program. The following statements will implement elements of the these goals and objectives, and the recommendations of the Ground Water Advisory Committee.

Water Rights: Any action which involves or leads to a change in ground water usage, including distribution, should be accompanied by appropriate changes to water rights. These actions include, but are not limited to, water system expansion, annexations by water districts or municipalities, and water system planning. Water rights no longer in use may be relinquished under the authority of Ecology.

Water Use Efficiency: Inefficient use of Island County water resources shall be inconsistent with this policy. Any proposed actions leading to or involving uses of Island County water resources should be evaluated in terms of water use efficiency, and approval withheld until a finding is made that reasonable efforts have been made and appropriate technologies used to ensure that water use practices will be consistent with the goals of the Ground Water Management Program.

Ground Water Recharge: Recharge of ground water is the preferred method of surface water disposal from a site, except where such recharge could contaminate ground water or otherwise cause adverse environmental impacts, such as depletion of downstream flows. Any action which involves the creation of impervious surfaces should be carefully evaluated in terms of the effect on recharge. Where appropriate and as necessary, total impervious surface should be limited to protect recharge.

Contamination of Ground Water: Any proposed action should be evaluated in terms of potential for ground water contamination, and approval withheld until a finding is made that appropriate measures have been taken to avoid such contamination. Such contamination shall include, but not be limited to, seawater intrusion and the introduction of harmful chemicals or other substances, by any means, into the ground water.

Because of the serious environmental and public health implications which would result from risking the only available drinking water to eighty percent of the County's population and the difficulty and cost of ground water remediation associated with even small chemical spills, throughput oil transmission facilities in Island County, including pipelines, should not be permitted.

Existing policies and regulations, such as SEPA, should be used as appropriate to address contamination concerns. Any remedial measures resulting from past actions should be consistent with the GWMP.

Well Abandonment: Any action leading to or involving the abandonment or discontinued use of any water well should not be approved until assurances are made that all such abandoned wells will be located and identified and that such abandonment will follow appropriate procedures as provided for in State law.

Well Identification: Any proposed action which involves the preparation or exchange of information on real properties should not be granted final approval until the location and status (active or abandoned) of any wells, along with status of any water rights associated with such wells, are properly identified and documented.

Ground Water Withdrawals: Any proposed action which involves or leads to withdrawals of ground water should not be granted final approval until reasonable assurances are made that such withdrawals will not adversely impact existing ground water uses.

Watershed Protection: Island County should work closely with municipalities and large water systems to provide comprehensive protection of the water resources serving these systems, especially where such protection is needed on lands outside the jurisdiction of these systems. This should include joint protection of watersheds, wellhead protection, and other efforts where cooperative action would most effectively provide the necessary protection.

Coordination with State Agencies: State and federal agencies, including the Department of Ecology, the Department of Health, the Department of Natural Resources, the

Department of Fisheries, the Federal Emergency Management Agency, and other applicable agencies, when exercising their authority in Island County, should make every effort to ensure that the policies of the Ground Water Management Program are not contradicted. Furthermore, these affected jurisdictions should review their applicable policies and regulations and consider amendments, as appropriate, to ensure consistency with the goals and objectives of the GWMP.

## SECTION V

### ALTERNATIVES

#### A. INTRODUCTION

The Alternatives section comprises the main body of the Island County Ground Water Management Plan. In this section twenty management options are identified and evaluated in detail. For clarity, the management options are organized under six general headings: public involvement and assistance, conservation, ground water monitoring and evaluation, ground water recharge, ground water protection designations and programs, and other. No prioritization is suggested by the order in which the options are presented.

A specific recommendation and rationale concludes each of the management options. Not all management options are recommended for implementation at this time. Implementation needs for those options recommended for immediate implementation are in the Preferred Program and Implementation Plan (Section VI). Ongoing options will be reviewed and monitored using the procedures outlined in the Effectiveness Monitoring Plan (Section VII).

#### B. PRELIMINARY SELECTION AND EVALUATION OF MANAGEMENT OPTIONS

This section explains the procedure followed by the GWAC to address ground water management problems defined in the Problem Definition document (Section III). Management options were solicited from the GWAC to address their specific ground water concerns. Five matrices were designed to facilitate in the evaluation of the management options identified. Each option was evaluated against five criterion, including resource management, local acceptability, implementation concerns, financial costs, and consistency with regulatory standards. The results of the matrices reflect the cumulative response of the GWAC. Additional details regarding the matrix evaluation efforts, including a summary of the matrix results are found in Appendix G.

#### C. OPTION PAPER DEVELOPMENT

Following the completion of the matrices, the GWAC prepared twenty option papers to address each of the management options. For each management option, a desired objective was defined and existing policies and programs were evaluated. At least two suggested strategies were identified for each objective, including a no action strategy. GWAC concerns and

strategies for improvement or modification are evaluated in detail.

For each strategy, the potential environmental impacts which may result if the strategy is implemented are recognized. Discussion of environmental impacts consist of objective statements designed to address broader impacts to the environment. These statements are not intended to represent a thorough evaluation of all impacts to the environment, but are intended to recognize those general impacts which may result if a specific strategy is selected over another. A threshold determination will be made following public review of this document.

#### D. OPTION PAPER FORMAT

Each of the twenty option papers is organized in the following format:

Problem Statement  
Objective  
Existing Policies and Programs  
Suggested Strategies  
Evaluation of Strategies and Environmental Impacts  
Recommended Strategy  
References

The option paper topics are listed below and appear under the following broad headings:

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Public Involvement and Assistance	
#1 Education Program	V-5
#2 Technical Assistance Program	V-9
Conservation	
#3 Conservation Program	V-15
#4 Building Code Amendments	V-21
Ground Water Monitoring and Evaluation	
#5 Data Collection Program	V-23
#6 Ground Water Development Classification Matrix	V-47
#7 Ground Water Availability Criteria: Potable Water Source and Supply (Chapter 8.09 ICC)	V-63
Ground Water Recharge	
#8 Island County Land Development Standards Revisions	

#9 (Chapter 11.01 ICC) V-71  
Guidelines/Regulatory Criteria for  
Construction of Artificial Recharge  
Facilities V-75

Ground Water Protection Designations and Programs

#10 Water Resource Overlay Zone V-77  
#11 Environmentally Sensitive Areas  
under SEPA (WAC 197-11) V-81  
#12 Critical Areas under the Growth  
Management Act of 1990 (SHB 2929) V-87  
#13 Areas of Special Concern  
(WAC 248-96, draft revisions) V-93  
#14 Special Protection Areas  
(WAC 173-200) V-97  
#15 Aquifer Protection Areas  
(RCW 36.36) V-99  
#16 Wellhead Protection (WHP) Program V-103

Other

#17 Non-Regulatory Land Conservation  
Programs V-109  
#18 Pollution Source Controls V-113  
#19 Coordination Program V-121  
#20 Memorandum of Understanding V-125

ISLAND COUNTY  
GROUND WATER MANAGEMENT PROGRAM  
OPTION PAPER #1

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**Title: Education Program**

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**Problem Statement:** Public perception and understanding of ground water problems, and their possible solutions, needs improvement. Without a well-informed public, ground water protection efforts could be misunderstood and could lack both political and participatory support.

**Objective:** The objective of an education program in Island County will be to help the public understand:

- o the current knowledge of the characteristics of Island County's ground water resources;
- o the confirmed and potential adverse impacts to ground water of various activities; and,
- o programs and regulatory efforts to protect and conserve Island County ground water.

Ultimately, an objective and knowledgeable public will:

- o be able to make appropriate decisions on water resource issues; and,
- o increase the effectiveness of conservation efforts and other programs through voluntary cooperation and participation.

**Existing Policies or Programs:** Some effort has gone into education on ground water topics. Materials such as brochures, which provide information on topics ranging from seawater intrusion to conservation to handling of household hazardous waste, are available for distribution through the Island County Health Department, the Island County Solid Waste Department, the Soil Conservation Service, and the WSU Cooperative Extension. The Solid Waste Department distributes bimonthly newsletters on hazardous waste planning and household hazardous waste management, directly contributing to ground water protection efforts by encouraging practices which reduce ground water contamination.

The Health Department has held workshops in water system management. The GWAC sponsored a series of workshops on

ground water management issues in the fall of 1988. These workshops were well-attended, indicating substantial interest in the information and issues, and several favorable comments on the workshops were received.

The State Departments of Ecology and Health offer informational brochures, videotapes, and other materials. However, a consistent method of dispersal of these materials is not fully developed in the County.

**Suggested Strategies:**

**Strategy 1:**

Implement a comprehensive, ongoing public education program to:

- o disseminate ground water information on a regular basis;
- o to support the conservation, data collection, and technical assistance programs; and,
- o make staff, materials, and equipment available to assist the public in understanding ground water issues and preventing ground water problems

**Strategy 2:**

Take no action.

**Evaluation of Strategies:**

**Strategy 1:**

Public education is an important and successful element of ground water protection programs nationwide. Such programs can be relatively inexpensive, easy to implement, and are generally less disruptive than remedial actions or regulatory controls.

Some expense will be incurred with implementation of an education program. The value of a successful program, in terms of benefits to the resource, should soon outweigh the costs, however, especially if compared to costs of ground water remediation. An education effort aimed at preventing ground water problems before they become widespread can prevent significant future expenses.

Efforts to increase the public health and safety can be enhanced through public education. A well-informed

public is better able to understand the health effects of various activities, and can thus avoid situations which threaten their own health and the health and safety of others.

One of the most important elements of an education program is the dissemination of objective, factual material in a technically-oriented yet understandable format.

Environmental Impacts: Some environmental impacts of a successful education program would be positive: efficient water use practices would become more widespread, slowing the rate of ground water depletion, and awareness of the effects of potentially contaminating practices would reduce such contamination. Water made available through conservation measures could allow additional development and associated adverse environmental impacts, however.

#### Strategy 2:

As indicated above, previous and current education activities have increased awareness of ground water issues in Island County. Also mentioned, however, are the apparent and persistent misunderstandings among many people of ground water problems and of efforts to address such problems. Accurate perception is critical to an effective decision-making process. The effectiveness of conservation programs and other ground water protection efforts depend, in large part, on the effectiveness of public education.

Without an education program, awareness of ground problems might only increase if the problems become immediately threatening. Protection efforts would become remedial only, rather than preventative. Costs of prevention of problems are generally less costly and difficult than ground water remediation.

The public could put themselves or others at risk due to lack of awareness of current and potential ground water recharge, availability, or contamination problems. While new regulations may help avoid this risk, a successful public education program can further help the public avoid such problems.

Environmental Impacts: The no-action Strategy could have direct adverse environmental impacts on Island County ground water quality and quantity. Potentially contaminating activities not addressed or not adequately

covered by other County efforts will likely continue, increasing the occurrences of ground water contamination. Individuals using inefficient agricultural, commercial, and domestic water use practices would not be made aware of the adverse impacts of these practices and may continue to waste water. The cumulative impacts of an uninformed public could conceivably contribute to significant adverse impact to ground water supplies.

**Recommended Strategy:** Strategy 1, a long-term, comprehensive education program, which continues and expands on current efforts, could provide significant protection of Island County ground water resources. The benefits of such a program, if successful, will outweigh the environmental and financial costs, especially if possible future costs of remediation are considered.

ISLAND COUNTY  
GROUND WATER MANAGEMENT PROGRAM  
OPTION PAPER #2

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Title: Technical Assistance Program

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**Problem Statement:** An expanded, more centralized, and comprehensive program is needed to ensure adequate levels of technical support on ground water topics are available. The following shortcomings have been identified in current technical assistance efforts:

- o Regular small system technical seminars are needed. These require considerable staff preparation time and some presentation materials; current staff are unable to devote time necessary to offer such seminars.
- o Health Department and DOH staff are able to conduct on-site visits to water systems only when problems arise. Many of these problems could possibly be averted if site visits could be conducted for less urgent situations.
- o The Health Department operates a grant-funded program offering information on septic system operation and maintenance. While septic systems have not been identified as a source of serious ground water concern, this program helps to maintain this status. Grant funds for the program run out in February of 1992.
- o No technical or educational programs target owners of single-home domestic wells. While some owners of these systems voluntarily seek advice and assistance from the Health Department, the remainder may not be completely aware of potential problems and of technical assistance available through current programs.
- o While the Health Department occasionally holds workshops on changing regulations and guidelines, there is no ongoing technical or educational programs targeting local water system design engineers, well drillers, and other professionals. Regular workshops to inform these professionals of new technologies, changing regulations, and ground water information updates should be offered.
- o There is a lack of quality technical and educational materials available for distribution.

**Objective:** Enhance and expand technical assistance functions currently carried out by County staff. Specific functions

include helping purveyors, and individual well owners, and others in:

- o making the most efficient use of water;
- o identifying possible funding sources for system improvements;
- o preventing ground water contamination or depletion;
- o understanding and meeting state and local water resource regulations; and,
- o selecting appropriate water system design.

**Existing Policies or Programs:** In addition to the current activities described above, the USDA Soil Conservation Service has provided free technical assistance on Whidbey Island since 1965. Camano Island is served by the Lake Stevens SCS office. Although aimed generally at the agricultural community, SCS programs cover a wide range of resource protection, including protection of ground water. Only two staff members are available on Whidbey Island, however, and a program encompassing both Camano and Whidbey Islands does not exist.

Washington State University Cooperative Extension Service is also very active in Island County in educating residents on all aspects of the environment. Because of the wide range of services and activities offered, the local agent is able to devote only a portion of the Extension's resources to technical assistance in water resources.

The Board of Island County Commissioners officially established a Public Works Department in 1971, pursuant to Chapter 13.01 ICC, for the purposes of "establishing, maintaining, and operating systems of solid waste, sewage, water, drainage, and other public services authorized by the Board." The provisions of Chapter 13.01 ICC have never been fully implemented, however. The Coordinated Water System Plan recommends that the BICC review Chapter 13.01 ICC and consider implementation of some of the provisions of the code. Furthermore, the CWSP recommends that the Public Works Department be tasked with the development and implementation of a technical assistance program to water purveyors and Regional Water Associations.

The State Department of Health has one full-time employee devoted solely to providing technical assistance to water systems. Additionally, the district engineer and water quality sanitarian working out of the Northwest Drinking Water office in Seattle make frequent site visits; their area of responsibility covers several counties, however, and they are unable to devote the time necessary to accommodate the scope of technical assistance suggested here.

**Suggested Strategies:**

**Strategy 1:**

Develop and implement a program to provide Technical Assistance to individual well owners; water system managers and water purveyors; water resource professionals (well drillers, etc.); and other targeted groups as identified.

**Strategy 2:**

Take no action.

**Evaluation of Strategies:**

**Strategy 1:**

The Island County Coordinated Water System Plan (CWSP) identifies the development of a technical and financial assistance program as being one of the highest priorities in order to achieve CWSP objectives. The majority of public water systems in Island County are operated or managed by volunteers with limited time, knowledge, or experience in water system management. A Technical Assistance Program might provide these water systems with support sufficient to head off severe problems before they occur.

Owners of single home domestic wells would benefit greatly from a Technical Assistance Program. Technical assistance offered from the State is generally geared toward larger water systems, leaving the smallest systems and single home domestic well owners with limited technical assistance availability. These individuals rarely request or receive assistance or advice until a problem is experienced. A program which makes useful information available to these single domestic water systems could reduce the occurrence of health and resource-related problems associated with these systems.

Developers, well drillers, and water system design engineers would also benefit from a technical assistance program. A readily accessible source of the most current and accurate water resources information could help ensure that these professionals provide quality services to their customers, further reducing the incidence of water-related problems in the future.

One shortcoming of a program of the magnitude proposed here is that it requires significant funding and staff resources. It is possible, however, that these expenses could be at least partially offset by grant funding from the State.

Environmental Impacts: No adverse environmental impacts would result from implementation of a technical assistance program. Instead, environmental impacts resulting from a technical assistance program would be positive, in much the same fashion as in the Education Program (option paper #1). With greater awareness of potential negative impacts that particular activities or practices may have, users of the technical assistance program will tend to avoid or correct these activities or practices.

#### Strategy 2:

Current technical assistance activities are relatively successful; however, as previously mentioned, certain inadequacies exist. Also, as population growth continues in Island County, demands on water systems and on ground water resources will increase proportionally, creating a greater need for comprehensive technical assistance. The relative degree of success of current efforts will decline as greater demands are put on staff and other resources devoted to technical assistance.

Environmental Impacts: As these demands on current technical assistance efforts increase, and the overall effectiveness of these efforts decrease, the potential for adverse environmental impacts increases.

Recommended Strategy: Strategy 1 is recommended for implementation. Additional staff and other resources should be devoted to the development, implementation, and maintenance of a Technical Assistance Program. A Technical Assistance Program could help alleviate current ground water problems, and could head off more serious problems. Benefits of a successful Technical Assistance Program will outweigh expenses, especially when the preventative benefits are compared to the high costs of remedial measures.

#### References:

Chapter 13.20 Morro Bay Ordinance. Building Limitations.  
March 1988. City of Morro Bay.

Annual Water Report, 1989. Community Development Department,  
City of Morro Bay.

Thurston County Planning Department, 1989. Management Options for Ground Water Protection in Thurston County, Washington.

USDA - Soil Conservation Service, 1976. Assistance Available from the Soil Conservation Service, Bulletin 345. US Gov't Printing Office, Washington, DC.

ISLAND COUNTY  
GROUND WATER MANAGEMENT PROGRAM  
OPTION PAPER #3

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**Title:** Conservation Program

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**Problem Statement:** Population growth in Island County has significantly increased withdrawals from the ground water aquifers. This has diminished available supplies of freshwater and increased the potential for contamination of ground water by seawater intrusion. Efficient use of ground water is a widely recognized element of a complete water resource management program, yet no comprehensive conservation program exists in Island County to reduce aquifer withdrawal rates, extend the life of the resource, reduce the potential for seawater intrusion, and decrease the stress on septic and wastewater disposal systems.

**Objective:** Encourage and require water conservation in Island County in order to lessen the effects of increasing ground water extraction upon the County's limited ground water resource.

**Existing Policies and Programs:** Presently there is no comprehensive water conservation program in Island County. Existing policies and programs are comprised of the following:

1. The Island County Coordinated Water System Plan (CWSP) requires the following for new and expanding water systems:
  - a. Installation of individual and source meters.
  - b. Implementation of rate structures that encourage water conservation.
  - c. Development and implementation of a leak detection and repair program.
  - d. Outlining water use restrictions for drought periods in Operation and Maintenance Agreement.
2. The Island County Health Department (ICHD) and Department of Health (DOH), through the Salt Water Intrusion Policy,

require water conservation strategies be incorporated into the operation and maintenance agreement for systems at risk for seawater intrusion.

3. The Island County Planning Department (ICPD) can require the inclusion of water conservation practices as caveats in development approval.
4. The Memorandum of Understanding (MOU) between the Washington State Department of Ecology (DOE) and Island County outlines metering requirements for all new permitted wells and all new exempt potable water supply wells. The MOU also commits to a vigorous pursuit of conservation efforts through public education, plans, ordinances, and permit provisos.
5. The draft "Interim Guidelines for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology, and Conservation Programs," produced by a joint task force of the Washington Water Utilities Council (WWUC), DOE, and DOH, outlines an approach to identification of future water supply requirements and the development of comprehensive conservation programs.

**Suggested Strategies:**

**Strategy 1:**

Create and implement a program which encourages conservation of Island County's potable water resources.

**Strategy 2:**

Take no action.

**Evaluation of Strategies:**

**Strategy 1:**

As stated in the CWSP (page V-1),

"The indication of limits to ground water supplies are strong enough in most areas of the County that it should be a priority of all ground water users to employ conservation as a primary alternative to additional well construction."

Water conservation must not be limited as a strategy

employed only during severe water shortages or drought years. "The idea of the 'wise use of water' has been advanced...as the best way to avert a water crisis" (Beecher and Lauback, p. 19). Even in those areas not currently experiencing quantity problems, the efficient use of water is a sensible approach to avoid future problems. This is especially true in Island County given its finite ground water supply, and its designations as a Critical Water Supply Service Area and a Sole Source Aquifer.

It is the policy of the State of Washington to promote and encourage efficiency in the use of public water resources. According to the Water Resources Act of 1971,

"...state and local governments, individuals, corporations, groups and other entities shall be encouraged to carry out water use efficiency and conservation programs and practices...", and,

"Existing and future generations of citizens of the state of Washington should be made aware of the importance of the state's water resources and the need for wise and efficient use and development of this vital resource" (RCW 90.54.180).

Successful conservation programs, namely those which reduce demand ten percent or more, can be relatively inexpensive (CWSP, p. V-2). For instance, retrofit kits often pay for themselves within one year's time through savings resulting from decreased water consumption. Water conservation also reduces the demand on water system facilities, as well as waste water and septic systems. Furthermore, energy cost savings are yet another direct result of efficient water use.

Unfortunately, intensive conservation measures may be viewed as threatening by some residents. It is possible that water saved through conservation could support additional growth in some areas. It is essential that efficient water use practices be linked to maintaining the current quality of life, and to avoiding future water quality and quantity problems.

Environmental Impacts: No direct adverse environmental impacts would result from implementation of a water conservation program. Instead, impacts would be

positive in terms of lessening existing ground water withdrawal and alleviating the adverse effects associated with such withdrawal. Additionally, reduction in domestic use generally translates to reduced demand on sewage systems, thereby reducing the potential of ground water contamination through failing sewage systems.

However, it should be noted that supplies of ground water saved through conservation could occasionally be used to support additional growth where such opportunities did not exist prior to implementation of conservation measures. Thus, some indirect environmental impacts associated with additional growth may result from implementation of a County-wide conservation program.

Strategy 2:

The benefits of implementing conservation measures may not be immediately apparent, except in those areas currently experiencing water resource problems. Without implementation of a conservation program, however, inefficient water use would likely continue in Island County. Given the limitations of the resource, the costs of remediation versus that of prevention through conservation, a growing national attention of water resource issues, the failure of individuals, water systems, and local government to increase water use efficiency would be inappropriate and irresponsible.

Environmental Impacts: Failure to implement a County-wide conservation program could potentially lead to premature depletion of available water resources, and, as noted above, could conceivably be linked to undue loading of sewage and wastewater treatment systems. Both of these effects could have detrimental impacts on water quality and on the capacity of the resource to support human activities and wildlife habitats. On the other hand, possible adverse effects noted above under environmental impacts evaluation of Strategy 1 would be avoided in absence of a County-wide conservation program. Initial economic impact would be avoided, but high future costs can be expected without immediate implementation of a conservation program.

Recommended Strategy: Strategy 1 is recommended for implementation. A County-wide conservation program can

provide significant protection of Island County drinking water resources at an acceptable cost/benefit ratio from both economic and environmental viewpoints. The educational value of such a program in itself will generate public concern and interest in protecting the resource. The additional supplies made available through more efficient water use will help to ensure a sustained and reliable supply for the future.

#### References

American Water Works Association Document M6. Water Meters-Selection, Installation, Testing, and Maintenance. Beecher and Lauback.

City of Phoenix Water and Wastewater Department, 1986. Water Conservation Plan.

ICC 8.09. Potable Water Source and Supply.

ICC 13.03A. Minimum Standards for Water Works.

Island County Agriculture/Forestry Council, 1990. Second Draft Outline for AG and Forestry Water Resources Management in Island County.

Memorandum of Understanding between Washington State Department of Ecology, Water Resources Program and Island County, Washington, December, 1990.

Island County Coordinated Water System Plan, 1990.

New York State Department of Environmental Conservation, 1989. Water Conservation Manual for Development of a Water Conservation Plan (Draft).

RCW 19.27. State Building Code, 1989.

RCW 90.54. Water Resources Act of 1971.

Washington State Department of Ecology, Department of Health, and Water Utility Council, 1990. Interim Guidelines for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology, and Conservation Programs (Draft).

Washington State Department of Social and Health Services, Guidelines for the Preparation of Water Shortage Response Plans, June, 1988.

ISLAND COUNTY  
GROUND WATER MANAGEMENT PROGRAM  
OPTION PAPER #4

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**Title:** Building Code amendments

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**Problem Statement:** Maximum use performance standards for plumbing fixtures, as currently required by the State Plumbing Code, may not be stringent enough in and of themselves to conserve significant volumes of ground water.

**Objective:** Minimize ground water use through requiring the use of water-conserving fixtures.

**Existing Programs or Policies:** The State Plumbing Code is often revised annually, but is published in its entirety only once every three years. The County regularly adopts, by reference, this updated Uniform Building Code and the Uniform Plumbing Code into the Island County Building Code, 14.01 ICC. To avoid redundant costs of adoption, annual revisions of the State Building or Plumbing code are usually not immediately adopted into local code, but are instead adopted at the time of the three-year update.

Current State standards require use of low-volume plumbing fixtures. The Island County Building Department is following the state-wide convention of beginning implementation of these requirements after January 1, 1991, thereby allowing merchants and contractors to eliminate existing stocks of fixtures which do not meet the new State requirements. More stringent State standards go into effect on July 1, 1990, and will be immediately enforced in Island County.

The Comprehensive Plan recommends that "Utilization of water and energy conservation techniques should be encouraged in all developments. Examples include water conservation fixtures..." (II-25).

**Suggested Strategies:**

**Strategy 1:**

Amend the Island County Building Code to require use of ultra-low-volume fixtures in all new construction and remodeling.

**Strategy 2:**

Develop specific policy language requiring installation of water conserving devices through Planning Department approval process.

**Strategy 3:**

Take no action.

**Evaluation of Strategies:**

**Strategy 1:**

In 1989, the Washington State Building Code Council was directed by the state legislature to amend the Water Resources Act of 1971 by adding requirements for low water consumption plumbing fixtures, effective July 1, 1990 (Chapter 51-18 WAC). As amended, State Plumbing Code language requires low-flow fixtures (3.5 gallon per flush toilets, 3.0 gallon per minute faucets and shower fixtures), a vast improvement over previous standards. Additionally, more stringent standards for low-volume plumbing fixtures will become effective on July 1, 1993; the Island County Building Department will begin enforcement of these standards upon that date. The Council will be conducting a study in the interim on the availability of water efficient fixtures and the potential impact of their use on sewerage and septic lines and treatment plants. In the meantime, however, the legislature has prohibited, effective July 1, 1990, cities, towns, and counties from amending the code revisions and standards established for low water consumption plumbing fixtures, pending completion of the study.

**Environmental Impacts:** Adverse environmental impacts could result from implementation of this option in terms of conserved water contributing to additional development. In absence of this development, beneficial impacts to ground water quality and quantity would occur.

Questions have been raised about the effect of reduced wastewater flow on the treatment effectiveness of on-site sewage system drainfields as constructed under current standards, and subsequent adverse environmental effects on ground water quality. Some data shows, however, that the treatment efficiency of septic tanks is enhanced under reduced flows (Department of Health, 1990).

With implementation of this strategy, economic benefits

could occur through savings on water and electric rates.

Strategy 2:

The Comprehensive Plan language cited above gives the Island County Planning Department authority to impose conditions on approvals for proposed development. In the past, this has included the use of low-volume fixtures and other water use efficiency techniques; as a result, some homeowner's covenants include specifications for water-conserving fixtures and techniques. Also, the awareness of the finite nature of Island County ground water and current problems has already prompted a few individuals and associations to voluntarily use water-efficiency fixtures and techniques.

Additional Planning Department authority to require the use of low-flow plumbing fixtures is provided through implementation of State Environmental Policy Act (SEPA) procedures. Activities or proposals which are subject to SEPA, and which have a potential to adversely affect ground water quantity or quality, may be issued a "Mitigated Determination of Non-Significance", or MDNS. The term mitigation, in this context, refers to conditions which are imposed on the activity or proposal to ensure that adverse effects are minimized to the level of non-significance. While this occurs frequently during Planning Department operations, the Planning Department would be given authority to place such conditions on a wider range of projects if Island County, or a portion(s) thereof, is declared an "Environmentally Sensitive Area" (see option paper #11).

Environmental Impacts: Same as Strategy 1.

Strategy 3:

Following the no-action strategy would not significantly deter ground water management efforts in Island County. Current Comprehensive Plan implementation has led to the installation of low-volume fixtures in several new developments, and SEPA provides additional authority for the Planning Department to require use of such fixtures.

As mentioned above, current State Building Code standards do provide requirements for low-volume fixtures, though more stringent standards would be more effective in conserving ground water. In 1993, the State Plumbing Code will again be amended, imposing more stringent standards. These standards will then take

effect in Island County upon adoption into local building code.

Environmental Impacts: The no-action strategy could allow more adverse environmental impacts to occur than Strategies 1 or 2 through less efficient use of ground water. Ground water may be withdrawn at a higher rate than if Strategies 1 or 2 were implemented. Successful conservation and education efforts, as proposed in option papers #1 and #3, may offset these possibilities of additional withdrawals.

Recommended Strategy: Strategy 3 is preferred. Current State Plumbing Codes already require the use of low-flow fixtures. More stringent requirements will take effect in Island County on July 1, 1993. Planning Department authority through the Comprehensive Plan and through SEPA is effective in ensuring use of water-efficient fixtures in some new development. An additional consideration is the GWMP Conservation Program (option paper #3), which, if successful, will contribute to satisfying the ultimate objectives of this option paper through a variety of techniques.

References:

Department of Health, State of Washington, 1990. Washington's On-Site Newsletter. Volume 7, Number 4.

ICC 14.01. Island County Building Code.

Island County Planning Department, 1977. Island County Comprehensive Plan: Planning Policy, Phase Two. (Revised 1984).

WAC 51-18. Washington State Water Conservation Performance Standards.

ISLAND COUNTY  
GROUND WATER MANAGEMENT PROGRAM  
OPTION PAPER #5

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**Title:** Data Collection and Management Program (DCMP)

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**Problem Statement:** Existing ground water data on quality, quantity, and recharge to adequately characterize and protect ground water resources in Island County is lacking. A comprehensive ongoing ground water monitoring and data management program does not exist.

**Objective:** To develop an implementation scheme to collect and analyze data in areas of quality, quantity, and recharge as described in the Data Collection and Analysis Plan (DCAP) and as deemed necessary to support other GWMP programs and recommended regulatory and non-regulatory options. Establish an efficient data management system in the County to maximize use of existing and future ground water data.

**Existing Policies and Programs:** Comprehensive data collection and management efforts outlined in this program will serve to supplement and enhance existing efforts to better evaluate hydrogeologic conditions and trends in the County.

The GWMP Hydrogeologic Characterization (Appendix A) identified five geographic areas, Focus Areas, based on existing data which indicate that water quality has deteriorated as a result of seawater intrusion and/or over pumping of ground water. These areas may be subject to water quality and/or quantity problems. The boundaries of the Focus Areas will be subject to continuing review based on possible management requirements and new data.

The DCAP (Appendix D) is designed to provide guidelines for meeting Island County ground water information needs. Certain methods and criteria for the collection of ground water quantity and quality data are recommended.

The Data Management Plan (DMP; Appendix E) is designed to characterize data to be collected and to describe the methodology for data handling. The long range objective of this document is to provide the County with a practical and effective means of recording and reporting ground water data which may be needed to carry out the provisions of the GWMP. Presently, elements of the database management system have been made operational on a computer system at the Island County Health Department (ICHD). However, the existing data management system requires additional work for efficient data

retrieval and evaluation. The ground water information database will reside with ICHD.

**Suggested Strategies:**

**Strategy 1:**

Seek implementation of a long-term ground water quality and quantity data collection and management program for Island County. Continue to improve the existing data management system for efficient data entry and retrieval. In addition, continue to enter existing ground water data in the County database in accordance with Ecology guidelines for GWMPs.

**Strategy 2:**

Take no action.

**Evaluation of Suggested Strategies:**

**Strategy 1:**

The Data Collection and Management Program intends to focus efforts in geographic areas which have had a history of ground water quality and quantity problems and in areas where a potential for quality and quantity problems exists. The Focus Areas were identified in the DCAP as areas which have experienced ground water quality or quantity problems. Focus Area boundaries predominantly reflect surface water drainage basins and not hydrogeologic basins, and therefore may be excluding areas with unknown ground water problems.

Prior hydrogeologic characterization of existing ground water data in the County has indicated that data is insufficient to allow for the delineation of areas which require special ground water protection for regulatory purposes. A Ground Water Development Classification Matrix (option paper #6) is being developed to provide a checklist of important ground water parameters to be used on a case-by-case basis to evaluate the overall seawater intrusion risk resulting from the development of a new well. The matrix, supplemented by additional data made available through the DCMP, will be used to identify areas in the County requiring special ground water protection.

Additional data collection in the County will also assist in refining water budget estimates contained in a recent hydrogeologic assessments, including USGS (Sapik

et al., 1988) and Hart Crowser (Coordinated Water System Plan, CWSP, Appendix K) reports. The DCMP intends to improve existing estimates of precipitation, evaporation, and runoff.

It should be a priority in the DCMP to devote additional time and effort towards bringing the existing data management system to the stage where data retrieval and evaluation can be conducted in an efficient manner. In addition, a dedicated staff member should be assigned to entering existing ground water data, in accordance to Ecology's Data Reporting Manual for the Ground Water Management Program.

DCMP activities will be coordinated with Ecology. Ground water data and reports will be submitted to Ecology annually in accordance with Ecology's Data Reporting Manual for the Ground Water Management Program. The Data Management Plan describes data hardware and software used and outlines a procedure for meeting minimum transmittal requirements. Three categories of data will be transmitted to Ecology, including well construction and water level information, water quality data, and any other types of data. Data will be error-checked and verified by the County before being transmitted to Ecology.

Ultimately, certain policy actions may be initiated based on the outcome of additional data collection efforts and implementation of the Ground Water Development Classification Matrix. These could include the identification of Environmentally Sensitive Areas under SEPA, the establishment of Water Resource Overlay Zones, or the establishment of Aquifer Protection Areas. Any of these policy actions require that sufficient data be available to support such ground water management actions.

Data collection methodologies are described in the DCAP. The DCMP recommends six data categories. These are:

	Page
1. Well Inventory	V-27
2. Ground Water/Lake/Wetland Level Monitoring	V-30
3. Ground Water Usage Monitoring	V-33
4. Water Quality Monitoring	V-36
5. Weather Data Collection	V-39
6. Runoff Data Collection	V-44

Environmental Impacts: No direct adverse environmental

impacts will result from the activities proposed in the DCMP. The program is designed to respond to the County's ground water data needs, minimize adverse impacts on the resource, and improve the basis for ground water development decisions. However, economic impacts may result from restrictions imposed by ground water management requirements resulting from analysis of additional ground water data.

Strategy 2:

Failure of the GWMP to recommend the need for a long-term water quality and quantity monitoring and data management for Island County will result in the continued absence of a coordinated ongoing system to detect trends in ground water quality and quantity. Without adequate information to evaluate the resource and effective data management, efficient allocation of government resources for ground water protection and management will be very difficult. Without data collection and management, the design of an adequate feedback mechanism for the GWMP will be impossible.

The process of delineating areas in the County which are susceptible to ground water quality and quantity problems is dependent on the management of existing data and on the availability of additional data. Policy actions which may be initiated based on the outcome of the DCMP, such as the identification of Environmentally Sensitive Areas under SEPA, will not be possible.

Environmental Impacts: The absence of a ongoing data management system to effectively use existing ground water data may result in land use decisions which do not adequately protect the resource. Basing ground water development decisions on existing limited ground water data may increase the risk of adverse environmental impacts on ground water quality and quantity. Surface water quality, flora and fauna, and environmental health may be adversely impacted if long-term ground water trends are not documented.

**Recommended Strategy:** Implement an ongoing Data Collection and Management Program to enable the County to improve its understanding of ground water resources, to make informed ground water development decisions, and to better manage the resource. Early detection of water quality and quantity problems allows them to be addressed when they begin to become apparent, a time when they are generally easier and less costly to correct.

## WELL INVENTORY

**Objective:** The objectives of a well inventory in Island County are to: first, identify all wells (both private and public, including abandoned wells if possible); and second, gather necessary ground water information for all wells.

**Background:** An inventory of all known public water systems in Island County was conducted in 1982 and updated in 1985.

This inventory is presented in the report Preliminary

Assessment: Water System Issues in Island County (January 1985) compiled by the ICHD, ICPD and DOH. The purpose of the inventory was to compile information on water quality, water quantity, system reliability, and water system coordination and planning. Water system information was obtained through a questionnaire, and ICHD, DOH, and USGS records. The inventory identified 466 public water systems. Presently, over 650 public water systems are known in Island County.

The Water Facilities Inventory (WFI) is a DOH public water supplies inventory of public water systems. The WFI is used as a tool to track system owner and system characteristics and is being updated as existing unregulated, new, and expanding water systems are registered in the County.

Unregulated public water systems which become apparent during the home loan, sewage permit, and building permit processes.

ICC 8.09 requires approval of well sites and quality and quantity parameters prior to development. In addition, private wells located near any activity requiring County decision making are reviewed for potential adverse environmental impacts as part of the ICHD land use review program. Well log reports for all wells are being filed with the ICHD.

Ecology is presently developing a unique well identification system and is evaluating possible computer system designs and implementation schemes. Once this work has been completed a strategy for well abandonment will be developed. Presently, no draft schemes have been made available.

### Suggested Strategies: .

#### Strategy 1:

Develop and implement a well inventory of all wells in Island County by mailing a survey to all property owners. Coordinate with Ecology's efforts to devise a scheme for well identification and abandonment.

#### Strategy 2:

Take no action.

**Evaluation of Strategies:**

**Strategy 1:**

The well inventory effort in Island County could begin with the design of a survey aimed at identifying private and public water systems. One way of reaching all well owners is to enclose a survey using County Assessor records of property owners.

A properly executed inventory could assist in recording at least 80% of all wells in the County, including public and private wells. The identification of wells in Island County will contribute significantly to the efforts of many County Departments, including Planning, Health, Engineering and the Assessor's office.

The DCMP Sub-Committee has developed a survey and is discussing the feasibility of utilizing County Assessor's or Treasurer's records for address purposes to undertake this effort. A well inventory survey example is presented in Appendix J. In addition, an assessment of logistics and cost of implementing the well inventory is being evaluated. The result of the survey would be verified and possibly field checked before being entered into the the County data managment system.

The main objective of Ecology's Well Identification Task Force is to tag all wells in the State with a unique well identification number and develop a method to correlate this number with existing ground water data associate with the site. The designed system will be available and easy to use.

Although the results of Task Force effort's would be extremely useful in Island County, the length of time and cost required to successfully accomplish this effort has not been defined by the State. The authority of the County in integrating such a system into its existing framework is also unclear. The local effort involved in such an undertaking may be met with some resistance, perhaps relating to the time and expense involved. The alternatives will need to be evaluated once a draft scheme has been presented to the County and reviewed by the potentially affected agencies.

**Environmental Impacts:** Implementation of a well inventory in Island County would have no long-term

adverse environmental impacts; instead, an inventory would assist in evaluating future ground water availability and quality and in promoting ground water protection. However, the cost and time required to conduct a successful survey, manage the data, and the possible poor outcome may cause some to question the validity of conducting such an effort.

Strategy 2:

Existing inventory efforts in the County have and will continue to assist in locating wells throughout the County. The WFI reports are constantly being updated by the ICHD and are useful in assisting the County in locating wells that were previously unregulated. The ICHD, through local and state codes and programs, requires new public water systems to register their wells and to comply with local and state quality and construction specifications.

Although WFI reports assist in identifying new wells and other wells which indirectly become apparent, they do not represent an upfront and aggressive approach in pursuing the remaining unrecorded public and private wells in Island County.

Environmental Impacts: No adverse environmental impacts would result directly from the implementation of this strategy. The implementation of this strategy may be regarded as the most viable and affordable means to identify wells in the County; however, it is a less aggressive approach in meeting the desired objective. DOH's WFI and ICHD requirements and record keeping are presently recording new, public, and existing wells associated with land development review activities. No County program is in place to provide each well with a unique number and to record existing individual wells.

Recommended Strategy: The GWAC recommends Strategy 1 for implementation. To effectively manage and protect ground water resources in Island County, a well inventory identifying as many wells as possible should be undertaken. Without addressing all wells in ground water management, the potential for adverse environmental impacts may be increased. Although somewhat of a laborious, costly, and time consuming task, a well inventory is the first step towards comprehensive ground water protection.

## GROUND WATER/LAKE/WETLAND LEVEL MONITORING

**Objective:** The ongoing water level monitoring program identified in the DCAP should be implemented using a network of existing wells, lakes, and wetlands in the County. Regular water level monitoring will assist in determining regional water level trends and making ground water development decisions aimed at protecting the resource.

**Background:** Well water level measurements in the County have been conducted in a number of USGS water resources investigations (Jones, 1985, and Sapik et al., 1988) and are contained in the USGS database. An insufficient amount of water level data are available to indicate whether long-term trends exist. Ecology measures water levels in 10 deep wells semi-annually (April and August). Quarterly water level measurements are also conducted at the County landfill. Currently, the County does not regularly monitor water levels in public or private wells. Wetland and lake levels are not measured.

### Suggested Strategies:

#### Strategy 1:

Develop and implement a water level monitoring program described in the DCAP incorporating selected wells, lakes, and wetlands found in areas with confirmed or potential ground water quality and/or quantity problems.

#### Strategy 2:

Take no action.

### Evaluation of Strategies:

#### Strategy 1:

Water level monitoring should be conducted for wells County-wide with emphasis on wells in areas with ground water quantity and/or quality problems or concerns, such as the Focus Areas. Initial water level monitoring efforts would focus on wells, lakes and wetlands which best reflect aquifer characteristics. Emphasis would be placed on wells used in previous ground water studies and on public water supply wells, including those used by USGS, Ecology, and ICHD. The DCAP recommends 20 to 40 wells per Focus Area to characterize existing conditions. In addition, wells, lakes and wetlands in the vicinity of major pumping centers and in areas which

are suspect of water level declines would be given priority. The wells monitored for water levels should overlap with wells used for water usage and water quality monitoring.

Selected wells would be examined for proper construction, hydrologic connection, accessibility, and where possible, wells would be selected so various aquifers are represented. Careful attention must be given to the intent of the water level monitoring and the selection of wells to be incorporated into the network. Selection of wells and monitoring requirements would be in accordance with the DCAP.

As recommended in the DCAP, selected lake and wetlands would be monitored to determine water level fluctuations, especially where lakes and wetlands are found to be in hydraulic continuity with ground water. Careful selection of monitoring sites may require some preliminary monitoring and evaluation.

The feasibility of conducting a pilot study using transducers to monitor water levels in specific areas in Island County has been discussed with Ecology staff. Ecology has expressed interest in assisting the County in designing a study and in training staff in using a transducer. A transducer is a highly specialized instrument hooked up to a microcomputer and placed in a well to monitor water level changes as they relate to tidal effects or pumpage. The details of a transducer study, including wells to be monitored and duration of study, have not been defined at this stage. To undertake this study, an official request should be drafted to Ecology defining the need and the proposed monitoring plan.

Environmental Impacts: No adverse environmental impacts are associated with implementing this strategy. An ongoing water level monitoring program in Island County will assist in preventing adverse environmental impacts associated with ground water limitations and quality degradation. The cost and time required to conduct water level monitoring and data management in the County may be appear to outweigh the immediate data results. Recent water resource investigations have not indicated long-term quantity trends (Sapik et al., 1988), suggesting that perhaps long-term trends are insignificant or that they may take many years of data collection to identify.

Strategy 2:

Failure of the GWMP to address the need to monitor water levels County-wide, especially in areas with confirmed or potential quality or quantity problems may lead to ground water quality deterioration and water shortages. Without more information on water level trends in the County, ground water development decisions may not adequately address ground water protection.

Environmental Impacts: The absence of an ongoing water level monitoring program in the County could result in adverse impacts to surface and ground water quality and quantity, and associated flora and fauna. The resultant water quality problems associated with water shortages may adversely impact environmental health.

**Recommended Strategy:** The GWAC recommends the implementation of an ongoing water level monitoring program County-wide, as outlined in the DCAP, focusing on areas with confirmed or potential ground water quality and/or quantity problems.

## GROUND WATER USAGE MONITORING PROGRAM

**Objective:** Implement a water usage monitoring program in Island County, as outlined in the DCAP, to refine usage estimates and ensure ground water protection.

**Background:** Aside from the usage information collected by USGS and the ICHD, there is limited water use data available in Island County. DOH obtains some water use data from its Water Facilities Inventory (WFI), as reported by water system managers. However, this data is not retrievable for a period of more than a few years, and in some cases its reliability may be questionable. Presently, very few water systems and private wells have source meters.

Chapter 13.03A ICC (Revised 8/1/90) Minimum Standards for Water Works requires all new and expanding public water systems to install individually metered service lines. In addition, Chapter 8.09 ICC, Potable Water Source and Supply, requires a source flow meter be installed on each new potable water source at the well head, whether the system is public or private. Wells affected by these regulations should be considered for incorporation into the usage monitoring program.

A formal process designed to collect water usage data does not exist in the County. Ecology has the authority to require that all wells in Island County be metered.

### Suggested Strategies:

#### Strategy 1:

Develop and implement a ground water usage monitoring program County-wide in order to refine usage estimates as defined in the DCAP.

#### Strategy 2:

Take no action.

### Evaluation of Strategies:

#### Strategy 1:

A ground water usage monitoring program should be developed in Island County to monitor long-term water usage trends and to ensure ground water protection. In some cases, volunteers from representative populations may be selected to assist in reporting usage figures (See Appendix I). Wells monitored would include

agricultural, commercial, industrial, public and private users from various geographic areas in the County. The monitoring network should follow the procedures outlined in the DCAP and attempt to address factors such as climate, user density, land uses, and development density.

Chapter 8.09 ICC metering requirement would assist in providing a greater variety of metered wells to be incorporated into the monitoring program. In addition, the County would seek funding to provide individual meters for monitoring stations selected for this project.

Relating the usage figures with population estimates for the represented uses will assist the County in refining existing usage estimates. Usage estimates, in conjunction with precipitation and evaporation estimates, will be valuable in the development of an improved water budget for Island County. The results of a usage monitoring project may also reflect the need for a more extensive evaluation of usage trends in the County to ensure ground water protection.

If results of the study indicate the need for more extensive water usage monitoring, the County should consider establishing a program to monitor usage and for all wells in Island County, beginning with public water systems. A comprehensive program would require ongoing usage data management.

Environmental Impacts: No long-term adverse environmental impacts will result from a usage monitoring study in Island County. This strategy promotes ground water protection by providing a means to collect and evaluate usage data for improved ground water development decisions. On the other hand, the cost of supplying meters to those participating in the study may be regarded as a financial burden and some may be reluctant to install a meter with fear that rates will be imposed in the future.

#### Strategy 2:

The absence of a organizational framework to collect and evaluate water usage data from metered wells in the County could result in ground water development decisions which do not adequately address ground water protection. Ground water usage figures have been obtained as County-wide estimates without the use of meters.

Environmental Impacts: Adverse environmental impacts could result if water usage in the County remains unmonitored and ground water availability decisions rely solely on existing usage estimates and other ground water information.

**Recommended Strategy:** The GWAC recommends the implementation of a County-wide ground water usage monitoring program in Island County, as outlined in the DCAP, to refine existing usage estimates and assist in ground water development decisions.

## WATER QUALITY MONITORING

**Objective:** Implement an ongoing water quality monitoring program in the County, as described in the DCAP, to identify ground water quality problem areas and prevent additional quality problems in the future.

**Background:** Water quality sampling is presently underway in the County at both the local and state level. The DOH/ICHD Salt Water Intrusion Policy requires chloride and specific conductivity sampling semi-annually for a number of public water system wells exceeding 100 mg/l chloride. Expanding and new public water system wells with chlorides exceeding 100 mg/l are required to sample for chlorides in April and August each year.

Semi-annual chloride monitoring of eight wells in Island County is presently being undertaken by the Health Department as part of an ongoing chloride monitoring program. Quarterly monitoring of twelve wells for organics and primary drinking water contaminants is presently being conducted at the Coupeville and Freeland landfills. These parameters are recorded in the ICHD and have not been entered into the GWMP data management system. Water quality sampling is also being conducted regularly at two NPL sites at NAS Whidbey Island. The ground water quality data generated from these sites can be obtained from NAS Whidbey environmental staff.

DOH has specific water quality requirements for public water supplies under the Rules and Regulations of the State Board of Health Regarding Public Water Systems (Chapter 248-54 WAC). In Island County, over 650 public water systems are currently reporting. DOH is responsible for ensuring Class I and II water systems conduct proper monitoring, whereas ICHD administers the portion of the state program pertaining to smaller public water systems (Class III and IV).

Drinking water samples from public water supplies are collected regularly for bacteriological and inorganic chemical and physical analysis. Turbidity, trihalomethanes, pesticides, radionuclides, and additional substances are also tested for regularly. This data is available from DOH and ICHD. If necessary, Ecology can require specific quality monitoring of certain wells.

### Suggested Strategies:

#### Strategy 1:

Develop and implement an ongoing ground water quality monitoring program County-wide, as outlined in the DCAP,

focusing on areas requiring additional water quality monitoring.

**Strategy 2:**

Take no action.

**Evaluation of Strategies:**

**Strategy 1:**

The overall goal of the water quality monitoring program is to identify contamination before it is too late to prevent serious and costly problems. Existing water quality monitoring required by local, state, and federal drinking water programs ensures drinking water is safe for human consumption; however, it is not designed to conduct ongoing monitoring of site specific quality parameters. It does not necessarily provide an accurate representation of site specific quality trends to the level required to identify sources of contamination.

A water quality monitoring program as outlined in the DCAP should be implemented. Water quality data generated from existing monitoring networks should be coordinated with GWMP data collection efforts. For GWMP efficiency, ultimately, all water quality data ought to be accessible from a centralized database.

Section V and VI of the DCAP outline water quality sampling needs and procedures. These sections should be referred to for specific quality assurance and quality control procedures to be followed.

USGS (Sapik et al., 1988) recommends that for bacteria and chemical constituents other than chlorides water samples be collected and analyzed from a dense network of wells in aquifers C, D, and E every 5 years. In between the 5 year sampling effort, water samples from a less dense network of wells should be analyzed for the same constituents. If a problem area is detected from the sampling program, a detailed study could be conducted.

**Environmental Impacts:** No direct adverse environmental impacts will result from the implementation of this strategy. However, the cost of water quality sampling and the additional effort involved in sampling and analysis may appear to outweigh the benefits of such an effort.

Strategy 2:

Without implementing an ongoing water quality monitoring program in the County, the ability to detect changes in chemical and biological characteristics of an aquifer is limited. Also, it may be argued that identifying contamination after it has reached a major public water supply well means that the contamination has been identified too late to prevent serious and very costly problems.

Environmental Impacts: Adverse impacts to water quality, environmental health, wildlife habitats, and flora and fauna may result if an ongoing water quality monitoring program is not established in Island County.

**Recommended Strategy:** The GWAC recommends Strategy 1 for implementation. The County should implement an ongoing ground water quality monitoring program County-wide, as outlined in the DCAP, to identify contaminant sources and long-term water quality trends.

## WEATHER DATA COLLECTION

**Objective:** The weather data collection component of the DCMP is designed to assist the County in developing methodology to collect precipitation, evaporation, and transpiration data as outlined in the DCAP. These data will be used to develop a conceptual/theoretical model of the water budget in order to better refine ground water recharge estimates in the County. In addition, these data will assist in watershed management and planning efforts designed to protect ground water quality and quantity for existing and potential users.

**Background:** The WSU Cooperative Extension Office is presently managing a daily precipitation monitoring network consisting of 25 stations located throughout the County. Volunteers record precipitation and temperature daily and send monthly reports to the WSU Cooperative Extension Office. Evaporation and transpiration data to adequately evaluate these components of the water budget in the County is lacking. Existing evapotranspiration estimates have been indirectly obtained and do not reflect the specific vegetative cover in Island County.

Weather data collection strategies cover three areas - precipitation, evaporation, and evapotranspiration and vegetative cover. Strategies for each of these three areas is described below.

### I. Precipitation

#### Suggested Strategies:

##### Strategy 1:

Implement a more extensive precipitation monitoring program in Island County, as identified in the DCAP, to assist in ground water development decisions and refine existing ground water recharge estimates.

##### Strategy 2:

Take no action.

#### Evaluation of Strategies:

##### Strategy 1:

Precipitation is a major component of the hydrologic cycle affecting ground water recharge in Island County. However, precipitation data is lacking in many areas

and in some cases existing data conflicts with national data. Additional precipitation data is necessary to refine existing recharge estimates in Island County. A weather-net organization chart has been proposed as a possible organizational scheme to coordinate weather data collection (See Appendix H). This scheme is recommended for the implementation of all weather data collection components.

Environmental Impacts: No environmental impacts would result from the implementation of a precipitation monitoring network. A more refined evaluation of recharge in the County will help ground water management decision protect the resource from adverse environmental impacts in the future.

**Strategy 2:**

Failure of the GWMP to adequately address the County's need for refined evaluation of precipitation could result in ground water development decisions which fail to protect ground water recharge.

Environmental Impacts: Adverse environmental impacts could result if a precipitation monitoring network is not implemented in the County. The evaluation of recharge will remain based on County-wide estimates which may not adequately address ground water availability. However, additional staff time and effort devoted toward this effort may outweigh the benefits of precipitation monitoring.

**Recommended Strategy:** The GWAC recommends Strategy 1 for implementation. The development of an improved precipitation monitoring network County-wide is essential for the proper management of Island County's ground water resources.

**II. Evaporation**

**Suggested Strategies:**

**Strategy 1:**

Implement a pan evaporation monitoring network in Island County, as recommended in the DCAP, to improve recharge estimates.

**Strategy 2:**

Take no action.

### Evaluation of Strategies:

#### Strategy 1:

The measurement of evaporation from pans is considered one of the easiest and most accurate ways of estimating evaporation from a "free water surface" (USGS, National Handbook of Recommended Methods for Water Data Acquisition, Chapter 8, 1982).

No pan evaporation stations presently exist in Island County. Preliminary discussion with members of the SCS and NOAA on the value of pan evaporation measurements in estimating evaporative losses for use in recharge estimates have indicated a number of difficulties with using this method in a region with a humid climate. Many factors need to be taken into account when selecting a pan evaporation station location, including humidity, temperature, wind, and soil types. Pan evaporation has been mostly used for irrigation purposes in arid regions when attempting to grow plants at the peak rate.

Initial efforts to evaluate evaporation should consist of two pan evaporation stations in areas of extreme climate conditions for Island County, preferably near precipitation stations and on both Camano and Whidbey Islands. Daily measurements of temperature and humidity, and observations of wind conditions and any other pertinent factors should be made. Data from the two stations should be compared and evaluated closely.

Environmental Impacts: There are no environmental impacts associated with the implementation of this program. The additional cost and time required to implement this strategy may appear to outweigh the benefits.

#### Strategy 2:

The absence of a means to measure evaporation in the County will not assist the County in improving ground water recharge estimates. Because of the significance of evaporation as a component of the water budget, evaporation estimates will remain generalized and ground water recharge estimates unrefined.

Environmental Impacts: If ground water availability estimates do not accurately reflect conditions in the County, ground water development decisions based on these estimates may not adequately protect the resource

and adverse environmental impacts may result.

**Recommended Strategy:** The GWAC recommends Strategy 1 for implementation. This strategy represent an initial effort to improve the County's understanding of evaporation as a component of the water budget.

### III. Evapotranspiration and Vegetative Cover

#### Suggested Strategies:

##### Strategy 1:

Research and evaluate the relationship between evapotranspiration and vegetative cover in Island County to improve existing recharge estimates.

##### Strategy 2:

Take no action.

#### Evaluation of Strategies:

##### Strategy 1:

Very little is known about the evapotranspiration potential of existing vegetative cover, nor does an inventory of vegetation exist in the County. In certain areas, a considerable amount of precipitation may be intercepted by the foliage, limiting the amount of water available to recharge the aquifers.

Evapotranspiration is the term used to refer to the processes of evaporation and transpiration occurring in areas where the land surface is composed of both vegetative cover and bare soil. As a critical component of the water budget, evapotranspiration estimates need to be improved to reflect existing conditions in Island County. A review of the existing literature on this subject may be useful in generating estimates of the relative evapotranspiration potential for the following surfaces:

- o impervious
- o grass
- o deciduous trees (i.e. alder)
- o evergreen conifers (i.e. douglas fir)

An interim water balance formula reflecting evapotranspiration of the various vegetative covers should be developed. This formula will provide a basis

for evaluating evapotranspiration impacts on recharge estimates when making development or ground water development decisions based on water budget analysis.

Once a literature search of evapotranspiration has been completed, the County may consider hiring a contractor or additional staff to assess vegetative cover through aerial photography, remote sensing, or other accepted technique.

Environmental Impacts: No direct adverse environmental impacts will result from implementing this strategy. In some respects, the cost and time required to implement this strategy may appear to outweigh the benefits.

#### Strategy 2:

The absence of an effort to improve evapotranspiration estimates in the County to reflect vegetative cover may result in ground water development decisions which do not adequately address ground water protection. Precipitation data alone does not adequately reflect ground water recharge in an area.

Environmental Impacts: Although this strategy may be a cost and time saving approach, adverse environmental impacts, relating to water quality and quantity, may result if ground water recharge estimates which do not adequately reflect evapotranspiration are used as a basis for ground water development decisions.

Recommended Strategy: The GWAC recommends Strategy 1 for implementation. Evapotranspiration is a critical component of the water budget in Island County. Established data and existing literature on this topic should be reviewed and evaluated to assist in ground water and watershed planning efforts.

## RUNOFF DATA COLLECTION

**Objective:** Select and evaluate artificial and natural discharges in critical watersheds in Island County to improve runoff estimates and to assist in defining areas of potential recharge.

**Background:** Limited runoff data is available in the County and no known gauging stations are presently active. In the Island County Coordinated Water System Plan (1990) recharge analysis based on existing data estimates runoff of 0 to as much as 10 percent of precipitation. USGS (Sapik et al., 1988) measured discharge from springs on both Whidbey and Camano Islands; however, discharge below sea level was not measured.

The Island County Watershed Ranking Report (December 1986) ranks eight of the top priority watersheds and watershed groups in the County. These watersheds were selected based on the existing or potential contributions of nonpoint source pollution to Puget Sound waters.

### Suggested Strategies:

#### Strategy 1:

Implement a runoff data collection and monitoring program to improve runoff estimates and to assist in watershed management and planning efforts in Island County.

#### Strategy 2:

Take no action.

### Evaluation of Strategies:

#### Strategy 1:

The determination of the quantity of precipitation or ground water lost by runoff is critical in refining recharge estimates in Island County. Discussion with ICED staff has indicated a possible interest in coordinating efforts to evaluate runoff. Pursuant to the Stormwater Master Plan, the County Engineering Department is planning to conduct a facilities drainage inventory and will be drafting a drainage map for the County. One of the purposes of the inventory is to prepare for future changes in runoff as is necessitated by the predicted population growth trends, especially in critical and urbanized areas.

Runoff evaluation could consist of selecting several critical watersheds, as identified in the Watershed Ranking Report, for refined hydraulic analysis. Daily measurements of stream and artificial runoff are recommended for a two year minimum. Various methodologies for runoff measurements are outlined in Appendix F in the DCAP. The preferred methodology will depend on the characteristics of the flow measured.

Environmental Impacts: No environmental impacts are associated with the implementation of this strategy. Efforts to improve the County's assessment of runoff will allow for better management of the resource.

**Strategy 2:**

The absence of efforts to evaluate artificial and natural runoff in the County could result in land development which does not adequately promote ground water recharge and protect ground water from contamination. Recharge estimates reflecting existing runoff data may not adequately reflect ground water availability in an area.

Environmental Impacts: Adverse environmental impacts may result from the implementation of this strategy. If no efforts are dedicated toward improving runoff estimates, ground water development decisions based on recharge estimates may not adequately protect ground water quality and quantity.

**Recommended Strategy:** The GWAC recommends Strategy 1. The GWAC wants to ensure that runoff data is collected as part cooperative efforts between water resources and Engineering Department staff.

**References:**

Economic and Engineering Services, Inc, 1989, Island County Ground Water Management Plan Part A: Technical Memorandum Hydrogeologic Characterization and Background Data Collection Relating to Ground Water Protection and Management.

Hart Crowser Inc. 1987, Coordinated Water System Plan Ground Water Resources Evaluation, Report J-1939, Seattle, 49 p.

Guidelines for Data Collection from Wells used in the Ground Water Management Area Program, May 1989, Washington Department of Ecology.

Island County Engineering Department, 1988, Island County Watershed Ranking Report.

Economic and Engineering Services, Inc., 1990, Island County Coordinated Water System Plan.

Economic and Engineering Services, Inc. and Island County Planning Department, 1990, Island County Ground Water Management Plan, Data Collection and Analysis Plan.

Island County Planning Department, 1990, Island County Ground Water Management Program, Data Management Plan, draft.

Jones, M.A., 1985, Occurrence of Ground Water and Potential for Seawater Intrusion, Island County, Washington, United States Geological Survey WRI Report 85-4046.

ICC 13.03A, Minimum Standards for Water Works.

ICC 8.09, Potable Water Source and Supply.

Island County Health Department, 1985, Preliminary Assessment Water System Issues in Island County.

United States Geological Survey, 1982, National Handbook of Recommended Methods for Water-Data Acquisition, Chapter 8.

Sapik, D.B., G.C. Bortleson, B.W. Drost, M.A. Jones, and E.A. Prysche, 1987, Ground-water Resources and Simulation of Flow in Aquifers Containing Freshwater and Seawater, Island County, Washington, Water-Resources Investigation Report 87-4182, 70 p.

WAC 248-54, Public Water Supplies.

ISLAND COUNTY  
GROUND WATER MANAGEMENT PROGRAM  
OPTION PAPER #6

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**Title:** Ground Water Development Classification Matrix

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**Problem Statement:** No objective and realistic criteria have been developed to evaluate ground water impacts resulting from development of a new well or from additional withdrawals in Island County.

**Objective:** To develop a consistent and objective set of criteria for classifying ground water impacts associated with developing new wells or permitting additional withdrawals in Island County in order to avoid potential adverse impacts to ground water quality and quantity from potential or existing users.

**Existing Policies and Programs:** Ground water availability has not been specifically quantified for the Island County Ground Water Management Area. Preliminary assessments of ground water resources and their potential for supporting additional development were performed both as part of the CWSP and the GWMP Hydrogeologic Characterization. These evaluations of ground water availability were designed to serve as the basis for initial ground water planning and water use and to provide a general understanding of the components of recharge, ground water use, and natural discharge. However, estimates alone can not be used for accurate long-term management of ground water resources.

Current public water system withdrawal proposals are evaluated in accordance with the DOH/ICHD Salt Water Intrusion Policy. Pumping test and water quality analysis results provide site specific information of the proposed withdrawal.

The GWMP Policy Analysis contains a sample matrix of weighted risk factors for seawater intrusion. Although certain factors in this matrix may not be realistically obtained or measured for ground water availability determination in Island County (i.e. aquifer transmissivity and annual recharge), this matrix was designed to be used as an initial guide in developing criteria to be used to support local decisions affecting ground water in Island County.

**Suggested Strategies:**

**Strategy 1:**

Develop the Ground Water Development Classification Matrix and an accompanying regulatory framework for its implementation.

**Strategy 2:**

Take no action.

**Evaluation of Strategies:**

**Strategy 1:**

The proposed Island County Ground Water Development Classification Matrix (See attachment to this option paper) will be used to assist the County in:

- (1) standardizing the process used in determining the potential adverse impacts of new wells or additional withdrawals on the overall hydrogeologic system;
- (2) guiding well development, especially in areas experiencing water quality or quantity problems relating to seawater intrusion;
- (3) further defining areas which have ground water quality and/or quantity problems;
- (4) characterizing wells in terms of hydrogeologic parameters and generating reproducible results.

The matrix is used to determine whether the appropriate permit associated with a proposal should be issued or if planned aspects of the well should be changed to avoid possible adverse impacts. The matrix consists of a series of factors that affect the well's impact on existing wells and the overall hydrogeologic system. These factors could include, but are not limited to: distance to seawater, static water level, pumping water level, geographic location, pumping rate, completion elevation, water quality, infiltration potential, and number of wells in the surrounding area.

A well development proposal will be classified into a low, medium, or high risk category depending on the relative rating of each of the factors. An evaluation of aquifer parameters should be required for

wells in medium and high risk areas. If a well is found to pose a high risk of adversely impacting the existing hydrogeologic system, changing one or more of the factors may shift the well into a lower category. Changes may include tapping a different aquifer zone, lowering the pumping rate, moving the well inland.

The matrix will serve to refine existing data and eventually provide support for the delineation and mapping of areas which require special ground water protection, such as critical areas pursuant to the Growth Management Act. Information gathered through the Data Collection and Management Program and any other ground water monitoring efforts will also be considered in the overall classification of a well.

Well classification should result from the use of the best available knowledge and should provide for adaptability as additional data is collected and as the understanding of aquifer behavior is improved. Criteria should include water quality analysis, any additional testing necessary to adequately characterize the well potential, and if possible, careful monitoring of surrounding wells during and after the pumping test to observe drawdown over time and recovery rates.

The classification matrix will assist the County in collecting data which can be used to design a well test which best reflects site specific characteristics. A well test should satisfy minimum requirements by all agencies and must adhere to the requirements of the County/DOH Salt Water Intrusion Policy. Ecology is in the process of drafting a State Seawater Intrusion Policy which applies to both public and private water systems. Additional water quality and quantity testing should be required based on regulatory requirements and risks of seawater intrusion.

A well test should be conducted whenever a new well is constructed or when a water right application to increase a withdrawal quantity is filed. The test design should be consistent with the aquifer test protocol for use in Island County which is to be developed by Ecology and Island County pursuant to the MOU (See option paper #20). The test results should be used to supplement information gathered in the matrix for a comprehensive evaluation of the proposed withdrawal.

Environmental Impacts: No immediate adverse environmental impacts are associated with the

implementation of this strategy. The matrix will assist the County in evaluating new wells and withdrawals which may potentially affect ground water. However, some development decisions based on the matrix could potentially impact ground water. In addition, the implementation of the matrix could result in increased economic burdens on some applicants.

**Strategy 2:**

The absence of a method to objectively evaluate well development proposals and additional withdrawals and to maximize the use of ground water data available may result in decisions which do not adequately address ground water protection.

**Environmental Impacts:** Implementation of this strategy may result in adverse environmental impacts, including ground water contamination and shortages, and public health problems. In addition, economic impacts may result from inadequate testing and evaluation of proposed well development.

**Recommended Strategy:** The GWAC recommends Strategy 1 for implementation. The GWAC will contribute to the development of the Ground Water Development Classification Matrix so that it best reflects the confirmed and potential ground water problems identified in the County. A policy framework or ordinance should be established to make the matrix effective.

**References:**

Economic Engineering Services, Inc., 1990, Island County Ground Water Management Plan Policy Analysis.

Hart Crowser Inc, 1987 Coordinated Water System Plan Groundwater Resource Evaluation, report J-1939.

Memorandum of Understanding between Washington State Department of Ecology, Water Resources Program & Island County, Washington, December 1990.

SHB 2929, Growth Management Act, effective July 1, 1990.

State of Washington Department of Health/Island County Health Department Salt Water Intrusion Policy for Public Water Systems, July 1989.

**GROUNDWATER DEVELOPMENT CLASSIFICATION MATRIX**  
**VERSION: DECEMBER 24, 1990**

FACTOR NUMBER*		1		2		3		4		5		6		7		8		9	
FACTOR NUMBER	QUANTIFIED SENSITIVITY	DEPARTURE FROM SEA WATER	STATIC WATER LEVEL	STATIC WATER LEVEL	WATER LEVEL, WATER LEVEL, WATER LEVEL, WATER LEVEL	LOCATION	GEOPHYSICAL CONC.	WORKING CONDITON	CONC. IN AREA										
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HIGH	1	<2000	<0	<10	<15	<10	<5	<10	>20	<3	>200	HIGH	>300	FOR INFORMATION	>300	FOR INFORMATION	>300	FOR INFORMATION	
MEDIUM	1	2000-6000	0-10	10-70	15-25	0-5	5-10	10-20	15-100	5-20	5-50 OR BELOW -250	LOW	100-200	NEUTRAL	100-200	NEUTRAL	100-200	NEUTRAL	
LOW	1	>6000	>10	>70	>25	>5	>10	>20	UNCLASSIFIED	<3	>30	LOW	<100	LOW	<100	LOW	<100	LOW	
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USER'S GUIDE  
ISLAND COUNTY GROUND WATER DEVELOPMENT CLASSIFICATION MATRIX

The following user's guide describes how to select and input data for the Ground Water Development Classification Matrix. Through the use of this matrix, the relative impact of a new well is classified into one of three categories based on nine factors that can be estimated or measured from existing and site-specific data. The classification can then be used in deciding whether the appropriate permits associated with the project should be issued or whether planned aspects of the well should be changed to reduce the potential impact.

**PURPOSE**

The main purpose of this matrix is to allow a trained professional to classify, in a consistent and unbiased manner, the overall risk resulting from development of a new well. Classification into a low, medium or high risk category helps the user to assess whether the proposed well is consistent with ground water policy in a given area. For example, the county may have decided that a building permit will not be granted in a certain area if a "high risk" well is to be used. The matrix allows the user to assess whether the new well posses a high risk to the existing hydrogeologic system.

A secondary purpose of the matrix is to guide well development, especially in areas experiencing water quality or quantity problems relating to salt water intrusion. For example, if a proposed "high-risk" well is rejected in a certain area, changing one or more of the factors may shift the well into a lower category, e.g. such as tapping a different zone, pumping at a lower rate, moving the well inland. The new well configuration could pose lower risk to the hydrogeologic system and may therefore be allowed.

The use of the matrix allows consideration of nine factors that affect the well's impact on existing wells and the overall hydrogeologic system. Ideally, the hydrogeologic system would be known with enough detail to quantify the effects through calculations or the use of a model. Such a quantification is the preferred method to assess hydrologic impacts. In Island County, such quantification is not possible because the system is not completely understood. Instead, the accompanying matrix can be used to rate the relative effects of each of the factors and generate a score that indicates the overall classification (high, medium or low risk) and thereby give a general indication of the potential to impact the overall system.

The matrix in effect allows the use of "best professional judgement" in a consistent and reproducible way. Data from areas experiencing water quantity and quality problems were assessed and compared with data from areas where development is not causing noticeable or measurable degradation of the environment. Averages (both means and medians) were generated for both "problem" and "non-problem" areas<sup>1</sup>. These were compared and differences were noted. General values (for example distances from the "sea"<sup>2</sup> within which saltwater intrusion has typically occurred, well completion elevation, etc.) were estimated. These estimates were then used to set the limits of the three categories for each factor used in the matrix. By using a consistent set of values for each factor, a well is assigned to a category based on the actual data and not just arbitrarily assigned based on the "gut feeling" of the evaluating hydrogeologist.

#### LIMITATIONS

The matrix has several limitations. First of all, it does not evaluate or quantify the actual hydrologic effects of a new well on the existing hydrologic system. It only ranks the well and places it into a category indicative of how the well is likely to affect the system. A calibrated computer model of the ground water system would be needed to actually quantify impacts to the system.

A second limitation is that the divisions between the categories are estimated based on existing data. The results are not absolute. New data collected over time may require changes in the values for each category, development of new or different factors, or shifting of the relative weighting of each factor in order to keep the matrix current. For example, continuous development of new wells will eventually over draft a given area as it can only sustain a finite amount of ground water development. Even if all new wells were placed in the "low-risk" (as defined today) category, the total allowable limit from an area will eventually be exceeded. However, changing the values of various factors to reflect the changing situation, could limit or stop development. For example, the county may decide that for certain areas only wells in the low-risk category are approved. In some situations the conditions and matrix values may make only medium or high-risk wells possible. Ground water development in this area would likely stop.

A third limitation is that the matrix requires some hydrogeologic skills to properly input data. The skills required include selection of appropriate values and some limited calculations. The lay-person may not be able to use the matrix without guidance from a qualified hydrogeologist.

The final limitation is that only wells can be evaluated. This matrix cannot rank the relative category of other types of development beyond well placement. Clear-cutting, housing developments, shopping malls or any other type of development cannot be assessed with this matrix.

#### METHOD

The following instructions indicate how to use the Ground water Development Classification Matrix. These instructions are based on the assumption that the user is familiar with the general hydrogeology of Island County, the GWMP Part A Technical Memorandum, the Island County Well database and general hydrogeologic terminology.

#### General Procedure

The general procedure for use of the matrix is to select a "quantified sensitivity value" for each of 9 factors considered in the matrix. This value (0, 1, 3, or 5) is based on physical data for the proposed well. Each of these values is multiplied by a weighting factor (indicating the relative importance of the factor on the overall rating). Each of these products is added and the overall rating is translated into a risk category based on the total rating score. A total of less than 70 is classified as "Low Risk." A score of 70 to 105 is classified as "Medium Risk" and a score of greater than 105 is classified as "High Risk." The calculations for this matrix can be performed by hand or entered into the Lotus 123tm spreadsheet provided.

The method for selecting the input data for each factor is discussed below. In many cases, several methods are available. In each case the first method is more accurate and preferred to the second. The second method is preferred to the third and so forth. Subsequent methods are less accurate and involve more estimation. We have incorporated an element of conservatism such that estimated data are more likely to be biased toward the higher risk categories. This conservatism is meant to encourage the use of actual field data. These data may be based on a nearby existing well or may require the drilling of a "test well." In most cases, a "test well" can become the production well if the well is approved.

In two cases (static water level and pumping water level), the method used to select the quantified sensitivity value depends on the distance of the well from seawater. For these factors, only one of the three sets of choices is used in the matrix analysis. For example, if the well is to be located 1500 feet from the coast, a value of "0" is entered for the choices in the 2000 to 6000 and >6000 feet categories.

## Distance to Seawater

Purpose: To locate the well away from likely salt water intrusion areas, minimize the impact of the well on down-gradient wells by moving the drawdown "cone of depression" away from near-shore wells that may already be experiencing salt water intrusion, and move the down-gradient stagnation point<sup>3</sup> inland from the salt water interface.

### Procedure:

- 1) The proposed well is surveyed and located on a USGS topographic map of the county (or one with better detail). The distance to the nearest body of "seawater" (sound, straight, inlet, bay, etc.) is directly measured.
- 2) The proposed well location is approximated on a USGS topographic map of the county (or one with better detail). The distance to the nearest body of "seawater" (sound, straight, inlet, bay, etc.) is directly measured. Ideally, the well location is verified by the county.

## Static Water Level

Purpose: To locate the well in areas where the existing static water level is less likely to be conducive to salt water intrusion.

### Procedure:

Choose the appropriate column in the matrix for static water level input based on distance of the well from seawater. Then choose one of the following procedures:

- 1) Static water level is measured in the actual well under consideration. Depth to water is measured from the well head with an electric sounder, steel tape, to the nearest 0.1 foot. The static water level elevation is calculated by subtracting depth to water from the elevation of the well head based on survey, calibrated altimeter capable of measuring to within 5 feet, or careful estimation using a topographic map (contour elevation 20 feet or better). In the case of an estimate based on altimeter or topographic map, the well should be carefully field located and 5 feet subtracted from the elevation as a safety factor to help account for possible error for the lesser error inherent in the method (in comparison with survey methods).

or

- 2) Static water level is measured in a well near to (within 500 feet) and finished at the same elevation (within 25 feet) as the proposed well. Depth to water and static water level elevation are calculated as described above. A safety factor of 20 feet should be subtracted from the calculated elevation to help account for possible error in using data from a nearby well that may be finished where water levels are higher.

or

- 3) Static water level is estimated from existing reports, Island County records (Health Department files or data base) for wells near to (within 500 feet) and finished at the same elevation (within 25 feet) as the proposed well. Depth to water and static water level elevation are calculated as described above. A safety factor of 30 feet should be subtracted from the calculated elevation to help account for possible error in using data from wells that may have higher water levels.

or

- 4) Static water level is estimated based on well completion elevation (elevation of the lowest part of the well or well screen) plus 10 feet. Well completion elevation is estimated as described below.

NOTE: All "static" water elevations vary seasonally. Water levels in Island County during fall and early winter are typically 5 to 20+ feet below those of spring. A conservative approach would be to base all decisions on fall data. A safety factor of 5 to 10 feet or more could be subtracted from all spring measurements, if desired.

#### Pumping Water Level

Purpose: To maintain pumping water levels at an elevation that is less likely to induce salt water intrusion in the new well and existing wells. Higher water levels are needed inland to maintain flow toward coastal areas where an inflow of fresh ground water is needed to maintain the position of the salt water interface.

#### Procedure:

Choose the appropriate column in the matrix for pumping water level input based on distance of the well from seawater. Then choose input values for that column.

All pumping water levels are based on either a commitment to control pumping water level by placing the well pump at a

surveyed elevation (the preferred method), or a calculation to estimate the approximate water level.

If a pumping water level is estimated the following formula is used:

$$\text{Static Water Level} - \text{Pumping Rate}/\text{Specific Capacity} = \text{Pumping Water Level}$$

static water level is assessed as described above. Pumping rate is based the method discussed below in a following section. Specific Capacity is the ratio of pumping rate (gpm) divided by drawdown (ft), based on one of the following methods.

1) Specific capacity is measured during a pumping test in the actual well under consideration. The average pumping rate during the test divided by the maximum drawdown during the test is equal to the specific capacity. If the test duration is less than 24 hours, then the specific capacity is multiplied by 2/3 as a safety factor to help account for decrease in specific capacity that occurs during longer pumping periods.

or

2) Specific capacity is based on an average of the values reported in the GWMP Part A Technical Memorandum for wells within 2000 feet of the site, finished at a similar altitude to that of the proposed well. This average specific capacity is multiplied by 1/2 as a safety factor to help account for possible errors and non-representative wells used in the average.

or

3) Specific capacity is based on the median value reported for the county multiplied by a safety factor of 1/4 to help account for possible errors and non-representative wells used in the average. Data in the Part A Technical Memorandum can be used as an indicator of the median value. The median times 1/4 in the Part A report is approximately 0.25 gpm/ft for the "C" and "D" aquifers.

#### Geographic Location

Purpose: To locate the well away from areas where salt water intrusion is more likely because of the narrowing of the land mass.

#### Procedure:

Select the type of geographic location based on the following:

**Point:** If the proposed well lies within 2000 feet of salt water on a line in any direction, and it also lies within 2000 feet of salt water on a line at 90 degrees to the first line, and it also lies within 2000 feet of salt water on a line at -90 degrees to the first line or 90 degrees to the second line, the well lies on or near a point.

**Isthmus:** If the proposed well lies within 2000 feet of salt water on a line in any direction, and it also lies within 2000 feet of salt water on a line at 180 degrees to the first line, the well lies on or near an isthmus.

**Unclassified:** If the proposed well does not meet either the criteria for a point or isthmus, it is unclassified.

#### Pumping Rate

**Purpose:** To pump the well at lower rates such that water conservation and multiple-well systems (verses single wells pumping at higher rates) are encouraged.

#### Procedure:

The pumping rate used in the matrix is equal to the maximum instantaneous pumping rate of the installed or to-be installed pump based on pump rating curves, manufacturer's rating, or well test using the pump to be used for long-term production. Well tests shall follow:

- 1) DOH requirements for new and previously unapproved well sources, or
- 2) DOH sizing guidelines for Public Water Systems and Chapter 13.03A ICC Minimum Standards for Water Works

#### Completion Elevation

**Purpose:** To complete wells in zones that are less frequently developed and less likely to experience seawater intrusion.

#### Procedure:

Select one of the following:

- 1) Completion Elevation is measured in the actual well under consideration. Well completion elevation is based on well head elevation (based on survey, altimeter or careful estimation using a topographic map with contour elevation 20 feet or better) minus depth of the lowest

part of the well boring or well screen. In the case of estimation based on a topographic map, the well should be carefully field located and 5 feet subtracted from the estimated elevation as a safety factor to help account for possible error in interpretation using topographic maps (compared to survey methods).

or

- 2) Well completion elevation is estimated before well is constructed from topographic maps (as described above) minus depth of the lowest part of the well boring or well screen. A safety factor of 10 feet is subtracted from the estimated completion elevation to help account for possible error.

#### Chloride Concentration in Area

Purpose: To locate wells outside of areas already experiencing salt water intrusion.

##### Procedure:

Chloride concentration is calculated based on the method described in the Island County Salt Water Intrusion Policy. The "Risk Categories" (page 3 and 4 of the document) shall be used.

#### Infiltration Potential at Site

Purpose: To locate wells (and their associated developments) in areas less likely to contribute to ground water recharge.

##### Procedure:

The well is located on a topographic map. The location is compared with the "Infiltration Potential" maps included in the Part A Technical Memorandum for the GWMP as indicated in Exhibits II.2-1 through 4 pages, II-55 through 58). The infiltration potential as indicated on the maps is entered into the matrix.

#### Number of Well Users in Area

Purpose: To locate wells in areas less developed thereby encouraging less dense ground water development.

##### Procedure:

The Island County Database is used to identify all the wells in the one square mile surrounding the proposed well. The state plane coordinates of the well are identified from

the proposed well location. The rectangle surrounding the well (with the well at the center) is identified in the data base and all wells are identified and counted. This number is entered into the matrix. If part of the one square mile rectangle lies off shore (with the well at the center of the rectangle), then the boundary or boundaries of the rectangle are shifted such that they lie on, or approximately on, the coast.

If one or more actively used irrigation wells lie in the square mile, the proposed well is entered into as a "high sensitivity" for this factor. Irrigation wells are identified through Ecology's water rights files or by field identification on a site reconnaissance.

FOOTNOTES:

1. In this matrix "problem areas" include the Focus Areas as discussed in the "Ground Water Management Plan Part A Technical Memorandum" prepared by EES and Pacific Ground Water Group in 1989, and "seawater intrusion areas" and "water level below sea level areas" as noted in the "Appendix A, Coordinated Water System Plan, Ground Water Resource Evaluation" prepared by Hart Crowser, Inc in 1987. Non-problem areas include the remainder of the county.
2. In this report we have used the generic term "sea" to indicate a body of marine water such as Puget Sound, Admiralty Inlet, the Straits of Juan de Fuca, Saratoga Passage and all other connecting straits, inlets, passages, and bays.
3. The stagnation point is the position downgradient from a pumping well where the gradient toward the well caused by pumping is equal to and canceled by the natural flow gradient of the ground water system. At this point, a drop of water does not move. Water on the well side of the stagnation point flows towards the well. Water on the other side of the stagnation point flows towards the sea. If the salt water/freshwater interface is downgradient from the stagnation point, the interface will not flow inland toward the well. If it lies between the well and the stagnation point, it will move toward the well and seawater intrusion will progress. For further discussion, see *Hydraulics of Groundwater* by Jacob Bear, pages 379-435, published by McGraw-Hill.

ISLAND COUNTY  
GROUND WATER MANAGEMENT PROGRAM  
OPTION PAPER #7

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**Title:** Ground Water Availability Criteria: Potable Water Source and Supply (ICC 8.09)

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**Problem Statement:** Prior to the adoption of Chapter 8.09 ICC Potable Water Source and Supply as County ordinance (September 1990), no codified guidelines existed to ensure that "adequate" water was available (ICC 8.07B), nor had the County defined what constituted "appropriate provisions" for potable water supplies (ICC 16.17). With specific ground water availability guidelines now in place in the County, some of the GWAC's initial concerns have been addressed. However, questions remain about:

- o the role of the Ground Water Development Classification Matrix in ICC 8.09 implementation;
- o the 400 gallon per day (gpd) minimum well yield requirement;
- o the adequacy of a one-hour minimum pumping test for individual water systems, and;
- o the provision which exempts applicants proposing individual water systems on subdivisions in which all lots are 2.5 acres or greater from having to drill a test well.

**Objective:** Coordinate the administration of the Ground Water Development Classification Matrix (option paper #6) with ground water availability requirements in ICC 8.09. Recommend specific changes to ICC 8.09 to strengthen its requirements for providing evidence of adequate ground water availability for individual water systems and all subdivisions.

**Existing Policies and Programs:** The Growth Management Act (GMA; SHB 2929) has taken an important first step towards the goal of managing ground water resources in some of the State's fastest growing counties, including Island County. The bill became effective on July 1, 1990. Section 63 of the Act modifies the State Building Code to require that an applicant for a building permit for any building requiring potable water provide evidence of an adequate water supply for the intended use. Furthermore, Section 52 of the GMA requires that "appropriate provisions are made for...public

water supplies" prior to approval of subdivisions.

To implement Sections 51, 52, and 63 of the GMA at the County level, the BICC adopted ICC 8.09 as County ordinance on September 17, 1990.

As written, Chapter 8.09 ICC applies to building permits issued for buildings requiring potable water, and to proposed subdivisions in Island County, with the exception that applicants proposing subdivisions for which individual water systems are proposed, and where each resulting parcel is 2.5 acres and greater, are not always required to drill wells to determine water quality or quantity. An ICHD approved plot plan, well site approval, and provisions for a sanitary control area are required for these subdivisions. Also, additional information may be required as deemed necessary by the Health Officer. For example, in areas with existing elevated chloride levels or indications of primary contaminant levels in excess of maximum contaminant levels, applicants for well site approval are required to drill test wells and results of water quality analysis.

#### Suggested Strategies:

##### Strategy 1:

This strategy consists of the following components:

- A. Create and adopt a County policy consistent with ICC 8.09, Portable Water Source and Supply, providing for use of the Ground Water Development Classification Matrix in evaluating new wells.
- B. Insert a new ICC 8.09.050.C.2 as follows:

"An estimation of the maximum anticipated peak day demand of the proposed development; and"...

- C. Revise ICC 8.09.020.A as follows:

"Adequate water supply means a water supply which 1) is capable of supplying at least 400 gallons of water per connection per day for indoor use, 2) is capable of meeting the maximum anticipated peak day demand of the proposed development, and 3) meets siting criteria established by State and local regulations."

- D. Revise the existing language at ICC 8.09.050.C.3 as follows:

"The written results of a bailer test, or air lift test,

or pump test, any of which is performed for a minimum of one four hours, verifying a minimum well yield of 400 gallons per day meeting the maximum anticipated peak day demand of the proposed development. Such minimum well yield shall be at least 400 gallons per day to meet the indoor water use requirements of the proposed development; and..."

- E. Renumber the remaining items under ICC 8.09.050.
- F. Review the State Seawater Intrusion Policy classification criteria for adequacy in addressing seawater intrusion risks associated with individual water systems. Adopt State criteria or develop local criteria for individual water systems located in high, medium and low risk categories pursuant to the Island County/DOH Salt Water Intrusion Policy for public water systems.
- G. Delete 8.09.060.B.2(g).

Strategy 2:

Take no action.

Evaluation of Strategies:

Strategy 1:

- A. Where ICC 8.09 provides guidelines defining what constitutes ground water availability in the County, the Ground Water Development Classification Matrix (option paper #6) can assist in evaluating the potential for adverse impacts to ground water quality and quantity related to ground water withdrawals. The matrix can be used in conjunction with the provisions of ICC 8.09 to assist the County in making ground water development decisions which minimize adverse environmental impacts. Specific policy language linking the matrix to the administration of ICC 8.09 should be drafted and adopted if this strategy is adopted.

Because of staff and funding limitations, the ICHD has indicated that preliminary use of the matrix will be limited to public water systems and all subdivisions. With existing resources, a detailed evaluation of individual water systems would create significant additional work for existing ICHD staff.

The GWAC feels that if the matrix proves to be a useful tool, it should be used to classify all new ground water

withdrawals in Island County, including all new individual withdrawals. Although the GWAC recognizes the resource constraints which presently exist in the County and the additional workload which would result from additional review, all ground water withdrawals, including individual water systems, may contribute to potential adverse ground water impacts to water resources in the County, and therefore, the GWAC feels that all new withdrawals should be subject to the most thorough evaluation possible.

The State Seawater Intrusion Policy (draft) presently outlines requirements for new and existing domestic wells in areas where seawater intrusion has been documented. The matrix is designed to address only new withdrawals. When the State policy is approved, and if new domestic well withdrawals are adequately addressed, use of the matrix to classify domestic wells may not be necessary. On the other hand, if the State policy does not adequately address domestic withdrawals, the GWAC may recommend that the matrix be used to classify domestic wells at least in areas of existing ground water problems, and possibly throughout the whole County.

- B. Materials needed for a building permit include blueprints and other drawings. Information in these materials include number of bedrooms, location and number of plumbing fixtures (standards for plumbing fixtures are provided in the State Plumbing Code - see option paper #4), and other information sufficient to make an estimate of the anticipated peak day usage for the building. Some idea of outdoor water use can also be estimated.  
  
Instructions to calculate this estimate will be provided with other application information provided to the applicant. This additional requirement in ICC 8.09 would not create a significant burden on the applicant, and will facilitate the design of a site specific well test, of a duration, which better reflects anticipated demands for the proposed development.
- C. Despite the fact that few individual water systems have yields so low as to create a health risk during peak day demands, the use of this language to define "adequate water supply" would ensure that wells drilled in the future meet anticipated peak day demands, and would eliminate any concerns over the adequacy of the 400 gallon per day minimum requirement. The 400 gallon per day requirement is based on indoor use only, and in many

cases may not be adequate for peak day use.

D. The specific language added to the requirements for building permits for individual water systems, not requiring a water right, will enable ICHD staff to better characterize proposed wells and to evaluate their potential ground water quality and quantity impacts on neighboring wells. The adequacy of a one-hour pump test is questionable; a four-hour test is more appropriate given the susceptibility of some areas to seawater intrusion and the lack of ground water information. In addition, requiring the proposed well to meet maximum anticipated peak day demand will ensure that the water supply needs of the applicant can be met, even when demand is greatest. Because minimum requirements for public water systems are adequately addressed in State and local code, this specific language shall apply only to individual water systems.

E. This is a "housekeeping" item.

F. ICC 8.09 specifies that additional information may be required by the health officer before individual water system approval. Although no specific criteria is provided in the code as to what additional requirements may be imposed, individual water systems are classified into a low, medium or high risk category very similar to those identified in the Island County/DOH Salt Water Intrusion Policy for public water systems. ICHD conducts an evaluation of existing ground water quality and quantity data and considers site specific factors which may indicate the need for additional information.

Individual water systems proposed in areas with wells experiencing seawater intrusion (e.g. Focus Areas) may be required to conduct additional quality and quantity testing to better characterize ground water availability. Additional requirements may include a 24 hour pumping test, water conservation, water use restrictions, and additional water quality monitoring and reporting. Although specific requirements for individual water systems which fall in the high, medium or low risk categories have not been defined at the County level, the State Seawater Intrusion Policy (Draft) includes risk classification criteria for individual water systems which address these concerns. These criteria should be considered for adoption at the County level once the State policy is adopted or local requirements should be established.

#### Use of the Ground Water Development Classification

Matrix for evaluating individual water system withdrawals proposed in areas requiring special ground water protection will assist the ICHD in their ground water availability determination.

G. Removing the language that exempts proponents of certain subdivisions from having to drill test wells in all cases will provide protection to potential buyers of the property, and will minimize economic losses to land buyers resulting from the purchase of "undvelopable" land. Removing the exemption will, however, place an economic burden of drilling test wells on applicants for subdivisions.

Environmental Impacts:

No adverse environmental impacts are associated with linking the Ground Water Classification Matrix with ICC 8.09 to better evaluate ground water availability. No immediate environmental impacts are associated with using information collected through the Ground Water Development Classification Matrix to supplement ICC 8.09 ground water availability requirements. An estimate of the anticipated peak day demand will allow well design test design to better reflect specific site characteristics, thereby providing increased protection of ground water resources through realistic characterization of actual withdrawal amounts. No adverse environmental impacts are associated with defining general criteria to be used to evaluate individual water system withdrawals. In some cases, adverse economic impacts may be associated with placing additional requirements on individual water systems.

Strategy 2:

Advantages of taking no action on changes to ICC 8.09 include maintaining "status quo" conditions in regards to the workload for existing County staff. No extra burden would be placed on applicants to provide estimates of anticipated peak day demand.

Economic hardships might be experienced by persons buying subdivided land on which water availability has not been determined by the drilling of a test hole. Also, failure to adequately characterize well yield could potentially result in health-related problems associated with exceeding well capabilities, and could result in financial losses to applicants as improvements to individual water systems become necessary.

Environmental Impacts: Failure to adequately characterize ground water availability for all developments and subdivisions may result in adverse impacts to ground water quality and quantity. If individual water systems are inadequately tested for ground water availability, existing wells may be adversely impacted and an increase demand on the aquifer may lead to deterioration of the individual water supplies.

**Recommended Strategy:** Strategy 1 is recommended for implementation. The GWAC recommends the following:

- 1) The Ground Water Development Classification Matrix should be used when making certain ground water availability decisions pursuant to ICC 8.09;
- 2) Consider revisions to ICC 8.09 to require well tests be designed to ensure the proposed well yield meets the anticipated peak day demand. Taking these actions will ensure adequate characterization and evaluation of the risk posed by proposed developments, and will ensure that individual water systems are designed with adequate protection against problems associated with exceeding well capacities;
- 3) Review State Seawater Intrusion Policy criteria for individual water systems. Consider adopting State criteria or designing local individual water system classification criteria and requirements to minimize adverse ground water impacts to existing and future users, and;
- 4) Consider requiring that all subdivisions drill a test hole and determine water quality. Proof of an adequate water supply for any development or subdivision is not thoroughly determined without conducting a well test.

**References:**

ICC 16.17, Planned Residential Development/Subdivision Ordinance.

ICC 8.09, Potable Water Sources and Supply.

ICC, 8.07B, Sewage Waste Disposal.

SHB 2929, Growth Management Act, effective July 1 1990.

ISLAND COUNTY  
GROUND WATER MANAGEMENT PROGRAM  
OPTION PAPER #8

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**Title:** Island County Land Development Standards Revisions  
(Chapter 11.01 ICC)

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**Problem Statement:** While recharge of ground water is encouraged in the Island County Land Development Standards (Chapter 11.01.110(c)(9) ICC), drainage plans for new development, including construction of County roads, are not required to contain evaluation of recharge facilities as possible alternative surface water management techniques. Additionally, the installation of impervious surfaces can lead to reduction in aquifer recharge and ultimately to ground water resource depletion due to lack of renewal functions. County code does not provide for restrictions in impervious surface coverage where appropriate.

**Objective:** Reduce adverse effects on ground water recharge in Island County, and increase recharge where feasible.

**Existing Programs:** One of the intents of the Land Development Standards is to "Protect the public interest in management of surface water drainage, ground water recharge, and related functions of drainage basins, water courses, and shoreline areas..." (Chapter 11.01.010(d) ICC). The code provides planning requirements for construction of retention/detention basins and other drainage and erosion control facilities, including those associated with road construction.

The use of recharge is also encouraged as a drainage management technique through the Comprehensive Plan (II-6).

**Suggested Strategies:**

**Strategy 1:**

This strategy consists of making the following changes to the Land Development Standards, ICC 11.01.

A. Make the following change to 11.01.110(c)(9) ICC:

~~"Recharge of storm water into the ground is encouraged; however, recharge potential shall be reviewed and certified by the proponent or his engineer prior to any attempt to recharge to the ground. is the preferred~~

method of drainage control, and all detailed drainage plans, where applicable, shall contain an evaluation of the potential for using recharge as a means of drainage control. Approved recharge projects shall have an inflow capacity sufficient to handle the design storm. An overflow system which meets the water quality and quantity release standards shall be available for backup. Runoff is required to flow through an oil separator and a filtering system prior to entering the infiltration system unless otherwise approved by the County Engineer. Recharge facilities of any type shall not be permitted in industrialized areas unless approved by the County Engineer. The approval of any recharge project shall not constitute approval of any means by which unstable subsurface conditions may occur."

B. Additionally, 11.01.070(b)(7) ICC, which details plan requirements for County road construction, should be amended as follows:

"Existing and proposed drainage structures, showing type and size of culverts, with direction of flow indicated. Evaluation of the possible use of recharge systems to manage storm water shall be included."

Strategy 2:

Take no action.

Evaluation of Strategies:

Strategy 1:

According to Engineering Department staff, recharge facilities are becoming more commonly used than in the past. Regulatory incentives would further increase the use of these types of facilities.

The proposed revisions would require evaluation of the potential to use recharge as a technique to manage surface water drainage in all applicable land developments or permits listed in 11.01.030 ICC, and in the construction of County roads. Traditional drainage management usually involves off-island disposal of surface water runoff; recharge systems may have been largely ignored simply because these traditional methods work so well for the purpose for which they were designed: getting rid of unwanted storm water. Benefits of recharge systems may not have been completely understood in the past.

By requiring consideration of recharge as an alternative to the "off-site" approach, the use of recharge systems should become more popular, and future development should thus have less negative impact on Island County's overall recharge balance.

There are some sites that are geologically or otherwise inappropriate for ground water recharge. Similarly, some land uses coupled with improperly constructed recharge facilities may exacerbate ground water contamination problems. Thus, the implementation of this option may prove most effective if coupled with the development of guidelines for construction of recharge facilities (see option paper #16). Additionally, recharge projects should be reviewed by the Health Department as well should quality of recharge water be in question.

This option is intended to increase recharge in the County through encouraging the construction of recharge facilities. When evaluating the potential for using ground water recharge facilities as an alternative for drainage management, the economic feasibility and public health and safety implications of the alternatives must be considered. It should be noted, however, that construction of recharge facilities should not be considered appropriate mitigation for ground water withdrawals, as the quantitative benefits of such systems are difficult to determine, particularly if these systems are not properly maintained.

Environmental Impacts: Ground water recharge facilities can serve as potential avenues for ground water contamination. The contaminant-attenuating ability of different soil types and recharge facility designs vary widely. Thus, without careful site-by-site evaluation, the encouragement of recharge facility construction could lead to adverse environmental impacts in the form of ground water contamination. Additionally, "down stream" effects of creating recharge facilities must be considered, as in any alteration to surface water flow. Improperly sited recharge facilities could conceivably have adverse environmental impacts on such "down stream" uses such as wetlands, shoreline habitats, and human uses, such as irrigation. Thus, pre-development runoff rates should, in many cases, be retained. Detailed environmental review is required on a site-by-site basis.

Some economic impacts may result from implementation of this strategy. Recharge systems often require more

maintenance than other surface water management techniques.

Strategy 2:

If the take-no-action strategy is selected, traditional methods of surface water management will probably continue to prevail over more environmentally aware options. Increasing impervious surface without compensating for ground water impacts incrementally reduces the gross amount of ground water recharge. Selection of the no-action strategy will not necessarily completely preclude the use of recharge facilities to control surface water, but the use of such facilities will certainly be less common.

Environmental Impacts: As indicated above, increases in overall impervious surface generates runoff and leads to reduction in ground water recharge. This effect, combined with the additional demands on available ground water resources associated with development, increases the rate of ground water depletion. At best, this is an inefficient use of available resources; at worst, environmental impacts could be severe in the case of widespread and significant reduction of ground water recharge.

**Recommended Strategy:** The GWAC recommends that Strategy 1, revising the Land Development Standards (ICC 11.01), be considered for implementation. This strategy will lead to increases in ground water recharge with minimal economic, social, or environmental impacts. Completing the revisions is a relatively simple process, though requiring some staff time, publication costs, and advertising expenses.

References:

Island County Land Development Standards, ICC 11.01.

Island County Planning Department, 1977. Island County Comprehensive Plan: Planning Policy, Phase II. (revised 1984).

ISLAND COUNTY  
GROUND WATER MANAGEMENT PROGRAM  
OPTION PAPER #9

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**Title:** Guidelines/Regulatory Criteria for Construction of Artificial Recharge Facilities

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**Problem Statement:** Construction of artificial recharge facilities is encouraged as part of a comprehensive ground water management program; however, serious ground water quality problems could occur from inappropriately sited or improperly constructed facilities.

**Objective:** Ensure artificial recharge facilities are constructed in accordance with practices which promote protection of ground water quality.

**Existing Policies and Programs:** The Island County Land Development Standards (ICC 11.01) encourage recharge as a means of managing post-development drainage, but provide only minimal guidelines for construction of recharge facilities.

Local governments are required by Chapter 173-275 WAC, the Stormwater Management Rule, to adopt regulatory guidelines for construction of recharge facilities. The Washington State Department of Ecology (Ecology) has distributed initial drafts of guidelines and technical manuals for construction of such facilities. Currently, Island County Engineering Department (ICED) staff, in their review of drainage plans, require that details of water quality treatment and certification of soil recharge capability be submitted, and recommend the use of the King County Surface Water Design Manual as best management practices.

ICED will be adopting local guidelines to satisfy the Stormwater Management Rule. Three choices are available: adopt the State guidelines and technical manual; adopt other standards which meet State criteria, such as the King County manual; or further develop the guidelines which were began in Island County in 1985 but which were never completed. Staff in the Engineering Department are currently evaluating these choices, and a set of guidelines satisfying the objective of this option paper is expected to be adopted in early 1991. Therefore, no GWMP action is required to accomplish the above objective.

**Recommendation:**

It is recommended that the adoption of any standards by the Engineering Department be coordinated with water resource staff from other departments. See the Coordination Program, option paper #19.

**References:**

Island County Land Development Standards, ICC 11.01.

King County Public Works Department. 1990. Surface Water Design Manual.

Stormwater Management Rule, Chapter 173-275 WAC, 1990.

ISLAND COUNTY  
GROUND WATER MANAGEMENT PROGRAM  
OPTION PAPER #10

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**Title: Water Resource Overlay Zone**

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**Problem Statement:** The existing Island County Zoning Ordinance (ICC 17.02) does not define ground water sensitive areas, nor does it identify special criteria or conditions to be met in the land use permit approval process to assure protection of ground water resources for existing and future users.

**Existing Policies and Programs:** A water resource overlay is a special designation, often used to regulate sensitive lands, applied to a specific geographic area in addition to the basic zoning requirements. Once these areas have been mapped, density restrictions and performance standards may be developed to protect their ground water resources.

According to the Findings of Fact to the Island County Code (Amended 6/20/88), seven overlay zones have been recommended for use in modifying development potential: wetlands, steep/unstable slopes, noise, scenic corridors, water resources, critical drainage and historic. These overlay zones are intended to ensure that the unique, fragile, sensitive, and scenic areas of Island County are protected and enhanced and that natural constraints are recognized in planning decisions. As stated in the Plan/Zoning Strategy, these overlays are not zoning classifications because they do not regulate density or uses, but instead, propose a management system designed to address specific landforms or natural features of importance to the County. Only two of the overlay zones have been adopted: wetlands and steep/unstable slopes.

**Suggested Strategies:**

**Strategy 1:**

Adopt a water resource overlay to protect ground water resources in fulfillment of the intent of the Island County Comprehensive Plan.

**Strategy 2:**

Develop criteria for the establishment of a water resource overlay in Island County. Ground water data collected as outlined in the Data Collection

and Management Program (option paper #5) and the Ground Water Development Classification Matrix (option paper #6) will provide additional data for developing water resource overlays.

**Strategy 3:**

Take no action.

**Evaluation of Strategies:**

**Strategy 1:**

As stated in the Plan/Zoning Strategy, the proposed water resource overlay would identify areas with supply limitations, areas subject to seawater intrusion, and areas identified for aquifer recharge. The overlay zone designation may provide for increased design flexibility as a means to provide greater resource protection. In some areas, a density restriction may be appropriate. Allowable base densities could be determined by subtracting the acreage of these areas from total land area. Performance standards will be developed to protect such areas from over use.

Establishing a water resource zoning overlay will require delineating the area(s) within which special controls and standards will be enforced. Adequate information about the resource will be required to adequately map the protection areas. It also will require a sophisticated understanding of how development affects ground water resources and the means by which those impacts can be mitigated.

Overlay zoning could include the designation of well head protection areas, recharge protection areas, Aquifer Protection Areas (Chapter 16.36 RCW), and Environmentally Sensitive Areas (SEPA). All of these designations require mapping.

**Environmental Impacts:** Although there are no direct adverse environmental impacts associated with this strategy, premature implementation of this strategy may result in a failure to provide the necessary ground water protection in those areas which require it, and may impose too stringent regulations on areas which do not require immediate attention. At this time, other management alternatives evaluated by the GWAC appear easier to implement because of the level of mapping required. These other designations include Environmentally Sensitive Areas (option paper #11) and

Critical Areas (option paper #12). These alternatives provide comparable tools for effectively protecting areas with vulnerable ground water resources.

Strategy 2:

Although the water resource overlay is consistent with the intent of the Comprehensive Plan and generally sounds good to those interested in protecting the resource, it would be difficult to implement in Island County. The possible ground water designations (see above) to be used to approach establishing a water resource overlay in Island County each present some inherent challenges when trying to geographically define the exact areas to be protected.

Although a number of ground water investigations have been conducted in the County, there are limitations to which recharge areas, aquifers, and seawater intruded areas can be mapped accurately and defensibly to support specific regulations or requirements. To define areas requiring special ground water protection, additional data is necessary to refine the County's understanding of the extent and the severity of the need to address ground water quality and quantity in these areas.

The Data Collection and Management Program (option paper #5) will assist in gathering additional data in areas with confirmed or potential ground water quality and/or quantity problems. Also, the Ground Water Development Classification Matrix (option paper #6) will serve as a checklist for gathering relevant ground water data. The analysis of data generated through GWMP efforts may be valuable in providing the necessary documentation to support the development of a water resource overlay in Island County in the future.

Environmental Impacts: No immediate adverse environmental impacts are associated with the implementation of this strategy. The collection of additional ground water data will assist in delineating areas which require special ground water protection. In the meantime, other GWMP area designations being considered appear more favorable for implementation at this time.

Strategy 3:

Failure to consider a water resource overlay as an potential ground water management tool, especially as new ground water information becomes available in the

future, may result in ground water development decisions which do not adequately address ground water protection.

Environmental Impacts: Adverse environmental impacts may result from the implementation of this strategy, including the failure to adequately manage ground water resources and to ensure adequate protection. However, if another ground water management alternative is used which adequately addresses the County's needs, adverse environmental impacts can be minimized.

**Recommended Strategy:** The GWAC recommends Strategy 2. As additional ground water data is collected, the water resource overlay option will be reevaluated and given further consideration as a ground water management tool in Island County.

**References:**

Final Environmental Impact Statement of The Island County Comprehensive Plan and Zoning Ordinance Strategy, 1984.

Island County Plan/Zoning Strategy, 1984.

Island County Findings of Fact, amended 6/20/88.

RCW 36.36, Aquifer Protection Areas.

WAC 197-11, State Environmental Policy Act, Environmentally Sensitive Areas.

ISLAND COUNTY  
GROUND WATER MANAGEMENT PROGRAM  
OPTION PAPER #11

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**Title:** Environmentally Sensitive Area under SEPA (WAC 197-11)

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**Problem Statement:** Certain activities are exempt from the State Environmental Policy Act (SEPA) review process until action is taken at the local level to eliminate these exemptions. Some of these activities could potentially have adverse impacts on ground water in Island County.

**Objective:** Ensure that any activities which could adversely impact ground water are evaluated adequately during the local SEPA review process.

**Existing Policies and Programs:** Pursuant to Chapter 197-11 WAC, Island County has adopted procedures (16.14C ICC, County Environmental Policy) which implement the State Environmental Policy Act (SEPA). Several sections of WAC 197-11 have been adopted by reference into County code. Under SEPA, proposed activities are evaluated in terms of their environmental impacts.

Chapter 197-11-908 WAC of the SEPA regulations grants counties and cities the authority to designate certain portions of their jurisdictions as Environmentally Sensitive Areas (ESAs). The Environmentally Sensitive Area designation allows local governments to define geographic areas requiring special protection. These areas can include but "(are) not limited to areas with unstable soils, steep slopes, unusual or unique plants or animals, wetlands, or areas which lie within flood plains". The ESA designation requires that maps be constructed which clearly identify the areas. These maps are to be adopted by reference as part of the SEPA procedures.

Without an ESA designation, certain activities are automatically exempt from SEPA review. The designation of ESAs allows counties to eliminate certain of these exemptions which are inappropriate to the area. Some of the categorically exempt activities (found in WAC 197-11-800) could potentially lead to significant adverse environmental impact in areas of ground water sensitivity. All of WAC 197-11-800 has been adopted into County code; this means that all activities listed in WAC 197-11-800 are exempt from review pursuant to SEPA.

Declaring all or a portion of Island County an ESA and

removing certain activities from exempt status does not preclude future overlapping ESA designations for areas within the original ESA. In other words, if in the future it is found that there is benefit to defining additional areas within existing ESA's for reasons of environmental concern, whether related to ground water protection or not, nothing in existing State or local law would prevent such action.

**Suggested Strategies:**

**Strategy 1:**

In order to remove or revise inappropriate categorical exemptions from County environmental policy code, the County must first adopt language into the code declaring the area to be an Environmentally Sensitive Area. The next step is drafting code identifying those categorical exemptions which are inappropriate, and inserting new code language either eliminating certain categorical exemptions entirely, or specifying the new thresholds for SEPA review of these activities. The specific elements of these code revisions are spelled out below.

- o Designate all of Island County an ESA under per WAC 197-11-908.
- o Reduce the thresholds for SEPA review for certain activities by amending and adopting the following language in the County SEPA procedural rules (ICC 16.14C):

WAC 197-11-800(1)(b)(iii): "The construction of an office, school, commercial, recreational, service or storage building with 4,000 square feet of gross floor area, and with associated parking facilities designed for twenty ten automobiles."

The effect of this change is to provide for SEPA review of commercial buildings where ten or more parking spaces are proposed, instead of the previous figure of twenty or more spaces. Impervious surface coverage of a site is the basis for including this item in the list of exemptions recommended for reduced thresholds in Island County.

WAC 197-11-800(1)(b)(iv): "The construction of a parking lot designed for twenty ten vehicles."

The effect of this change is to provide SEPA review of the construction of parking lots for ten or more

vehicles, instead of the previous figure of twenty or more. Again, impact of impervious surface on ground water recharge should be considered during SEPA review of this type of activity.

- Remove entirely the following activities from exempt status:

WAC 197-11-800(2)(g): "The installation of impervious underground tanks, having a capacity of 10,000 gallons or less."

The effect of this change is to ensure that all proposed underground storage tanks go through SEPA review, instead of only those with a capacity greater than 10,000 gallons. Potential impacts to ground water quality are to be the focus of evaluation of this activity under SEPA.

WAC 197-11-800(6)(a): "Except upon lands covered by water, the approval of short plats or short subdivisions pursuant to the procedures required by RCW 58.17.060, but not including further short subdivisions or short platting within a plat or subdivision previously exempted under this subsection."

The effect of removing this exemption from County code is to ensure SEPA review of proposed land use actions at an early stage in the proposal. Review can include the effects of impervious surface coverage, ground water withdrawals, and other environmental concerns associated with ground water.

- Unlike the above exemptions, removing the following exemption from County code requires a request, or petition, to the Department of Ecology:

WAC 197-11-800(4)(b): "Appropriations of one cubic foot per second or less of surface water, or of 2,250 gallons per minute 5000 gallons per day or less of ground water, for any purpose."

The effect of changing the threshold of this exemption in County code is to allow SEPA review of withdrawals of 5000 or more gallons per day of ground water. The amount of 2,250 gallons per minute, or 3,240,000 gallons per day, is ridiculously high, and is completely inappropriate in Island County.

Strategy 2:

Take no action.

Evaluation of Strategies:

Strategy 1:

An ESA designation can provide several important benefits in Island County. It can assist in raising the level of awareness of both the public and governmental agencies regarding the sensitivity of the aquifer system to contamination from overlying land use activities and the limitations of the resource. It would also permit the County to adopt a policy framework concerning land and water-use activities that potentially impact ground water in environmentally sensitive areas.

Several activities are exempt from SEPA review; 197-11-800 WAC contains a complete listing of these activities. Many of these exempt activities could potentially impact ground water in Island County. ESA designation would allow SEPA review of these activities. Should a finding be made that proposals involving these activities could impact ground water in an ESA, the Planning Department has the authority to require mitigation of these impacts. If the mitigating measures cannot be met, then the proposal is denied.

For some land use related activities, local governments are allowed to raise the thresholds for triggering environmental review under SEPA. Under RCW 34.04.060 and WAC 197-11-890, an agency can petition DOE to adopt additional exemptions or to delete existing exemptions by amending SEPA rules.

In determining the number of categorical exemptions to be eliminated, caution should be taken to eliminate only those which have a direct relationship to ground water resources. Eliminating some categorical exemptions will certainly require additional staff time and effort. Eliminating all categorical exemptions could result in an unfavorable public response and potentially create a overwhelming burden to the County staff responsible for processing and reviewing environmental documents.

The above exemptions proposed for elimination were selected due to the potential adverse effects of these activities on ground water. Specifically, the exemptions dealing with commercial structures of 4,000

square feet gross floor area, and with parking lot construction were chosen because of the potential impacts of impervious surfaces associated with these activities upon ground water recharge. It is recognized that in many areas of the County, impact of these activities would be insignificant. In other areas, however, significant impacts could occur.

Implementation of this strategy provides an avenue to restrict impervious surface coverage where appropriate, based on site-by-site evaluation. Existing regulations provide no such method of evaluating and restricting impervious surface coverage for commercial/institutional buildings of 4,000 square feet or less with parking for twenty or less vehicles, or for parking lots for twenty or less vehicles.

Siting of underground storage tanks should also be evaluated carefully, given the fact that ground water is the sole source of drinking water for the majority of the County's residents.

A withdrawal of 2,250 gallons per minute of ground water could have disastrous impacts on ground water quantity and, through seawater intrusion, on ground water quality. SEPA is a generally powerful and useful planning tool, but this particular exemption is a definite weakness. Lowering the threshold amount on this exemption would address this weakness.

Information collected from past ground water studies, additional data collection efforts, and the sole source aquifer designation could provide the necessary support required to designate the County as an ESA.

Environmental Impacts: No direct adverse environmental impacts are associated with applying for the Environmentally Sensitive Area status. The objective of obtaining ESA status would be to protect ground water resources, specifically by providing maximum protection through regulating land uses, groundwater withdrawals, the use of chemicals and pesticides, etc. The elimination of certain categorical exemptions, however, could increase the number of environmental documents that must be reviewed by the County, placing more demands on County staff.

#### Strategy 2:

Failure to recognize the merits of applying for ESA status could result in a potentially effective ground water management tool being overlooked.

Environmental Impacts: Failure to provide SEPA review to all activities with potential ground water impacts could result in adverse impacts to ground water quality and quantity.

**Recommended Strategy:** The GWAC recommends that Strategy 1 be considered for implementation. Designating Island County an Environmentally Sensitive Area is a defensible and viable ground water management option. Such designation, accompanied with the appropriate elimination of exemptions, will provide significant protection to Island County ground water resources.

**References:**

ICC 16.14C. Island County Environmental Policy

RCW 34.04. Administrative Procedure Act.

SHB 2929. Growth Management Act, effective June 1, 1990.

WAC 197-11. State Environmental Policy Act.

GROUND WATER MANAGEMENT PROGRAM  
OPTION PAPER #12

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**Title:** Critical Areas under the Growth Management Act of 1990  
(SHB 2929)

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**Problem Statement:** Aquifer recharge protection and enhancement is critical to preserving the quality and quantity of ground water in Island County's sole source aquifers. Ground water data are currently not available to scientifically establish Island County's recharge areas.

**Objective:** Designate Island County as a critical area pursuant to the Growth Management Act. Develop methodology to classify aquifer recharge areas in Island County, following Chapter 365-190 WAC (Minimum Guidelines to Classify Agriculture, Forest, Mineral Lands and Critical Areas), by the potential for various land uses to degrade ground water quality and by hydrogeologic conditions which facilitate degradation. Adopt interim regulations for the protection of critical areas from development which is incompatible with the function of the designated area.

**Existing Policies and Programs:** The critical area designation is applied to areas where aquifer recharge is essential for ensuring ground water quality and quantity. On or by September 1991, Island County must adopt interim regulations that preclude land uses incompatible with designated critical areas. Mapping is not required for critical area designation.

The Growth Management Act requires counties to protect critical aquifer recharge areas both in the Comprehensive Plan and in development regulations. The Act requires counties and cities adopt, where appropriate, critical area designations by September 1, 1991. Critical areas include the following areas and ecosystems: wetlands, areas with critical recharging effect on aquifers used for potable water, fish and wildlife conservation areas, frequently flooded areas, and geologically hazardous areas.

Chapter 365-190 WAC represents draft guidelines developed by Ecology to assist counties in classifying critical recharge areas. Aquifer recharge areas are defined as "areas with a recharging effect on aquifers used for potable water" and the specific criteria to identify these areas include:

- (1) the availability of supporting ground water data on the location and extent of the aquifer;

- (2) the vulnerability of the aquifer to contamination; preferably including hydrogeologic analysis of a proposed area, but not excluding the following factors: depth to ground water, soil permeability, soil type, presence of potential contamination sources, and other relevant factors;
- (3) the extent to which the aquifer is an essential source of drinking water.

Existing hydrologic studies, soil, and surficial geologic information can be used to characterize recharge areas. Classification of recharge areas should include their separation into high or low susceptibility to contamination categories. The strategy for recharge classification should be to maintain the quality of ground water, with particular attention to recharge areas of high susceptibility. High susceptibility is indicated by land uses in an aquifer recharge area which contribute contaminants that are likely to adversely impact ground water quality.

In aquifer recharge areas of high susceptibility to contamination, additional studies should be conducted to determine if ground water contamination has occurred. Management strategy for these areas should include consideration of the degree to which the aquifer is used as a potable water source, feasibility of protective measures to maintain potability, and alternative potable water sources.

Chapter 365-190 WAC specifies five important considerations in evaluating the potential for contaminant loading in areas important to recharging the aquifer. These include:

- (1) General land use;
- (2) Waste Disposal sites;
- (3) Agricultural activities;
- (4) Well log and water quality test results; and
- (5) Other information about the potential to cause contamination.

Examples of areas which can be considered for this designation include:

- (1) Sole source aquifer recharge areas pursuant to the Federal Safe Drinking Water Act.

- (2) Special protection areas pursuant to Chapter 90.44 RCW and 90.54 RCW, and Chapter 173-100 WAC.
- (3) Wellhead protection areas pursuant to the Federal Safe Drinking Water Act.
- (4) Other areas meeting "critical recharging effect on aquifers" definition in Ecology's guidelines.

There are no specific mapping or inventorying requirements for critical areas. In most instances, mapping of critical areas would be too inexact for regulatory purposes. However, if mapping is the selected approach to designating these areas, the Act advises counties map for informational or illustrative purposes and not for regulatory purposes.

According to Ecology guidelines, performance standards and definitions are the preferred techniques for mapping in critical areas so they can be specifically identified during the processing of a permit or development authorization. Performance standards deal with the effects various land uses have on the surrounding area and are always measurable. This method of regulating leads to an objective review of the impacts of a proposed development and encourages innovative site plans which reduce negative impacts in critical areas.

Infiltration potential for Island County has been assessed and represents a significant component of recharge. Infiltration potential maps are included in the Part A Technical Memorandum for the GWMP. These maps are based on soil type and surficial hydrology. Additional factors such as hydraulic gradient and hydraulic conductivity in the underlying aquifers is needed to quantify recharge.

#### **Suggested Strategies:**

##### **Strategy 1:**

There are three components to this strategy:

- 1) Designate Island County as a critical area pursuant to the Growth Management Act of 1990.
- 2) Establish a mechanism to classify recharge areas following Ecology guidelines (Chapter 365-190 WAC).
- 3) Adopt interim development regulations for the protection of critical areas.

##### **Strategy 2:**

Take no action.

Evaluation of Strategies:

Strategy 1:

Island County's sole source aquifers exclusively on ground water recharge; and therefore, all land area in the County has a role in promoting aquifer recharge. Using this rationale, Island County should be designated a "critical area" pursuant to the definition provided in the Growth Management Act.

Objective and technical criteria, consistent with Chapter 365-190 WAC, should be developed to classify aquifer recharge areas County-wide. Classification of land into categories of low or high susceptibility to contamination will assist the County in recognizing the differences among these areas and in promoting ground water protection.

Performance standards should be used to evaluate site specific characteristics which potentially affect aquifer recharge. Standards should relate to the following factors:

- annual precipitation
- vegetative cover
- soil conditions
- potential sources of contamination (i.e. seawater intrusion, landfill contamination, septic failure, etc...)
- topography (i.e. slope angle and irregularities)
- impervious surface
- population served
- aquifer conditions (i.e. geology, transmissivity, confined/unconfined, hydraulic gradient, and hydraulic continuity)

The County should draft development regulations that govern changes in land uses and new activities by prohibiting inappropriate actions and restricting, allowing, or conditioning other activities as appropriate. All actions, which could potentially impact ground water recharge would be required to be evaluated in terms of these standards. Applicants should be required to meet performance standards and to provide any additional information necessary to characterize recharge. Actions subject to review could include ground water withdrawals, any proposed development, installation of On-site sewage systems, and

any other actions which may interfere with normal ground water recharge.

The Ground Water Development Classification Matrix (see option paper #6) provides objective criteria which can be used to assist in classifying aquifer recharge areas in Island County. Although the matrix is limited for classifying impacts related to wells, the matrix can be used as an indicator of the potential risks to recharge associated with additional withdrawals and development. If the matrix indicates that the proposed well development poses a high risk for adverse impacts, the area surrounding the well may be considered important to aquifer recharge because of its susceptibility to water quality and quantity problems.

Environmental Impacts: No direct adverse environmental impacts are associated with this strategy. As a result of this strategy, however, an economic burden could be put on applicants to provide the County with adequate ground water information necessary to determine if the proposal may impact aquifer recharge.

#### Strategy 2:

Under the GMA, preliminary classification and designation is to be completed on or by September 1991. The County must develop a classification scheme and enact interim development regulations to protect critical areas within the same time frame.

Environmental Impacts: Adverse environmental impacts could be associated with failure to protect areas critical to aquifer recharge. Adverse impacts could include public health problems associated with poor water quality and water shortages.

**Recommended Strategy:** The GWAC recommends that Strategy 1 be considered for implementation. Due to the inadequate ground water information at this time to select areas which require special attention, and the sole source aquifer designation County-wide, the critical area designation should be applied to the whole County. Through the adoption of performance standards relating to aquifer recharge, additional data collection and area characterization, will allow recharge areas to be classified. Through classification of aquifer recharge areas in Island County, interim development regulations that preclude land uses incompatible with designated critical areas can be adopted.

**References:**

Hart Crowser Inc, 1987, Coordinated Water System Plan  
Groundwater Resource Evaluation, report J-1939, Seattle, 49p.

RCW 90.44, Regulation of Public Ground Waters.

RCW 90.54, Water Resources Act of 1971.

SHB 2929, Growth Management Act, effective July 1, 1990.

WAC 173-100, Ground Water Management Areas and Programs.

WAC 365-190 (Draft), Minimum Guidelines to Classify  
Agriculture, Forest, Mineral Land and Critical Areas.

ISLAND COUNTY  
GROUND WATER MANAGEMENT PROGRAM  
OPTION PAPER #13

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**Title:** Areas of Special Concern (WAC 248-96, draft revisions)

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**Problem Statement:** Presently there are no specific criteria designed to define areas which require special ground water considerations for on-site sewage treatment.

**Objective:** Designate specific criteria pursuant to Chapter 248-96 WAC (On-Site Sewage Systems, draft revisions) in order to prevent adverse impacts to ground water quality resulting from failing on-site sewage systems. Evaluate the potential benefits of delineating areas of special concern to protect areas where drinking water aquifers are potentially threatened by on-site sewage systems.

**Existing Policies and Programs:** ICC 8.07B Sewage Waste Disposal establishes minimum requirements of the ICHD governing sewage disposal systems for individual homes or any other source of sewage waste. ICC 8.07B.210 requires alternate sewage treatment systems for Type 1 soils (highly permeable soils) to provide enhanced treatment.

As defined in the draft revision On-Site Sewage Systems (248-96 WAC), an area of special concern is defined as "any area of definite boundaries, where a health officer or board(s) of health determines that additional requirements for on-site sewage systems are necessary to protect the public health". Areas of special concern can represent areas which require special ground water protection, including:

- o Areas where drinking water aquifers are not geologically protected.
- o Areas that have been designated as special protection areas per WAC 173-200, the water quality standards of ground waters in the State of Washington.

According to the draft of WAC 248-96, once an area is designated an area of special concern, the County Health Department or the State Department of Health may impose more stringent requirements on new developments and/or remedial action on existing developments. Requirements may include, but are not restricted to the following:

- o Additional location, design, and/or performance

standards for on-site sewage systems.

- o Larger land areas for new development.
- o Additional operation, maintenance, and monitoring of on-site sewage system performance.
- o Requirements for upgrading existing on-site sewage systems.
- o Requirements to abandon existing on-site sewage systems.
- o Monitoring of ground water or surface water quality.

At least once every four years every on-site sewage system within "areas of special concern" should be inspected by a certified designer, installer, pumper, regulator, or an improved management entity (ICC 8.07B recommends this be done every three years). System failures should be immediately reported to the local health officer. The following system information should be submitted to the health officer and the property owner within 30 days following the inspection:

- o Location of the tank;
- o Structural condition of the tank, including baffles;
- o Depths of solids in tank;
- o Problems detected with any part of the system;
- o Maintenance needed;
- o Maintenance provided at time of inspection;
- o Other information as required by the local health officer.

#### **Suggested Strategies:**

##### **Strategy 1:**

Develop specific criteria, pursuant to WAC 248-96, On-site Sewage Systems, to protect ground water from potential contamination from on-site sewage systems. Develop a methodology to designate areas of special concern in Island County.

##### **Strategy 2:**

Take no action.

**Evaluation of Strategies:**

**Strategy 1:**

Island County Code 8.07B defines inadequate sewage disposal systems as those contaminating surface or ground waters of the state or creating a health hazard or nuisance by discharging on the surface of the ground. In Island County, alternative wastewater treatment systems, such as sand filters and mound systems, may be required at sites overlying shallow aquifers, very porous soils, and/or high water tables.

The major factors that determine the extent to which on-site sewage systems installed in coarse textured soils will impact ground water are system design and characteristics of the number of systems within a given area. In some cases, on-site septic system placement may require more stringent requirements due to the vulnerability of the aquifer as indicated by the hydrogeology.

A recharge area characterized as highly susceptible to ground water contamination may be at risk if special considerations are not made for adequate sewage disposal. It is also important to recognize, however, that on-site sewage systems can recharge over 50% of the water supplied to the home to ground water; and therefore, contribute to ground water recharge in an area (Sapik et al, 1987).

The areas of special concern designation allows the ICHD to impose specific requirements in order to better meet sewage disposal requirements defined in the ICC 8.07B. These requirements will be based on site specific criteria made by the ICHD.

The ground water information that is available is inadequate to accurately define the boundaries of areas of special concern. As ground water information is gathered and analyzed through additional data collection and monitoring, the delineation of areas of special concern may be investigated and a methodology developed.

**Environmental Impacts:** No adverse environmental impacts are associated with implementation of this strategy. The development of specific criteria would assist the County in minimizing adverse impacts to ground water associated with on-site sewage systems. Adverse economic

impacts may be associated with more stringent requirements on new developments and/or remedial action on existing developments located in areas of special concern.

**Strategy 2:**

Failure to address ground water contamination which may result from placement of on-site sewage systems in areas requiring special protection may lead to ground water quality and quantity problems which may endanger public health and the natural environment.

**Environmental Impacts:** Adverse environmental impacts may be associated with the implementation of this strategy. Without special considerations for areas where the aquifer is vulnerable to on-site sewage system contamination, ground water contamination may threaten drinking water supplies.

**Recommendation:** The GWAC recommends Strategy 1 for implementation. Specific criteria should be developed to prevent the potential adverse risks associated with on-site sewage systems in areas requiring special ground water protection. The possibility of delineating areas of special concern when additional data collection and analysis is available will be evaluated by the ICHD.

**References:**

ICC 8.07B, Sewage Waste Disposal.

Sapik, D.B., Bortleson, G.C., Drost, B.W., Jones, M.A., and Prych, E.A., 1988, Ground-water resources and simulation of flow in aquifers containing freshwater and seawater, Island County, Washington: U.S. Geological Survey Water-Resources Investigations Report 87-4182, 67 p.

WAC 173-200, Ground Water Quality Standards.

WAC 248-96, On-Site Sewage Systems, Areas of Special Concern, November 12, 1990, draft revisions.

ISLAND COUNTY  
GROUND WATER MANAGEMENT PROGRAM  
OPTION PAPER #14

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**Title:** Special Protection Areas (WAC 173-200)

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**Problem Statement:** Presently, no special area designations exist in Island County which directly address ground water protection.

**Objective:** Follow and contribute to the development of the draft Ground Water Quality Standards (WAC 173-200) and evaluate the potential benefits of designating Special Protection Areas (WAC 173-200-090) in Island County.

**Existing Policies and Programs:** The top priority of the State Department of Ecology's 1987 Ground Water Quality Management Strategy was to develop ground water quality standards. These standards were developed under the authority of the Water Pollution Control Act (RCW 90.48) and implement the State's antidegradation policy requiring that natural and existing water quality be preserved and that degradation be prohibited. WAC 173-200 became effective early December 1990.

The Ground Water Quality Standards establish numerical criteria which will generally apply to all ground waters in the saturated zone. The standards are to be implemented through permits and regulatory orders for activities which discharge to ground water. These "activities" include water well withdrawals and water right permits.

WAC 173-200-090 proposes the designation of Special Protection Areas used "to identify and designate ground waters that require special consideration or increased protection because of one or more unique characteristics." The area(s) designated are to receive special attention when "regulating activities, developing regulations, guidelines, and policies, and when prioritizing department resources for ground water quality protection programs." In addition, water right permits and proposed withdrawals can be conditioned in special protection areas.

The following criteria in the Ground Water Quality Standards are to be used to guide designation of Special Protection Areas:

- o Ground waters which support a beneficial use or

- ecological system requiring more stringent water quality criteria than drinking water standards;
- o Ground waters including, but not restricted to, recharge areas and wellhead protection areas, that are vulnerable to pollution due to the hydrogeologic characteristics;
- o Sole source aquifer status by federal designation.

To propose an area for the Special Protection Designation, the following is required for submittal to Ecology:

- o A rationale for the proposed designation;
- o Supporting data;
- o A description of the proposed area including geographic and hydrologic boundaries;
- o Documentation showing coordination with state and local agencies, water users, and other affected groups;
- o Additional information Ecology requests to evaluate the proposed designation.

**Recommendation:** GWMP lead agency water resources staff and the GWAC will evaluate and consider the benefits of designating Island County, or portions thereof, as a Special Protection Area pursuant to WAC 173-200.

**References:**

WAC 173-200, Water Quality Standards for Ground Waters of the State of Washington, Special Protection Areas.

ISLAND COUNTY  
GROUND WATER MANAGEMENT PROGRAM  
OPTION PAPER #15

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**Title:** Aquifer Protection Areas (RCW 36.36)

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**Problem Statement:** Sources of funding for the implementation of proposed GWMP ground water protection activities have yet to be fully identified.

**Objective:** Evaluate the benefits to ground water protection in Island County associated with the designation of the Island County Ground Water Management Area, or a portion or portions thereof, as an Aquifer Protection Area (Chapter 36.36 RCW).

**Existing Policies and Programs:** RCW 36.36 provides the authority for creation of local Aquifer Protection Areas (APAs) to help establish a funding base for ground water protection, monitoring, preservation, and rehabilitation programs.

No programs currently in effect in the County collect per-household assessments for ground water withdrawals or for on-site sewage disposal.

**Suggested Strategies:**

**Strategy 1:**

Review the benefits of designating Island County, or a portion or portions thereof, as an Aquifer Protection Area. If favorable, propose a ballot measure asking voters if an Aquifer Protection Area should be established in Island County.

**Strategy 2:**

Take no action.

**Evaluation of Strategies:**

**Strategy 1:**

An APA can be established through a ballot issue and requires a simple majority vote of registered voters in the proposed APA. If approved, the County can collect a per-household user fee on ground water withdrawals and/or on-site sewage disposal. The County may contract

with existing public utilities to collect the fees, or collect the fees itself. Collected revenues can be distributed to all political jurisdictions within the APA.

APAs may use fees collected to support the following:

- o The preparation of a comprehensive plan to protect, preserve, and rehabilitate ground water;
- o The construction of facilities for: a) the removal of water-borne pollution; b) water quality improvement; c) sanitary sewage collection, disposal, and treatment; and d) storm water or surface water drainage collection, disposal, and treatment;
- o The proportionate reduction of special assessments imposed by a county, city, town, or special district in the aquifer protection area for any of the facilities described above; and,
- o The costs of monitoring and inspecting on-site sewage disposal systems or community sewage disposal systems for compliance with applicable standards and rules, and for enforcing compliance with these applicable standards and rules in aquifer protection areas.

The use of revenues generated from the APA is limited to ground water protection planning, ground water treatment facilities, and wastewater treatment facilities. As currently written, the law does not authorize use of the APA revenues for day to day management and regulatory programs for the control of pollution sources such as underground storage tanks, hazardous wastes, and may be of limited value in funding ongoing management.

If an APA ballot is considered, a determination should be made as to what extent proposed ground water protection activities can be supported with APA revenues. If support would be nominal, then the ballot issue should be reconsidered or the Washington State Legislature should be requested to broaden the permitted usage of APA generated funds.

A County-wide assessment for ground water withdrawals and on-site septic systems would generate significant funds, but voters may be unwilling to support such assessments unless it can be shown that they will receive the benefits of such assessments. With counties

that also act as purveyors, such benefits could probably be demonstrated. As the RCW 36.36 is currently written, however, such assessments could be used only on area-specific projects in Island County, benefiting small groups at the expense of the majority. At present, it seems practical that the APA designation be used only in specific geographic regions of the County, such as those water systems or areas suffering from elevated chlorides.

Even if APA funding supports the major portions of the GWMP, there is some risk involved in placing APA measures on the election ballot. Failure of an APA at the polls could alter the way the local legislative body perceives the relative status of ground water protection and management on the political agenda.

In a June 1989 letter to the Prosecuting Attorney of Island County, the State Assistant Attorney General offers a legal opinion of specifics of the APA designation as it would relate to Island County. According to the Assistant Attorney General, in areas where sea water intrusion is present, a local government may properly invoke the provisions of RCW 36.36 to protect, monitor, preserve, and rehabilitate those waters affected. However, according to his interpretation of RCW 36.36, ongoing ground water monitoring programs, facility maintenance, or operation costs may not legally be funded through APA-generated funds.

Environmental Impacts: Environmental impacts of implementing the provisions of RCW 36.36 would be positive; activities listed above as eligible for funding from APA assessments would clearly induce only beneficial environmental impacts. Some adverse environmental impacts may occur through construction of facilities for removal of pollution, water quality improvements, sewage collection, disposal, and treatment, or storm or surface water drainage disposal facilities, but these would require project-specific environmental review. Economic impacts would be experienced with implementation of an APA.

#### Strategy 2:

Not implementing the provisions of RCW 36.36 would not necessarily detract from ground water protection and management efforts in Island County. Other sources of funding may become available which does not require immediate widespread public support.

**Environmental Impacts:**

No adverse environmental impacts would occur as a result of not implementing the provisions of RCW 36.36. Environmental problems that could be addressed using APA generated funds have not been identified as being severe in Island County. If APA status is sought prematurely, inadequate ground water protection may result.

(NOTE: In March of 1991, after GWAC approval of this document, state legislation was passed which broadened the range of activities that APA-generated revenues could fund. The criticisms of APA in the preceding section have been addressed. The original GWAC recommendation was to look at the APA designation after any State code changes.)

**Recommended Strategy:**

Strategy 1 is recommended for consideration.

The benefits of an APA may merit consideration once public education and involvement has gained widespread support for ground water management efforts in the County. Also, APA's do not necessarily need to be formed County-wide; citizens in a portion or portions of the County may choose to form an APA on their own over a specific geographic area of the County to fund localized projects.

**References:**

Mosich, D.F. 1989, Legal opinion letter to David Thiele, Prosecuting Attorney of Island County.

RCW 36.36, Aquifer Protection Areas.

ISLAND COUNTY  
GROUND WATER MANAGEMENT PROGRAM  
OPTION PAPER #16

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**Title:** Wellhead Protection Program

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**Problem Statement:** The existence of over 650 public water systems in Island County creates difficulties when trying to regulate the use, storage, and disposal of contaminants within the sanitary control area of a well. Presently, no County-wide wellhead protection program exists to address ground water contamination from surface or subsurface drainage around a well.

**Existing Policies and Programs:** Although a comprehensive program to protect wellhead and wellfields from contaminant sources does not exist in Island County, certain state and local codes address or provide for special protection of the surface and subsurface around water supply wells. Minimum Standards for Construction and Maintenance of Wells (WAC 173-160) specifically states that water supply wells "shall be protected... from any surface or subsurface drainage capable of impairing the quality of the ground water supply. The well shall be located away from possible sources of contamination." In addition, the DOH presently requires that public drinking water be obtained from the highest quality source and establishes a minimum sanitary control area radius of one hundred feet around a well (Department of Health Drinking Water Regulations, WAC 248-54).

At the County level, the Sewage Waste Disposal Code (ICC 8.07B) requires a minimum distance of one hundred feet from the well to the sewage system absorption field. This distance may be increased by the health officer on a site by site basis to protect public health. It is recognized in the code that reducing setbacks of this type may require review by a ground water hydrologist prior to approval.

**Suggested Strategies:**

**Strategy 1:**

Evaluate the benefits of establishing a County-wide Wellhead Protection Program (WHP) under the Federal Environmental Protection Agency (EPA).

**Strategy 2:**

Take no action.

## Evaluation of Strategies:

### Strategy 1:

The Wellhead Protection (WHP) Program is a ground water protection program developed by EPA which can be applied at the local level to control contaminant sources to wells. The 1986 amendments to the Safe Drinking Water Act established a WHP Program designed to protect ground water which is tapped by public water supply wells or wellfields. The Act defines a wellhead protection area as "the surface and subsurface area surrounding a water well or wellfield, supplying a public water system, through which contaminants are reasonably likely to move toward and reach such water well or wellfield." EPA has identified several goals for WHP:

- o To provide a remedial action zone around the wellhead to act as a safety buffer;
- o To create an attenuation zone to reduce concentrations of known contaminants in ground water before they reach the well;
- o To use wellfield management zones to regulate activity in all or part of the recharge area.

The method used to delineate WHP areas may differ from one community to the next. The first step in implementation of a WHP Program is to identify a defined geographic area that is significant for the protection of quality. Criteria used to define WHP boundaries include distance of contaminant travel, time of contaminant travel, the extent of aquifer drawdown, flow system boundaries, and the capacity of the aquifer to assimilate or attenuate contaminants. These hydrogeologic characteristics have a direct effect on the likelihood and extent of contamination. Once criteria and threshold to delineate WHP areas have been selected by the Department of Health (DOH) and Department of Ecology (Ecology), methods for delineating WHP areas will be established by the state.

EPA has identified six methods to approach WHP area delineation, from simple and low cost approaches (such as establishing an arbitrary fixed radius around a well or well field) to sophisticated and high cost computer modeling techniques. Although relatively simple methods of delineating WHP areas may be most feasible for many public water systems, they may tend to be under-

protected if the aquifer recharge areas are larger than the protection radius or over-protected if the protection radius is larger than the recharge area.

Once a WHP area has been delineated, management programs are developed to outline the management strategies for wellhead protection from direct entry of microbial and chemical contaminants into the well casing. The remainder of the WHP area is to be managed based on an inventory of potential and existing contamination sources. A number of commonly used land use controls, source controls, and other tools are used for protecting WHP areas, including:

- o Zoning ordinances
- o Subdivision Ordinances
- o Site Plan Review
- o Design Standards
- o Operating Standards
- o Source Prohibitions
- o Purchase of Property or Development Rights
- o Public Education
- o Ground Water Monitoring
- o Household Hazardous Waste Collection
- o Water Conservation

Although Washington's well head protection program is still being developed and may require up to an additional two years of preparation, projects can receive funding through the Centennial Clean Water Fund. A number of municipalities, including City of Renton and Tacoma, have already successfully implemented a form of wellhead protection program. The success of these programs has been largely the result of the ability of the municipal wellfield owner to directly regulate land use overlying the wellfield.

Environmental Impacts: No direct adverse environmental impacts would result from implementation of a WHP Program. However, restrictions related to the use of an area surrounding a well could limit the development

potential in some areas, especially where lots are small and narrow. In addition, economic impacts associated with implementing this strategy may outweigh the benefits derived from administering a County-wide wellhead protection program in Island County.

Strategy 2:

Difficulties have been identified with implementation of a WHP Program in unincorporated areas where public well owners do not control the surrounding land use. In these cases, the success of the WHP Program will depend on the willingness of the county government to impose the necessary land use restrictions. In a county consisting of a majority of small public water systems, such as Island County, there may be some resistance to embark on a program requiring "spot" zoning. King County views individualized WHP land use controls for each public well in their county to be unworkable. This may very well be the case in Island County.

An alternative management approach to WHP areas in areas with many public water system wells under different ownerships and overlapping recharge zones would be to develop regional ground water protection requirements. It should be possible to develop generic, county-wide WHP regulations allowing individual well or wellfield owners to apply to the County for protection. This would especially be preferred in situations where well or wellfield owners lack sufficient resources to accurately define the recharge zone.

DOH and Ecology are aware of the inherent difficulties of adopting a WHP Program in unincorporated areas and are developing strategies to facilitate county acceptance of the program. They are requesting that the Washington State Legislature provide explicit financial incentives or assistance to local governments in developing WHP Programs. In addition, DOH and Ecology are assessing the possibility of state participation in the development of centralized data base management systems at the county level.

Environmental Impacts: Adverse environmental impacts may result if a WHP Program is not implemented in Island County. Although, existing County codes attempt to minimize ground water contamination initiated at the wellhead, the wide geographic distribution of wells makes enforcement difficult. The absence of a County-wide WHP program and the increase in the number of wells in the County may present additional difficulties in

regulating potential contamination at the wellhead. A special wellhead protection program provided to those individual requesting assistance may alleviate some of the potential adverse environmental impacts.

**Recommended Strategy:** Strategy 2 is recommended for implementation in Island County. Wellhead protection in Island County is best applied on a water system-by-water system basis. Because of the distribution and number of public water systems in Island County, it does not make sense to contemplate implementation of the WHP Programs on a County-wide basis. It is recommended that discussion of WHP Programs be relegated to the Technical Assistance Program (see option paper #2). Information on WHP Programs should be made available to individual water systems experiencing contamination or recharge problems.

The GWAC will identify the specific difficulties in establishing a wellhead protection program in Island County and make the necessary recommendations to the responsible federal and state agencies (See Coordination Program, option paper #19). Once a state-wide well head protection program is developed, the feasibility of developing a County program will be further evaluated.

**References:**

Environmental Protection Agency (EPA); Wellhead Protection: A Decision-Makers' Guide, Office of Ground-Water Protection, EPA 440/6-87-009.

Environmental Protection Agency (EPA); An Annotated Bibliography on Wellhead Protection Programs, Office of Ground-Water Protection, EPA 440/6-87-014.

Environmental Protection Agency (EPA); Wellhead Protection Programs: Tools for Local Governments, Office of Water, EPA 440/6-89-002.

ICC 8.07B, Sewage Waste Disposal.

WAC 173-160, Minimum Standards for Construction and Maintenance of Wells.

WAC 248-54, State Department of Health Drinking Water Regulations.

ISLAND COUNTY  
GROUND WATER MANAGEMENT PROGRAM  
OPTION PAPER #17

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**Title:** Non-Regulatory Land Conservation Programs

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**Objective:** Encourage non-regulatory techniques that conserve lands which contribute to protection of ground water resources.

**Problem Statement:** Land conservation programs, while historically receiving support from Island County government, could benefit from additional support to significantly contribute to the protection of ground water resources.

**Existing Programs:** The Ebey's Landing National Historic Reserve, managed by a Trust Board, provides protection to 17,400 acres of central Whidbey Island, the majority of which is maintained as agricultural open space or woodlands (NPS). This is a joint effort between a local citizens committee, local governments, and the National Park Service. Maintaining these areas as open spaces may contribute to protection of the Coupeville area's recharge; a critical need for protecting Coupeville's water supply is indicated by the June 1990 imposition of a temporary moratorium on building due to water availability concerns.

The Transfer of Development Rights element of the Zoning Ordinance (Chapter 17.02.170 ICC) is intended to encourage perpetual preservation of open spaces, wetlands, and farm and forest resources. Owners of sending properties (those properties from which development rights are conveyed) must grant a conservation easement (to the County, state or federal agencies, or land trusts or other tax exempt organizations) which restricts the use of the property to agriculture or forest management uses. The only viable market for the purchase of development rights is in receiving properties, i.e., the County is not in the market to purchase development rights. While contributing to the rural character and the preservation of open space, the TDR program allows some additional densities in the receiving properties. The Comprehensive Plan recommends use of the transfer of development rights program to protect ground water resources:

"Planning efforts should be supported which seek to acquire development rights on agricultural or forest lands. These lands also serve as watersheds for recharge of potable water supplies. Development rights or easements may be acquired by land banking or other

techniques which will preserve these natural resources" (II-16).

The TDR program, though scantily used in the past, is becoming more popular. Several applications involving the use of TDR's are in process in the Planning Department.

The recent passage of the Open Space Real Estate Excise Tax (REET) Act (SSB 6639) grants local authorities the ability to collect excise taxes on real estate sales. Monies collected from these taxes are to be used exclusively for the acquisition and maintenance of conservation areas (including "aquifer recharge areas"). The tax must be approved by a majority of voters of the County. On June 25, 1990, the Board of Island County Commissioners directed the Prosecuting Attorney to prepare such a ballot measure (Proposition 21) to go before the voters in November, 1990. Also under BICC direction, Planning Department staff have prepared an Administration Plan for the program, now titled "The Real Estate Environmental Endowment" (TREE) plan. Proposition 21 failed, however, at the polls on November 6, 1990. The TREE tax can be reconsidered as a ballot measure at later election dates.

The Open Space Taxation Program (Chapter 84.34 RCW) provides substantial tax penalties for changing uses on lands classified as "farm and agriculture land", "timber land", or "open space land" which, in their present use, would "protect streams or water supply", among other functions (Chapter 84.34.020 RCW). In order to minimize property taxes, owners of such lands must register them with the local assessor's office. This program provides incentives, in the form of reduced taxes and threat of substantial penalty (20% of difference between open space tax rates and normal rates, on top of the tax itself), to voluntarily keep the land in one of the open space classifications. This program successfully provides incentives to keep lands in uses which are beneficial to ground water in Island County, and is consistent with ground water management goals.

Chapter 84.34.230 RCW allows counties to levy a property tax called a "conservation futures tax", not to exceed 6 1/4 cents per thousand dollars, which may be used to purchase lands or to acquire development rights off these lands. Such a program could contribute to protection of ground water in Island County.

Other efforts are underway which contribute to recharge protection through the preservation of open lands. For example, the Whidbey-Camano Land Trust currently holds over \$1.5 million in conservation easements in Island County.

**Suggested Strategies:**

**Strategy 1:**

Consider levying the conservation futures tax in Island County.

**Strategy 2:**

Take no action.

**Evaluation of Strategies:**

**Strategy 1:**

The conservation futures tax is consistent with ground water management goals, especially the protection of recharge. Not all open space preserved under such a program may benefit ground water, however. The conservation futures program is not specifically designed to protect recharge area. Any open space which could potentially serve as a recharge area is generally considered to benefit ground water, however.

Property taxes are never popular. Careful evaluation should be given to implementing the conservation futures tax as part of the GWMP. Including a tax in the GWMP recommended program could significantly alter the way the public views the GWMP. Strategy 1 is thus put in a form which merely requests that the Board of Island County Commissioners consider the tax, as opposed to an assertive recommendation that the Board implement the tax.

**Environmental Impacts:** Implementation of the Conservation Futures Tax could have adverse economic impact on property owners. Such action, however, would serve to maintain environmental quality by preserving wildlife habitat, maintaining aesthetic quality, and keeping potential recharge areas intact.

**Strategy 2:**

Taking the no-action strategy would eliminate concerns over economic impact to Island County landowners. Development interests may view the conservation tax as a threat to their economic goals as it reduces development value of lands.

As mentioned previously, existing programs provide some,

albeit limited, protection of resource lands. Taking the no-action strategy would not detract from these efforts.

Environmental Impacts: Adverse environmental impacts could occur as a result of taking the no-action strategy. Though existing programs do provide some protection of lands of value to ground water management, lack of additional land conservation support could allow the removal of lands from uses beneficial to preservation of natural resources.

**Recommended Strategy:** Strategy 1 is recommended; implementation of the conservation futures tax in Island County should be considered.

**References:**

Harbour, Rob. 1990. Personal communication.

ICC 17.02. Island County Zoning Ordinance.

Island County Planning Department, 1990. The Real Estate Environmental Endowment (TREE) Administration Plan.

Island County Planning Department, 1977. Island County Comprehensive Plan: Planning Policy, Phase II. (revised 1984).

National Park Service, 1980. Comprehensive Plan for Ebey's Landing National Historic Reserve, Washington.

RCW 84.34 Open Space, Agricultural, and Timber Lands -Current Use Assessment - Conservation Futures.

SSB 6639 - Washington Laws, 1990 1st Ex. Session. Real Estate Excise Tax - Use to Acquire Local Conservation Areas Authorized.

ISLAND COUNTY  
GROUND WATER MANAGEMENT PROGRAM  
OPTION PAPER #18

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**Title:** Pollution Source Controls

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**Problem Statement:** Agriculture is a significant land use in Island County. In addition, limited industrial land uses are permitted. Improper agricultural and waste disposal practices could adversely impact ground water quality.

**Objective:** Establish pollution source controls, or Best Management Practices (BMPs), to provide guidance for the minimum essential action or treatment to solve, prevent, or reduce water pollution from a specific activity or facility.

**Existing Policies and Programs:** Ground water contamination may result from a variety of pollution sources caused by a wide array of human activities. Types and concentrations of contaminants include nitrates from septic systems, industrial solvents, and others. Pollution sources may be nonpoint sources, such as agriculture, pesticide applications, and seawater intrusion, or point sources, such as leaky underground storage tanks. Each pollution source is amenable to different regulatory controls under state or federal law (Jaffe and DiVino, 1987).

Pursuant to the Growth Management Act (SHB 2929, Sec. 7), land use elements of comprehensive plans should provide for protection of the quantity and quality of ground water used for drinking water. The law also requires counties to take action "to mitigate discharges that pollute waters of the state, including Puget Sound or waters entering Puget Sound". The Island County Comprehensive Plan provides language to the effect that pollution of water resources should be avoided (p. II-15).

Ecology has developed ground water quality standards (WAC 173-200), which regulate activities which discharge pollutants to ground water, including ground water withdrawals. These standards were adopted in December 1990.

A number of County provisions relate to the control of point and nonpoint pollution sources. Land Development Standards (ICC 11.01) are intended to protect the public interest in management of ground water recharge, and indirectly address the potential threat to ground water pollution through recharge. Although recharge of stormwater into the ground is encouraged, County standards (ICC 11.01) prohibit the use of

recharge systems in industrialized areas where contamination of ground water is an increased risk. Sewage Waste Disposal regulations (ICC 8.07B) address discharge of effluent to ground water or to the ground surface, including specific system siting criteria and design and construction standards for on-site sewage systems. The Island County Hazardous Waste Plan deemphasises regulation and emphasizes education to promote proper waste handling and disposal. ICC 8.08 regulates solid waste and sludge handling in Island County to minimize the potential adverse impacts to ground water.

Washington State codes regulate specific land uses which may potentially threaten ground water supplies. WAC 173-304, Minimum Standards for Solid Waste Handling, requires landfill facilities to operate under minimum functional standards to prevent air, land and water pollution and WAC 173-303 outlines requirements for dangerous wastes.

The Island County Agriculture (AG) and Forestry Council has drafted guidelines for AG and Forestry Water Resources Management in Island County (Appendix K). Four main focuses are identified and are to be followed by farmers as well as local and State Government in order to maximize water resources in Island County. These focuses are:

1. Increasing Ground Water Resources
  - o Retention pond siting, design, and funding support
  - o Increasing soil moisture holding capacity
2. Resource Conservation
  - o Overhead sprinkler systems
  - o Drip irrigation systems
3. Drought strategies for agricultural irrigators
4. Water Quality Protection
  - o Well Head Protection
  - o Pesticide handling, storage, and use
  - o Nutrient Management
  - o Agricultural Producer Education

The USDA Soil Conservation Service and the Washington State University (WSU) Cooperative Extension office is actively encouraging the use of these practices. Many of the practices outlined in the proposed AG and Forestry guidelines are consistent with the goals of the GWMP, however, the main focus of this effort is on the agricultural community.

Pollution controls may include engineering specifications, BMPs, or performance standards. They can include the following standards:

- Facility siting criteria: These are usually applied to discreet physical locations where specific facilities are prohibited. These locations can include flood plains, steep slopes, or excessively permeable soils.
- Design and construction standards: These affect all new developments and older facilities only when repairs and/or updating are mandated. This would include site preparation measures to allow for a suitable location for a septic system drainfield.
- Substance control: This is a pollution source control which is designed to provide guidance for the handling, storage, and disposal of certain chemicals and petroleum based products which could adversely affect ground water resources.
- Permits and licenses: These can be used in several ways to aid in protecting ground water from contaminant sources. They provide for accurate record keeping, an avenue for communication and a means of increasing control over a given activity. Permits can provide incentive for individuals or facilities to avoid using certain pollutants and can have time limits or be revokable based on failure to comply.
- Fees: To cover the cost of permit administration, fees are usually imposed. Fee schedules may be based on only the administration cost or may include enforcement, monitoring, and facility improvements. The rate structure, therefore, can be an incentive or disincentive.
- Operational requirements: These requirements for pollution source controls can be very broad. They can include conditions of operation, such as limitations on the hours of operation, the rate or manner of pumping, or the number of hours a well is pumped. Maintenance provisions may include how often regular maintenance is performed and recording the conditions. Regular testing and calibration of values may be included in addition to regular testing by a governmental agency. Special training and education of employees may be necessary.

- o Long-term monitoring: Long-term monitoring is usually necessary for many types of pollution source control programs. This provides background levels of data which indicate pollution trends over time. Pollution source controls may need to be adjusted over time based on improvements or other changes. The GWMP Data Collection and Management Program establishes methodology to monitor water quality.
- o Public education: Education can often play a significant role in local government initiatives, for instance, encouraging safe disposal practices of household hazardous waste. Pollution controls can include the outright ban of certain chemicals, pesticides or activities. To aid in enforcement and in undertaking remedial actions to mitigate pollution, ongoing monitoring is usually a necessary accompaniment to control measures.

#### **Suggested Strategies:**

##### **Strategy 1:**

There are two main components to this strategy:

- A. Design specific criteria for review of potential ground water contamination associated with industrial or commercial activities, using criteria identified in the Ground Water Development Classification Matrix and additional criteria relating to the ground water contamination risks associated with these activities.
- B. Assist the USDA Soil Conservation Service and the WSU Cooperative Extension Office through Public Education, Conservation, and Technical Assistance Programs in encouraging the use of water resource practices outlined in the AG and Forestry guidelines.

##### **Strategy 2:**

Take no action.

#### **Evaluation of Strategies:**

##### **Strategy 1:**

In certain areas, pollution source controls may be preferred over other geographic controls such as Aquifer Protection Areas (RCW 36.36) or a Wellhead Protection Program. Pollution source controls may be more effective where the underlying geology is too complex to

allow easy delineation of sensitive areas, or where the entire ground water basin is underlain by highly permeable geologic formations.

In some areas, pollution source controls may be more applicable where resources or political support for comprehensive ground water management planning and regulation is lacking. Also, some communities may prefer to identify ground water pollution threats which need to be addressed immediately.

In many instances, a form of pollution source controls are already in place in the County. Some of the standards which are not presently in place will be addressed through GWMP proposed management strategies. Although regulations and recommendations may adequately reflect the level of ground water protection in the County, this should not prevent the investigation of additional ways to control and/or manage point and nonpoint pollution sources.

The GWMP Ground Water Development Classification Matrix (option paper #6) establishes criteria to be used to evaluate all new withdrawals which may potentially impact ground water quality and quantity. The matrix will allow the County to classify the relative impacts of a new well or withdrawal in one of three risk categories based on nine factors that can be estimated or measured from existing and site specific data. These criteria, in addition to information gathered through the Data Collection and Management Program (option paper #5), will assist in objectively and empirically determining the potential ground water contamination risks associated with a proposal. The factors used in the matrix can be regarded as performance standards which can be used prevent and mitigate ground water contamination from seawater intrusion.

The GWMP Education, Conservation, and Technical Assistance Programs encourage the use of specific ground water practices to minimize contamination and mitigate ground water pollution, especially contamination associated with seawater intrusion.

One area which needs to be addressed is the relationship between specific land uses and the associated ground water contamination potential, especially industrial and commercial land uses. Testing the relationship between land use and ground water quality requires accurate characterization of land use, hydrogeologic conditions, and ground water quality. Land use survey maps can be

used to identify the type of general activity to which areas of land are presently dedicated (Area Characterization, Exhibit III-1). Special evaluation criteria should be designed to address industrial and commercial land uses, which do not necessarily involve withdrawals, but which could potentially contaminate ground water, considering such factors as:

- o soil type (infiltration potential)
- o stratigraphy
- o hydrogeology (e.g. the presence of a confined or unconfined aquifer, ground water flow direction)
- o use or presence of potential contaminants
- o number of wells in vicinity

If a proposed or existing industrial use is found above an unconfined aquifer and in an area which is determined critical to aquifer recharge (high susceptibility to contamination; see option paper #12), special mitigating procedures to lessen the potential for contamination should be required or an alternate site should be considered. Where applicable, information gathered through the Ground Water Development Classification Matrix should be used to supplement the evaluation of potential risks associated with industrial and commercial land uses.

Environmental Impacts: No direct adverse environmental impacts would be associated with the implementation of this strategy. Pollution source controls are designed to prevent adverse environmental impacts associated with contamination of ground water. Adverse economic impacts to agriculture and industry may result if individual development is halted as the result of regulatory controls.

#### Strategy 2:

Presently, state and local regulations provide specific pollution controls in the County. WAC 173-303 and WAC 173-304 outline requirements for dangerous waste and solid waste handling facilities and transport. The AG and Forestry guidelines relating to water resources, if used extensively, will help provide protection of ground water resources. WAC 173-200, the Ground Water Quality Standards, should provide additional protection of ground water for those land use activities requiring permits under the standards.

While these existing policies and codes do provide a certain level of protection, the possibility exists that

some potentially polluting activities may go unchecked under these current regulations. Changing land uses in Island County may increase the number of activities with ground water contamination potential. Lack of updated pollution source controls, whether they be regulatory or non-regulatory, may leave gaps in a comprehensive ground water protection effort.

Environmental Impacts: Failure to address potential ground water contamination associated with growth and changing land uses may result in adverse environmental impacts to public health, flora and fauna, and water quality and/or quantity.

Other elements of the GWMP, such as the Education and Technical Assistance Programs, if implemented fully, will provide some non-regulatory pollution controls.

Recommended Strategy: The GWAC recommends Strategy 1 for implementation. The development of specific performance standards for proposed land uses which potentially threaten ground water quality will assist the County in making land use decisions which effectively prevent potential ground water contamination. Criteria used in the Ground Water Development Classification Matrix should be used to supplement these standards. The GWMP Technical Assistance, Conservation, and Public Education Programs encourage and promote the use of the AG and Forestry pollution source controls to protect water resources in Island County (See Appendix K).

#### References:

Brown and Caldwell, Adolfson Associates, Sweet-Edwards/EMCON; Preliminary Draft Clover/Chambers Creek Ground Water Advisory Committee, Tacoma-Pierce County Health Department Lead Agency, March 1989.

SHB 2929, Growth Management Act, effective July 1, 1990.

ICC 11.01, Land Development Standards.

ICC 8.07B, Sewage Waste Disposal.

ICC 8.08, Solid Waste and Sludge.

Island County Agriculture/Forestry Council, 1990. Second Draft Outline for AG and Forestry Water Resources Management in Island County.

Island County Planning Department, 1977. Island County

Comprehensive Plan: Planning Policy, Phase II (revised 1984).

Jaffe, Martin and DiNovo, Frank. Local Groundwater Protection, American Planning Association, Chicago, IL. 1987

Third Interim Report Island County Hazardous Waste Management Plan, March 1990.

WAC 173-200, Ground Water Quality Standards.

WAC 173-303, Dangerous Waste Regulations.

WAC 173-304, Minimum Functional Standards for Solid Waste Handling.

ISLAND COUNTY  
GROUND WATER MANAGEMENT PROGRAM  
OPTION PAPER #19

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**Title:** Coordination Program

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**Problem Statement:** A complex issue in protecting Island County ground water is the existence of many overlaying and partially protecting mechanisms at the local, state, and federal levels. Effective use of all existing policies and program mechanisms has been difficult due to their complexity and due to funding constraints.

**Objective:** The Coordination Program is designed to:

1. Define responsibilities and capabilities of all local, state, and federal agencies in protecting and managing ground water resources in Island County;
2. Ensure that planning efforts in the County which may impact ground water quality, quantity, or recharge such as the Solid Waste Plan, the Coordinated Water System Plan, and watershed management programs are coordinated with the Ground Water Management Program;
3. Ensure that Island County ground water management issues are addressed and considered during the Department of Ecology's (Ecology) efforts to develop:
  - o A Seawater Intrusion Policy (Seawater Intrusion Task Force);
  - o A Well Identification and Well Abandonment Program (Well Identification Task Force);
4. Support the implementation of a Memorandum of Understanding with Ecology regarding water resource management responsibilities.
5. Track the results of the continuing studies taking place on NAS Whidbey Island.

**Existing Policies and Programs:** A variety of federal programs address many aspects of the ground water pollution problems. However, ground water protection remains a relatively new undertaking for many states and localities. A variety of federal, state and local codes are being implemented independently by different agencies. Many of the ground water protection rules and procedures which exist

demand sophisticated and experienced practitioners to ensure that these are used most effectively. Also contributing to the complexity is the insufficient information available about ground water and its contaminants.

**Suggested Strategies:**

**Strategy 1:**

Implement a program in Island County to continue and expand coordination with federal, state, and local agencies participating in ground water protection.

**Strategy 2:**

Take no action.

**Evaluation of Strategies:**

**Strategy 1:**

The Coordination Program will involve the dedication of water resources staff to following ongoing developments in the area of ground water management, whether it be with local, state, or federal agencies. Staff will also be responsible for actively participating in the development of programs, policies and ordinances which would directly affect local ground water management efforts.

Environmental Impacts: No adverse environmental impacts would result with implementation of this program.

**Strategy 2:**

The absence of coordination among the various agencies could result in gaps in ground water management efforts, the duplication of efforts, and the misallocation of resources which otherwise would potentially benefit ground water management in Island County.

Environmental Impacts: Adverse environmental impacts related to water resources and public health may result from the implementation of this strategy. Ground water quality and quantity issues may not be efficiently and effectively addressed to adequately ensure ground water protection for present and future users.

**Recommended Strategy:** Strategy 1 is recommended; County staff should continue to pursue coordination activities with the various local, state, and federal agencies to

assure consistency with local needs to protect ground water resources.

**References:**

Economic and Engineering Services, Inc., 1990, Island County Ground Water Management Plan Policy Analysis.

ICC 8.09, Public Water Source and Supply, September 1990.

RCW 36.36, Aquifer Protection Areas.

State of Washington Department of Health and Island County Health Department, 1989, Salt Water Intrusion Policy for Public Water Systems.

WAC 173-200, Ground Water Quality Standards, in draft form.

WAC 248-54, State Board of Health, Drinking Water Regulations, Revised September 1989.

WAC 248-96, On-Site Sewage Systems, Areas of Special Concern, draft revisions.

ISLAND COUNTY  
GROUND WATER MANAGEMENT PROGRAM  
OPTION PAPER #20

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**Title:** Memorandum of Understanding

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**Problem Statement:** The unique ground water problems of Island County are in many instances not adequately addressed in Department of Ecology (Ecology) regulations. Prior to December 1990, a formal agreement between Ecology and Island County regarding coordination, monitoring, and the allocation of water rights in Island County did not exist.

**Objective:** Develop a Memorandum of Understanding (MOU) between Island County and Ecology which outlines:

- o coordination and communication between agencies to promote efficiency in water resources management;
- o test criteria to determine ground water availability and sustainable yield to fulfill the decision making requirements of each agency; and,
- o standards for water quality and quantity monitoring and reporting, including metering.

**Existing Policies and Programs:** In the preliminary stages of the development of the GWMP, the GWAC expressed the need for the County to establish a formal understanding with Ecology on the process of issuing water rights in Island County. An MOU document was drafted with cooperation between the County Health and Planning Departments and Ecology Water Resources staff and was approved on December 10, 1990.

The County has developed a number of water resource management tools to responsibly manage the resource. The Coordinated Water System Plan encourages new users to hook up to existing water systems. The Island County Health Department subdivision code (ICC 8.09, Potable Water Source and Supply) requires in most instances a source and system approval prior to subdivision approval. This code requires evidence of an adequate water supply prior to issuance of a building permit to any building requiring potable water. In addition "adequate provisions" of ground water availability is required for most subdivisions. A Salt Water Intrusion Policy developed by County and State Health Departments is presently being implemented.

**Suggested Strategies:**

Strategy 1:

There are two main components to this strategy:

- A. Establish a Memorandum of Understanding between Island County and Ecology.
- B. Encourage GWMP lead agency and ICHD participation in carrying out responsibilities outlined in the MOU implementation plan.

Strategy 2:

Take no action.

**Evaluation of Strategies:**

Strategy 1:

The first step in the development of the Island County/Ecology MOU was completed when the document was signed in December 1990 (see attachment to this option paper). Certain provisions of this document require definition and implementation. The ICHD and GWMP lead agency should carry out responsibilities outlined in the MOU.

The MOU outlines procedures to be followed by Island County and Ecology water resources staff to coordinate land use and water rights approval. RCW 90.44, RCW 90.54, WAC 173-150, and WAC 173-54 outline regulations, policies and procedures to determine if a water right should be issued. Ecology's role is to assure there is sufficient water available for new wells and guarantee neighbors their wells will not be adversely impacted. In the past it has not always been possible to adequately assure adequate water will be available and that neighbors will not be adversely impacted.

The MOU should improve coordination and sharing of information among the responsible agencies before and after a water right has been issued. Metering requirements will be imposed by both the County and the Ecology. In addition, the MOU identifies agency responsibilities in delineating methods for regularly monitoring withdrawals and water quality, and specific reporting requirements. An aquifer protocol will be developed to assist in minimizing the seawater intrusion potential of a well and assure adequate potable water for existing and future uses.

Ecology is preparing a map which locates all existing water rights. In addition, Ecology is analyzing existing hydrogeologic data to locate areas requiring special ground water protection and areas where additional ground water is available for additional withdrawals. A State seawater intrusion policy and well identification system are being developed.

Environmental Impacts: No immediate adverse environmental impacts are associated with the development of the proposed MOU between Island County and Ecology. This agreement will encourage the optimal use of ground water data for ground water development decisions. The proposed MOU will be a valuable tool in assisting the County in assuring ground water protection.

Strategy 2:

The absence of a MOU between Island County and Ecology could result in ground water development decisions which do not adequately reflect the actual ground water characteristics of an area. As the result, existing and future developments may suffer the consequences of ground water quality deterioration and water shortages.

Environmental Impacts: Adverse environmental impacts may be associated with Strategy 2. The existing water rights issuance process may promote ground water development decisions which fail to address specific hydrologic characteristics of an area. Existing and potential ground water development could be significantly impacted if specific ground water availability criteria is not requested and coordinated among the agencies.

**Recommended Strategy:** The GWAC recommends Strategy 1 for implementation. The intent of the MOU between the County and Ecology regarding water resource management supports the goals identified in the GWMP. MOU coordination and implementation efforts between the GWMP lead agency, ICHD and Ecology Water Resources staff should continue. In addition, the GWAC recommends that DOH become a party to the MOU to ensure complete coordination of water resources management at both the State and local levels.

**References:**

RCW 90.44, Regulation of Public Ground Waters.

RCW 90.54, Water Resources Act of 1971.

WAC 173-150, Protection of Withdrawal Facilities Associated with Ground Water Rights.

WAC 173-154, Protection of Upper Aquifer Zones.

MEMORANDUM OF UNDERSTANDING  
BETWEEN  
WASHINGTON STATE DEPARTMENT OF ECOLOGY,  
WATER RESOURCES PROGRAM  
& ISLAND COUNTY, WASHINGTON

Related to: Coordination of Water Resource Planning,  
Management, and Permitting Activities in  
Island County

I. Agency Roles & Authority

Through its Water Resources Program, the Department of Ecology is responsible for the protection, management, and appropriation of the state's water resources. Ecology's role includes administration of water rights, resource conservation and protection, policy development, administration of the Ground Water Management Area Program, regulation of the well drilling industry, and development and enforcement of well construction standards.

Island County Health Department has responsibility for small water system approvals, sewage system approvals, and enforcement of health standards for drinking water. Responsibility for administration of land use planning and permitting, including the issuance of subdivision approvals, rests with the Island County Planning Department.

The growing concern about water quantity and quality in Island County indicates the need for this memorandum of understanding so that state and local coordination in the realms of water resource planning and management can be strengthened. Consideration of the vital and interrelated responsibilities of state and local government agencies provides a clear basis and implicit authority to enter into this memorandum of understanding. This agreement is intended to complement the Island County Ground Water Management Area Plan.

II. Purposes of Memorandum

The purposes of this memorandum of understanding are the following:

- o to prevent water resource degradation or over appropriation

## Memorandum of Understanding

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- o to foster state and local government efficiency with respect to water resource management through information sharing, development and implementation of consistent policies and requirements, and division of responsibilities
- o to bolster the technical information base upon which government decisions are made
- o to provide a process for effectively managing Ecology's backlog of water right applications
- o to develop a permit review procedure which provides certainty to the public
- o to enhance public information about the status of water rights administration
- o to aggressively pursue water resource conservation
- o to resolve issues, to the extent possible, at a staff-to-staff level

### III. Coordination and Cooperation with Other Agencies

The development of an implementation plan may require the involvement of agencies not party to this agreement. Whenever Ecology or Island County requests, due to statutory requirements or other considerations, that another agency be consulted during the development of implementing activities, that agency shall be notified early in the planning process and their participation shall be requested. This provision applies principally to the Washington Department of Health and incorporated cities and towns within Island County.

### IV. Dispute Resolution/Appeal Process

The intent of this memorandum of understanding is to foster a cooperative working environment between state and local levels of government. If, however, in the execution of this document, difference(s) of opinion cannot be resolved to the satisfaction of the involved agency staff, supervisors or managers of the respective agencies will be consulted to clarify issues and reconsider positions. After such consultation, agency staff will resume discussions in an attempt to reach consensus.

If staff-to-staff discussions reach an impasse, the issue will be elevated to respective agency managers and a meeting will be scheduled to renew dialogue and resolve the issue(s).

Signatories to this memorandum will be advised in the event that resolution cannot be achieved. For instance, there may be unclear statutory authority, conflicting policies, insufficient administrative authority, or matters which are

## Memorandum of Understanding

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beyond the scope of this memorandum. In such cases, specific recommendations for change will be developed and submitted to appropriate governmental bodies for consideration.

### V. Effective Date & Special Conditions

This document shall become effective upon the date of signature by all parties and may be terminated by either party, provided 30 days written notice is given. The document may be amended at any time by written consent of the two parties.

This agreement is not intended to expand upon existing law, or otherwise alter the legal powers and responsibilities of the signatories.

### VI. Understandings

This memorandum is based upon the following understandings:

1. Ground water is a finite and precious resource in Island County. Therefore, government agencies must coordinate their decisions to prevent resource degradation or over appropriation.
2. Although several efforts have been made to understand the hydrogeology of Island County, existing data and analyses are insufficient in some geographic areas to make reliable estimates of ground water availability.
3. Elevated chloride levels in ground water are indicative that seawater intrusion is already occurring in certain areas of Island County. Additional withdrawals of ground water and reduction of recharge may cause intrusion in other areas.
4. Prevention of water quality and quantity problems is preferable to solving the problems after they develop, for remedial actions are typically expensive and may have limited effect.
5. Both the Department of Ecology and Island County have specific roles in developing and implementing rational policies for water use. Given the limited fiscal resources available to state and local government, communication and coordination are critical to prevent duplication of effort or conflicting activities.

# Memorandum of Understanding

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6. Water conservation must be aggressively promoted to increase the availability of developed sources and to minimize resource degradation.
7. The current 5,000 gallon per day exemption for water rights applications under the Ground Water Code (90.44 RCW) poses difficulties for state and local agencies which are responsible for managing water resources and protecting public health in Island County.

## VII. Specific Implementing Agreements

This section identifies specific activities and tasks to which the Department of Ecology and Island County have hereby committed. These are classified and designated accordingly:

Designation \*

Short-term activities .....	(S)
(to be accomplished within a year)	
Long-term activities .....	(L)
(beyond a one-year timeframe)	
Ongoing activities .....	(O)

### A. Department of Ecology

Under this memorandum, the Department of Ecology is committed to the following:

1. Administration of the water rights program in accordance with applicable laws and regulations. Water Resources Program will issue permits consistent with Ecology's ground water quality standards (Chapter 173-200 WAC). Water right applications will be considered in order of priority date. (O) However, Ecology may choose to evaluate these on an area-by-area basis in order to alleviate the backlog of water right applications. (S) Ecology may issue temporary permits in cases where there are immediate public health and/or safety concerns. (O)
2. Notifying Island County of all water right applications. Such applications shall be reviewed pursuant to WAC 197-11-305 (SEPA Rules-Categorical Exemptions) to determine whether the application is categorically exempt. Ecology shall seek and consider

\* Generally, designations appear in parentheses following each provision. For multifaceted provisions, designations appear after each component.

Memorandum of Understanding

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comments by the county regarding the disposition of pending applications. (O)

3. Pursuing voluntary relinquishment of unused water rights in Island County in cooperation with the county. (O)
4. Requiring flow meters for all new permitted wells in Island County. (O) Ecology will also require flow meters on existing wells, as necessary, to improve upon the understanding of actual water use. (L) Data collected from these meters will be reported by well owners to Island County Health Department. (O)
5. Request water quality monitoring of certain wells which are located in areas of known or suspected water quality degradation. A variety of parameters may be monitored, including those which have been identified in Ecology's Ground Water Quality Standards (Chapter 173-200 WAC). Well owners will be responsible for obtaining samples and paying the full cost of water quality tests. Ecology will specify that tests must be performed by a laboratory which has Department of Health or Department of Ecology certification, depending upon the type of analyses required. Well owners will be responsible for sending data to Island County Health Department. (L)
6. Preparing a map which locates all existing water rights by point of withdrawal, including instantaneous (Q<sub>i</sub>) and annual (Q<sub>a</sub>) quantities. (S/O)
7. Analyzing existing hydrogeologic data and advising the county of areas where additional ground water withdrawals will cause impairment of existing rights or resource degradation. Ecology will also advise on areas where water does appear available for appropriation and areas where the availability is unknown. (S/O)
8. Developing and adopting a seawater intrusion policy to guide water rights administration in areas where a seawater intrusion risk has been identified. (S)
9. Developing a well identification system to permit data correlation and to provide positive identification of wells in the field. Begin tagging all new wells. (S) Implement well identification program for existing wells (fiscal resources permitting). (L)
10. Producing public education materials on seawater intrusion. (S)

Memorandum of Understanding

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11. Supporting funding requests for Island County data management with the understanding that data reporting will be conducted in accordance with the Department of Ecology's Data Reporting Manual for the Ground Water Management Area Program. (O)

B. Island County

Under this memorandum, Island County is committed to the following:

1. Administering its building permit, land use, and health-related regulatory programs in accordance with applicable laws, regulations and covenants, including Potable Water Source and Supply (8.09 ICC), the Island County Coordinated Water System Plan, and the Ground Water Management Area Plan. (O)
2. Serving as the manager for ground water data collected from selected wells within Island County. Access to data will be provided to the Department of Ecology. (O)
3. Requiring flow meters for all new potable water supply wells in Island County prior to source approval. (O)
4. Reporting annually to Ecology on the implementation of the Ground Water Management Plan. Island County shall also provide Ecology with any reports or data developed subsequent to this memorandum which is pertinent to the question of ground water availability. (O)
5. Working with Ecology to pursue voluntary water right relinquishments. (O)
6. Advising applicants, as appropriate, that an Ecology "Application for Change of Water Right" is required (e.g. when adding a well to an existing water system or intertying systems). (O)
7. Advising applicants for well site inspection that an Ecology permit is required before drilling a non-exempt well. (O)

C. Department of Ecology and Island County

Under this memorandum, the Department of Ecology and Island County are jointly committed to the following:

1. Developing a plan for implementation of this memorandum. (S)

Memorandum of Understanding

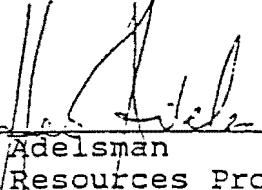
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2. Providing information to the public about steps in the water rights and building permit processes. (S)
3. Vigorously pursuing water conservation efforts in Island County through public education, plans, ordinances, and permit provisos. (O)
4. Meeting at least monthly to review and discuss water-related planning and permitting activities in Island County, including water rights and pending subdivisions and developments. (O)
5. Working cooperatively to reconcile differences in health and water resource requirements as pertaining to instantaneous demand and annual quantity standards. (S)
6. Developing an aquifer test protocol for use in Island County. (S)
7. Evaluating the progress of this agreement after one year and preparing a report summarizing the accomplishments. (S) Reviewing this memorandum periodically and revising it as necessary. (O)

Memorandum of Understanding

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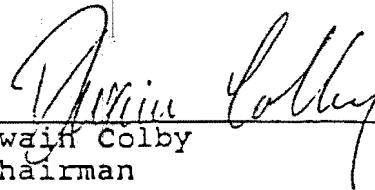
STATE OF WASHINGTON  
DEPARTMENT OF ECOLOGY

  
Hedia Adelsman  
Water Resources Program Mgr.

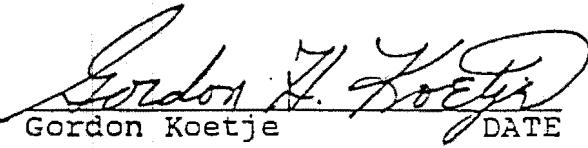
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ISLAND COUNTY COMMISSIONERS

  
Dwain Colby  
Chairman

DATE

  
Gordon Koetje  
Member

DATE

  
C.R. "Dick" Caldwell  
Member

DATE

## SECTION VI

### PREFERRED PROGRAM AND IMPLEMENTATION PLAN

This section recapitulates those ground water management options recommended for implementation, integrates them into a single preferred program, and details implementation needs for the preferred program.

The GWMP preferred program consists of fourteen management strategies recommended for immediate implementation. The preferred program consists of five programs which will function over the near term. These ongoing programs include Public Education, Technical Assistance, Conservation, Data Collection and Management, and Coordination with other entities. These programs are shown below as management strategies 1, 2, 3, 4, and 13, respectively. Additionally, nine non-program management strategies are recommended for implementation. These are shown below as management strategies 5 through 12 and 14. Six other management strategies have been deferred and are referred to "ongoing options". The ongoing options are discussed in the Coordination Program (option paper #19, p. V-121).

The nine non-program management strategies recommended in the preferred program generally represent three broad categories of ground water protection: water quality pollution control, water quantity, and ground water recharge. The preferred strategies are: ensuring ground water quality is not contaminated by activities associated with certain land uses, maximizing the use of accessible ground water information to evaluate ground water availability in land use decisions, and designating and protecting aquifer recharge areas. The combined results of implementing these strategies will assist the County in making land use decisions which are compatible with the ground water characteristics of an area.

#### A. PREFERRED PROGRAM SUMMARY

The following management strategies are recommended for implementation based on GWAC evaluations. Details of these evaluations are presented in the Alternatives, Section V. Also in Section V is information on each strategy's legislative authority and rationale for inclusion in the preferred program.

The preferred program strategies are listed in the same order as they appear in Section V, and are presented under the broad categories as shown in the Table of Contents. The page number following the preferred program element indicates

where details of implementation can be found within this section.

#### Public Involvement and Assistance

1. **Education Program (VI-5)** - This is a comprehensive program to elevate awareness of water resource issues, and to support the Conservation Program, the Data Collection and Management Program, and other ground water protection efforts.
2. **Technical Assistance Program (VI-10)** - This program recommends that staff and resources be allocated to providing water system managers, private well owners, and others with technical assistance relating to improving the management of water resources.

#### Conservation

3. **Conservation Program (VI-15)** - This program encourages County-wide reduction of current and future water consumption.

#### Ground Water Monitoring and Evaluation

4. **Data Collection and Management Program (VI-40)** - This program recommends data collection and management to provide support to land use decisions and ground water protection efforts.

5. **Ground Water Development Classification Matrix (VI-53)** - This classification tool provides an objective set of criteria for assessing relative ground water impacts associated with additional withdrawals and with the development of new wells in Island County. The matrix will assist the County in making land use decisions which adequately protect ground water resources based on available ground water related data.

6. **Ground Water Availability Criteria (VI-55)** - Specific changes are recommended to ICC 8.09 Potable Water Source and Supply to strengthen its well testing requirements for ensuring adequate ground water supply to individual water systems and all subdivisions. The development and possible adoption of the Ground Water Development Classification Matrix should be coordinated with the requirements specified in ICC 8.09.

#### Ground Water Recharge

7. **Land Development Standards Revisions (VI-56)** - The

proposed revisions identify recharge as the preferred method of drainage control, and require consideration of recharge potential in all drainage plans, including all developments and County road construction.

#### **Ground Water Protection Designations and Programs**

**8. Environmentally Sensitive Area designation (VI-57)** - This designation provides for additional ground water protection with the removal of categorical exemptions under SEPA which are inappropriate to effective ground water management. Specific criteria are recommended for environmental review in Island County.

**9. Critical Area Designation (VI-58)** - Under the Growth Management Act (GMA), Island County is required to designate critical recharge areas; land uses or development incompatible with a critical area are to be precluded by regulation. Island County should be designated a critical recharge area. Recharge potential should be assessed and classified throughout the County according to the susceptibility of ground water to contamination.

**10. Areas of Special Concern (VI-60)** - This designation allows the Health Officer to adopt specific requirements to be met by on-site sewage systems located in areas of the County requiring special ground water protection. Additional ground water information will assist in defining these areas.

#### **Other**

**11. Non-regulatory Land Conservation (VI-61)** - This option recommends that the BICC consider levying the conservation futures tax pursuant to RCW 84.34 in Island County to provide funds to purchase, or otherwise protect from development, lands which are important to ground water recharge.

**12. Pollution Source Controls (VI-62)** - This option recommends development and/or adoption of specific criteria to prevent ground water contamination from agricultural, industrial or commercial land use activities.

**13. Coordination Program (VI-64)** - This is a program which recommends that County staff continue to track and participate in all local, state, and federal activities relating to water resources management.

**14. Memorandum of Understanding (MOU) (VI-76)** - This is a formal agreement between Island County and the Department of Ecology to improve the processing of water right applications in Island County. It involves cooperative activities between

the affected agencies, the exchange of information, and regular staff meetings to discuss pending applications.

#### B. FUTURE ORGANIZATION

The Island County Public Works Department was established in 1973 pursuant to ICC 13.01. To date, the Public Works Department has received limited funding and staffing, and ICC 13.01 has not been fully implemented. The County Engineer is currently the Public Works Department director.

Renewed interest in the establishment of a fully staffed and functioning Public Works Department has arisen following recent discussions between the BICC and the directors of the Planning, Health, and Engineering Departments. The CWSP recommends (p. I-22) that a Public Works Department be responsible for several elements of that plan's implementation. It is further recommended here that a division of the Public Works Department be formed to serve as the core of staff responsible for overseeing the management and implementation of the GWMP (see County Responsibilities, below; and Table VI-3).

The GWAC suggests that such a concentration of water resource staff is necessary for the most economic and effective implementation and management of the CWSP and the GWMP. Recommendations for specific activities, staffing, and budget for a Public Works Department water resource division are provided in this section.

In the following implementation discussion, responsibilities are assigned within the existing County government structure. Where it is intended that specific activities be delegated to the Public Works Department, once formed, it is clearly indicated.

## C. PREFERRED PROGRAM IMPLEMENTATION PLAN

### 1. Education Program (also see option paper #1, p. V-5)

Several elements of a proposed public information and education program are outlined below.

#### a. Water purveyor information program

Water purveyors play a crucial role in ground water management, and should be focus of a concentrated education effort. Regular distribution of updated information to water purveyors should increase awareness of current problems, developing technologies, management strategies, and ground water legislation. Regular newsletters and packets of material will be distributed quarterly to each purveyor in the County. Information will be tailored to system size; one packet will be designed for Class 1 and 2 water systems, and another for Class 3 and 4 water systems. Information will specifically address issues pertinent to purveyors.

Because of the costs of repeated mailings, other methods will be used to provide information to individual ground water users (see below).

This element should be closely tied with the Technical Assistance Program (C.2, below). Materials prepared pursuant to the Technical Assistance Program should be used as educational tools in the water purveyor information mailings.

#### b. Quarterly press releases

Newspapers reach a much wider audience than other, costlier methods of disseminating information. Brief press releases, developed by staff and distributed on a quarterly basis, will help keep the public informed on progress and effectiveness of the GWMP, the latest on ground water issues, and practices they can use to help protect water resources.

Press release content could include, for example, information on:

- o changing resource management legislation, both locally and at the State level;
- o news on current ground water quality and quantity issues in Island County;

- o results of ongoing data collection and analysis;
- o hints on water conservation, water treatment, management of individual water systems, and other helpful technical information; and,
- o health issues related to water use practices.

Given probable staffing limitations, an alternative and effective means of reaching the public may be to retain a consultant, working under supervision of water resources staff, to prepare press releases and other public education materials.

Advertising space may be purchased as appropriate.

c. Newsletters

A mailing list and newsletter format will be developed as part of the interim education program. Further updates and distribution will require some additional resources. Contractor assistance may be required to handle graphics and printing to produce a high-quality, well-received product. Eventually, it is hoped that the County will become adequately staffed and equipped internally, moving away from dependence on outside contractors, such that a resource management brochure could be developed which conveys information on all aspects of the County programs - waste management, health department programs, ground water, and other pertinent information.

Different target groups should be identified, and separate newsletters developed as appropriate:

- o New private well owners should be made aware of Technical Assistance Program benefits (see C.2, below), and should be targeted for at least one mailing every 2 years. The well survey conducted as part of the Data Collection and Management Program (see Appendix J) will serve to identify existing private well owners.
- o Residents in areas with suspected or confirmed ground water problems should receive information particular to their situation at least once a year.
- o Brochures on conservation should be developed and provided to local jurisdictions and water districts, who in turn should distribute them to their customers. Other utilities, such as

electricity, telephone, and natural gas companies, should be asked to include the brochures in their mailings. The brochures should also be made available at libraries, banks, grocery stores, community centers, etc. These conservation newsletters should be updated every two years and distributed each summer. This element would necessarily be closely tied to the Conservation Program (C.3, below).

The brochures or newsletters will be 3 to 4 pages long, and will be designed to transmit information in a easy-reading, attractive, and professional format. Actual numbers of brochures, categories of target audiences, and level of effort will depend on funding.

**d. Demonstration Project: Workshops**

An 18-month demonstration project should be initiated. A temporary, part-time staff member, with assistance from volunteers, should be committed to giving regular presentations to schools, homeowner's associations, water associations, civic groups, etc. These presentations will focus on current ground water topics (household hazardous waste, conservation, data collection, etc.), and will be tailored for a variety of specific audiences (school children, water purveyors, residents of salt water intrusion areas, etc). The program personnel should solicit invitations to speak, and presentations should be delivered at least monthly. Information from the Technical Assistance and Conservation Programs should be used as much of the basis of the speaking engagements (see C.2 and C.3, below).

A temporary (18 month) employee with experience in public relations should be hired. The person will work half-time for the duration of the demonstration project. Following this 18 month period, the program should be evaluated and considered for expansion or continuation.

**Implementation Plan**

**Responsible agencies:** The Water Resources Planner in the Planning Department will be responsible for most elements of the Education Program (see Table VI-3 and Table VI-6). Administrative assistance located in the Planning Department will also be necessary. The temporary employee responsible for the Demonstration Workshop Project will also be housed in the Planning Department. The Health Department should continue

current efforts in Public Education, in coordination with Planning Department staff. Existing Health Department staff should assist with determining content of distribution materials.

The Public Works Department, once fully staffed and operational, will be responsible for ongoing operation of Education Program. The CWSP also identifies the Public Works Department as the appropriate office to conduct ground water education activities.

Schedule: The Education Program should receive high priority in GWMP implementation, and should begin immediately following GWMP approval, given availability of staff and funding (see Table VI-4).

Because immediate implementation of all of the above activities is unrealistic, it is recommended that the Demonstration Workshop project (d, above) be implemented approximately one year after GWMP approval (see Table VI-4). A Centennial Clean Water Fund grant application for funding of the Workshop Demonstration Project should be submitted during the 1992 application cycle.

#### Implementation needs

Personnel: Additional Health Department time will be required. Technical staff will be required to select and prepare materials for distribution; additional administrative staff to assist with preparation and distribution of materials will also be required. The Workshop Demonstration Project is proposed as a grant-funded program, and will require one half-time employee (see Table VI-6).

Operations/Administration: Costs of mailing and other distribution, purchase of educational and technical literature, printing and copies, etc., may be significant. Specific numbers of brochures will be decided upon after actual funding levels have been established. If advertising space is purchased, or a public education contractor retained, additional costs will result. Should newsletter production be contracted out, Planning Department staff will administer the contract, make decisions on newsletter content, and will arrange for distribution of the newsletters. Additional staff and equipment would be required should County take over preparation and distribution of newsletter. Costs would vary depending on extent of contractor assistance. See Table VI-6 for

details of implementation costs of the Education Program.

Materials/Equipment: A personal computer with word processing and desktop publishing software, and quality printing hardware, would be necessary for this element of the Education Program, and will facilitate other preferred program elements listed below. For large-scale printing jobs, local printers may be used as needed. Some additional materials/equipment costs will be incurred with in-house production of a newsletter (see Table VI-6).

The Education Program is closely related to, and should be linked in implementation with, the Technical Assistance and Conservation Programs (see C.2 and C.3, below, and option papers #2 and #3 in Section V). Additional public education activities are listed separately under the implementation plan for the Conservation Program.

Ideally, a single Island County public information office should be created and given the responsibility of disseminating current information on all aspects of the County. Such an operation could be run more efficiently, with better coordination, and with less cost than separate programs in each department. The Island County Coordinated Water System Plan recommends forming a Public Works Department, and suggests it be tasked, among other duties, with developing long-term educational programs. This recommendation is reinforced in the Ground Water Management Program.

These functions could be handled most efficiently under a single administration. It is recommended that operation and administration of the Education Program be shifted to the Public Works Department once fully staffed.

2. Technical Assistance Program (also see option paper #2, p. V-9)

Health Department staff presently committed to technical assistance functions should continue these functions. Additional resources need to be allocated, however, to expand existing services to the level recommended here. Some services may be delegated to Planning Department (and later, Public Works Department) staff; others should remain in the Health Department.

One important element of the Technical Assistance Program is an outreach effort to include owners of single home domestic wells. Such an effort will require significant staff time and mailing costs. These efforts, however, could be most efficiently combined with elements of the Education and Data Collection and Management Programs (see C.1 and C.5).

Ideally, a Technical Assistance Program offering a "show them how" approach, combined with an educational "tell them how" approach, will work to educate and train Island County residents. With implementation of this program, staff members will be devoted to conducting on-site visits to persons requesting assistance, and to working closely with the WSU Cooperative Extension Agent, with the SCS agents, and with State staff. County staff will explore funding, technical, and resource solutions for County residents in need.

It is recommended that the following Technical Assistance Program elements be expanded or developed. Additional technical assistance activities are listed under the Conservation Program (C.3) implementation plan. Actual level of implementation will depend on funding allocated to the program.

a. Water Conservation Assistance

In conjunction with the Conservation Program, staff and resources will be made available to assist individuals and water systems in identifying those water-use efficiency practices most suitable to their specific needs. Site visits will be made as appropriate to accurately determine these needs. See the Conservation Program implementation plan for additional details of this element of technical assistance.

b. Water System Management Assistance

Staff and resources will be available to assist water system managers with questions on expansion,

ground water shortages and contamination, and other regulatory and technical matters. In addition, technical seminars, similar to those conducted in the past by the Health Department, should be conducted at least annually. Similar workshops for owners of single home domestic wells would also be useful. Technical assistance in water system management will be provided in coordination with the Department of Health and other involved state agencies. Technical and educational materials will be sought from the Department of Health and other agencies, and distributed through the Water Purveyor Information element of the Education Program (C.1, above).

Written informational guidelines for adaptive approaches to managing water systems impacted by seawater intrusion could be made available to interested water system managers and individual well owners. These guidelines would suggest alternative approaches for mitigating seawater intrusion in areas prone to elevated chlorides and specific conductivity. Various management alternatives could be presented based on the availability of base data (i.e. well logs, development density, storage capability) and monitoring data (water quality and quantity). Depending on the specific needs of the system, certain design and operation alternatives could be recommended. These alternatives could include the implementation of one or more of the following:

1. Leak Detection Program
2. Conservation Program
3. Reduced pumping rate
4. Reduced pumping time
  - A. consecutive hours per day
  - B. total hours per day
5. Change of pumping time
6. Reduced water withdrawals
7. Alternating well operation
8. Screen wells at higher levels
9. Raise pump elevation
10. Plug lower portion of wells dug too deep
11. Increase storage capacity
12. Dig additional wells
13. Relocate wells further inland

**c. Water Resource Regulations**

With new awareness of the importance and fragility of water resources at both State and local levels, new regulations and policies are being created which may leave purveyors and others confused or unaware.

Technical Assistance staff will be able to respond to questions or concerns from persons seeking assistance in understanding the CWSP, GWMP, ICC 8.09, and new State regulations and policies, such as the Ground Water Quality Regulations (WAC 173-200) and the Memorandum of Understanding between Island County and Ecology. Currently, some technical assistance is provided by ICHD and is included here as an important element of a Technical Assistance Program. Existing technical assistance activities should be considered for expansion as appropriate. This function could also be carried out under the Purveyor Information and Press Release elements of the Education Program (C.2, above).

**d. Data Resources**

Individuals seeking assistance in understanding the state of ground water resources in Island County should benefit from the data collected and analyzed under the Data Collection and Management Program. Research requests will be accompanied with a reasonable fee to cover any significant staff time spent in researching the data or reproducing information. Current data base structure weaknesses will make this task difficult. Efforts are currently underway to improve the deficiencies in the data management system and to make stored information more accessible.

**e. Funding and Special Program Assistance**

With full implementation of the Technical Assistance Program, references and contact points will be maintained and made available to those seeking information on water district and other special district formation, Wellhead Protection Programs, Aquifer Protection Areas, the Drought Relief Program, other State and federal grants and loans, and other funding options.

**f. Water Resources Library**

Many of the above functions may be carried out on a self-help basis, where a central source of information is made available for persons to conduct their own research. As previously mentioned, staff may conduct additional research for an established fee. A library containing information on new water resource technologies, system management techniques, abstracts from pertinent studies, and a variety of water resource journals should be stocked, maintained, and updated by County staff. To minimize overlap, library functions

should be closely coordinated with State agencies, the SCS, and the WSU Cooperative Extension office. Current space limitations may prohibit the immediate formation of the Water Resources Library; solutions to this problem should be sought.

#### Implementation Plan

Responsible Agencies: Currently, ICHD environmental health specialists are the primary source of technical assistance. ICHD staff should continue current technical assistance activities, and will assist ICPD water resources staff in developing new activities and expanding existing ones. The Water Resources Planner and Hydrogeologist in the Planning Department will assist as appropriate (see Table VI-3). Additional administrative assistance would also be necessary to help satisfy requests for information. Assistance should also be solicited from the State Department of Health.

It is recommended that the Public Works Department take over these functions, once adequate staffing and funding are made available (see Table VI-3). This recommendation is also made in the CWSP.

Schedule: Assuming adequate funding, expansion of current efforts could begin immediately following GWMP approval with improvement of the literature mentioned above and initiating the development of the water resources library; contractor assistance in this area might be considered. The ICPD water resources staff will be responsible for initiating this program. Additional functions can begin upon establishment of a Public Works Department.

#### Implementation needs

Personnel: The implementation of this program will require some additional County staff time. Current Health Department, WSU Cooperative Extension, and Soil Conservation Service staff activities will be broadened with the assistance of Planning Department staff. Table VI-7 indicates the estimated level of staffing needed to implement this preferred program element.

Operations/Administration: Costs will be incurred with efforts to contact individual well owners; with ongoing education of staff, such as attendance at technical workshops; and with purchase and/or

preparation of additional technical materials to stock and maintain the water resource library. The use of an outside contractor might be considered for improving format, appearance, and readability of existing literature. These services can be linked with any required in the Education Program. Expanded on-site visits may increase transportation expenses. See Table VI-7 for detailed cost estimates of Technical Assistance Program implementation.

Materials/Equipment: Educational materials will be purchased or prepared. The Department of Health should be asked to provide or assist with preparation of these additional materials. Table VI-7 provides detailed cost estimates for Technical Assistance Program implementation.

### 3. Conservation Program (also see option paper #3, p. V-15)

This section serves as both an implementation plan for the County Conservation Program and as a guide for water purveyors, owners of individual water systems, and others interested in water conservation. Provided in this section are handy tips and technical information on conservation techniques and equipment, a directory of County conservation services, and a list of pertinent references for those seeking additional information. This entire section can thus be used as a handout for County residents seeking information on conservation.

The majority of public water systems in Island County have less than 100 services and no full-time staff. Water systems which meter at each connection, and which base water rates on actual use, are the rare exceptions in Island County. While there is much information available from other communities with successful conservation programs, many of these communities are urban, and the agencies implementing the conservation programs are often large municipal entities which act as purveyors, and customers are charged for actual use (via individual metering), rather than at a flat rate.

The most common and effective incentive in successful conservation programs is money saved. Thus, without this effective incentive, implementing a successful conservation program in Island County presents certain challenges and difficulties. Many users will experience economic benefit with use of conservation practices, but, in the absence of stringent regulation, it is hoped that other users will be motivated by individual willingness and desire to preserve a limited natural resource by using this resource wisely. As metered systems become more common in Island County, implementation of conservation measures should become easier.

Water conservation should be viewed as a crisis-aversion technique, rather than as a response to an immediate County-wide problem. In many communities, water conservation is a technique used to respond to water shortage crises, and often involves regulatory measures. Existing information does not indicate that situations approaching a crisis level are currently widespread in Island County. It is hoped that the non-regulatory measures proposed for existing parcels and/or users, along with required measures for building remodels, new construction and subdivisions, will serve this end.

Specific elements of a county-wide conservation program are outlined below. The program generally follows the format of the draft "Interim Guidelines for Public Water Systems Regarding Water Use Reporting, Demand Forecasting

Methodology, and Conservation Programs" (referred to hereafter as the state interim guidelines), dated July, 1990. Conservation elements recommended in Section V of the Island County Coordinated Water System Plan are also incorporated as are ideas from the August 1990, Conserv90 Conference held in Phoenix, Arizona.

The state interim guidelines impose stringent requirements that are intended to be used in a regulatory framework following final approval and adoption of the guidelines. They will be enforceable, however, only on new or expanding public water systems, and therefore will have little or no real impact on the majority of water systems in Island County. They are presented here as recommendations for voluntary implementation by existing, non-expanding water systems, with assistance provided by County staff. Specific regulatory avenues for implementation for new or expanding systems will be spelled out in the final draft of the state interim guidelines. It is recommended that all new and expanding water systems, regardless of size, be required to follow these guidelines.

The Conservation Program is divided into four segments:  
a) Public Education, b) Technical and Administrative Program, and c) Policy and Future Conservation Needs.

a. Public Education.

Public awareness and acceptance of the need for conserving water is essential to the success of the water conservation program. Residents need to understand the goals of conservation practices, the actual costs of delivering water, the status of the water resource (both locally and county-wide), and why ground water in Island County must be used wisely and protected for future generations. In short, the best approach to any conservation program is to assume the consumers know virtually nothing about the Island's water resource and where it comes from. Also, any water conservation program should be tied to a total conservation ethic.

In the absence of strict regulation, voluntary commitment to conservation is critical if desired water use reductions are to be met. Homeowner cooperation is essential for the success of retrofitting programs, leak detection and repair, water-use restrictions, and other components of a comprehensive program. Finally, voluntary public commitment to resource conservation can achieve

desired changes in water use without imposing mandatory regulations which may prove unpopular and difficult to enforce.

Public Education should include:

(1) School Outreach. This portion of the education program increases awareness of local water resources and encourages water conservation practices. It targets young people who will in turn share information with their parents and future generations. Activities include school assemblies to be presented by either county employees, volunteers, or consultants, preparation of curriculum material in cooperation with the Washington State Educational Association, local administrators and teachers, tours of water system facilities, field trips to active well drilling sites, etc.

(2) Speakers Bureau. This group of trained speakers, with audio-visual aids, will make presentations to schools (see above), county employees, service and community organizations as well as other groups, on water resource and conservation issues.

(3) Program Promotion. In order to publicize the need for water conservation, the water conservation program must be actively promoted on a continuous basis. This can be achieved through sponsoring an annual Water Awareness Week before the peak demand season, poster contests, public service announcements (radio, television, newspapers), in-depth news articles, bill inserts, newsletters, computer messages on bills, postage meter messages, press conferences, signs on buses and/or county vehicles, general signs in recreational areas as well as county and state parks and along county and state roads, tent cards for restaurants, messages on grocery bags, litter bags and balloons, developing merit badge requirements for Girl Scouts and Boy Scouts, displays in libraries and municipal buildings, bumper stickers, refrigerator magnets, lapel buttons, brochures, etc.

(4) Theme Shows and Fairs. The water conservation program must be visible at all local theme shows and fairs. This could be achieved via a portable display board with water conserving devices, background information, brochures, handouts, etc.

As the program develops, it could also sponsor a xeriscape show or similar workshop in conjunction with Water Awareness Week.

For additional details on public education measures, see option paper #1, Public Education.

**b. Technical and Administrative Program.**

Island County water resource staff will be responsible for providing technical assistance for improving water use efficiency. Suggested avenues of technical assistance are provided below.

(1) County Metering Program. Installation of meters is an important first step in water conservation as they a) provide monetary incentive to conserve water when coupled with effective rate structures in public water systems; b) provide a means to measure the effectiveness of the conservation program; c) facilitate leak detection and repair; and d) provide a means to predict future water needs.

In order to measure the success of water conservation programs and to estimate future demand, it is necessary to install meters, read them and record data regularly. The interim state guidelines indicate that at least five years of continuous data are necessary in order to properly evaluate trends. Data collection requirements are based on system size, with most Island County water systems falling under the less than 1000 connections category (Exhibit VI-1). Of course, water systems and consumers may choose to collect data more often.

EXHIBIT VI-1

Minimum data required to project future water demand. Five years of continuous data are required to properly evaluate trends. Most Island County water systems have less than 1000 connections. Modified from Interim Guidelines for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology, and Conservation Programs, 1989.

<u>System Size (services) (1)</u>				
	>25,000	10,000- 25,000	1,000- 10,000	<1,000
<b>Source of Supply Meter Usage Recorded (Each Source)</b>	Daily	Daily	Daily	Monthly
<b>Service Meter Usage Recorded</b>	(2)	(2)	(2)	
-Single-Family	Semi- Annual	Semi- Annual	Semi- Annual	Semi- Annual
-Multi-Family	Semi- Annual	Semi- Annual	Semi- Annual	Semi- Annual
-Commercial/Public/ Industrial	Bi- Monthly	Bi- Monthly	Bi- Monthly	Semi- Annual
-Irrigation/ Community System	Semi- Annual	Semi- Annual	Semi- Annual	Semi- Annual
<b>Annual Total by Source</b>	Yes	Yes	Yes	Yes
<b>Peak Day/Peak Month</b>	Yes	Yes	Yes	Yes
<b>Population Served</b>	Yes	Yes	Yes	Yes
<b>Economic Data</b>	Yes	No (3)	No (3)	No (3)
<b>Footnotes:</b>	.			

- (1) Number of system services is based on the number of existing retail services supplied by the utility reporting the data. Regional suppliers should include both direct retail and wholesale/retail customers in the total.
- (2) All utilities with more than 1,000 services should have a program to meter individual services by 1995, unless

EXHIBIT VI-1 (continued)

an effective demand management program that identifies water uses of all major user groups is implemented.

(3) Economic data to be collected by the county economic development agencies and OFM. The required data includes median income, employment data, water rates, population data by customer class, etc.

A program to maximize the number of public and individual water systems outfitted with meters is essential. The metering program should strive to meter 100 percent of the water connections in Island County.

During drafting of this section, concerns were raised that installation of meters on individual water systems would lead directly to charging these users for ground water use. It should be made clear that this is not the intention of the metering program. Instead, this element of the conservation program is intended to provide accurate usage data and to provide a means of determining the effectiveness of conservation efforts.

Initial emphasis of the metering program will be on unmetered public water systems. To facilitate this goal, the County should obtain and distribute meters at reduced cost to consumers. To be eligible for the metering program, purveyors must agree to:

- o allow verification by County employees of meter installation;
- o establish a rate structure, based on individual use, which provides incentives to conserve water (see p. VI-25); and
- o transmit usage data, and other data, as requested by the County.

Alternative incentives to encourage metering in existing public and individual water systems should be considered as appropriate. For example, it may be possible to establish a rebate program for purveyors and individuals voluntarily installing meters.

The County should be prepared to offer technical assistance for meter sizing, installation, operation, maintenance, and record keeping in accordance with the American Water Works Association Document M6: "Water Meters--Selection, Installation, Testing, and Maintenance." Exhibit VI-2 shows a variety of meter types and recommended applications. Exhibit VI-3 is a sample meter history record form which could be distributed to water systems to facilitate data compilation.

#### EXHIBIT VI-2

Meter Type and Recommended Applications. From New York State Department of Environmental Conservation, Water Conservation Manual for Development of a Water Conservation Plan (Draft), January, 1989.

<u>Meter Type</u>	<u>Recommended Applications</u>
<b>POSITIVE DISPLACEMENT</b>	
5/8	Demand flow rate 1/4 to 20 gpm Maximum continuous demand 10 gpm
3/4 inch	Demand flow rate 1/2 to 30 gpm Maximum continuous demand 15 gpm
1 inch	Demand flow rate 3/4 to 50 gpm Maximum continuous demand 25 gpm
<b>CLASS II TURBINE</b>	
2 inches	Demand flow rate 4 to 200 gpm Maximum continuous demand 160 gpm
3 inches	Demand flow rate 8 to 350 gpm Maximum continuous demand 300 gpm
4 inches	Demand flow rate 15 to 630 gpm Maximum continuous demand 500 gpm
6 inches	Demand flow rate 30 to 1400 gpm maximum continuous demand 1100 gpm
8 inches	Demand flow rate 50 to 2500 gpm Maximum continuous demand 2000 gpm
10 inches	Demand flow rate 75 to 3800 gpm Maximum continuous demand 3000 gpm

**EXHIBIT VI-2 (continued)**

**COMPOUND METERS (NEW STYLES)**

2 inches	Demand flow rate 1/4 to 160 gpm
3 inches	Demand flow rate 1/2 to 350 gpm
4 inches	Demand flow rate 3/4 to 630 gpm
6 inches	Demand flow rate 1.5 to 1400 gpm

**EXHIBIT VI-3**

Sample Meter History Record Form. From New York Department of Environmental Conservation, Water Conservation Manual for Development of a Water Conservation Plan (Draft), January, 1989.

The County metering program will be among the most important, and among the costliest, measures in the conservation program. Grant and loan funding will be thoroughly researched. Also see policy section, below, for more information.

(2) Distribution of Single-Family and Multi-Family Retrofit Kits. Retrofit kits with inexpensive, easily installed, long-lasting, water-saving devices should be distributed, upon an indication of interest, to the owners of single-family residences and to the owners and managers of water systems, apartment buildings, condominiums, and mobile home parks. The kits should include one shower flow restrictor, two sink aerators, one or two toilet tank water displacement bags, leak detection dye tablets, and a simple set of instructions. The kits should be distributed at low or no cost to consumers via direct mail, depot pick ups, door-to-door delivery, or contract installation. Coupons, redeemable for the kits, could be placed in local papers, community centers, libraries, etc. A program to assist the elderly with installation could also be established. This program could also offer rebates for installation of low flush toilets or other permanent fixtures, or could distribute such fixtures at cost or free of charge. Grant funding to cover costs of obtaining and distributing these kits and/or rebates will be sought.

(3) Purveyor and Customer Assistance. County water resources staff should aid purveyors in developing and implementing conservation programs tailored to their needs. Purveyors should be encouraged to provide similar assistance to customers in order to implement water conservation practices. The County water resources staff could also offer free or discounted water audits to large water consumers (e.g., hospitals, schools, commercial institutions), as well as technical manuals on various subjects. See also Technical Assistance Program, option paper #2 for more information.

(4) Technical Studies. Upon request from purveyors, County water resources staff should provide assistance by contacting other agencies or resources to provide information on new technology, comparing costs and benefits of different technologies and conservation programs, etc. A reference library could include information on

residential flow metering, outdoor watering, turf management, commercial or industrial water use, etc. See also Technical Assistance Program.

(5) Water Leak Detection. County water resource staff should provide technical assistance to public water systems interested in conducting regular and systematic leak detection surveys. Research materials, manufacturers' literature and on-site assistance, as appropriate, should be made available. Funding for low-interest loans for leak repair will be investigated.

(6) Nurseries/Agriculture/Xeriscaping. County water resources staff will coordinate with the WSU Cooperative Extension Service and local Conservation Districts in providing information and technical assistance on current technologies in order to improve the efficiency of water use for large agriculture or irrigation operations, (e.g. nurseries, parks, golf courses, farms, etc.). The County could also sponsor turf management and xeriscaping workshops, both for professionals and homeowners, develop a residential lawn care brochure, establish demonstration gardens which utilize low-water use plants including native species, provide reprints of xeriscaping articles, develop a plant list of low-water use plants appropriate for this area, provide data on local rainfall amounts to help establish watering schedules, maintain a list of local nurseries and landscape professionals familiar with xeriscaping concepts, etc.

(7) Alternative Sources. Use of cisterns, catchment basins, lagoons and ponds for non-potable water uses can reduce consumption of ground water. The AG/Forestry Council has been active in identifying potential pond sites which could be used collectively by agricultural users to supplement and reduce ground water consumption for irrigation. This effort should be supported and continued. Information on the formation of irrigation districts should be made available as possible cooperative means to finance construction of multi-user irrigation ponds.

(8) Rate Structures. County water resource staff should encourage and assist public water systems with the adoption of rate structures which encourage water conservation. For example, Exhibit

VI-4 shows the inverted block rate employed by the City of Phoenix in 1986. The more water used, the higher the rate per unit of water. In addition, rates are further increased during summer months to encourage reduced use during this high demand period (See Table VI-1). Lifeline pricing could be used to maintain low rates for those least able to pay higher costs (e.g., low income households).

FIGURE 3.2

Inverted block water rates used by the City of Phoenix. From City of Phoenix Water Conservation Plan, July, 1986.

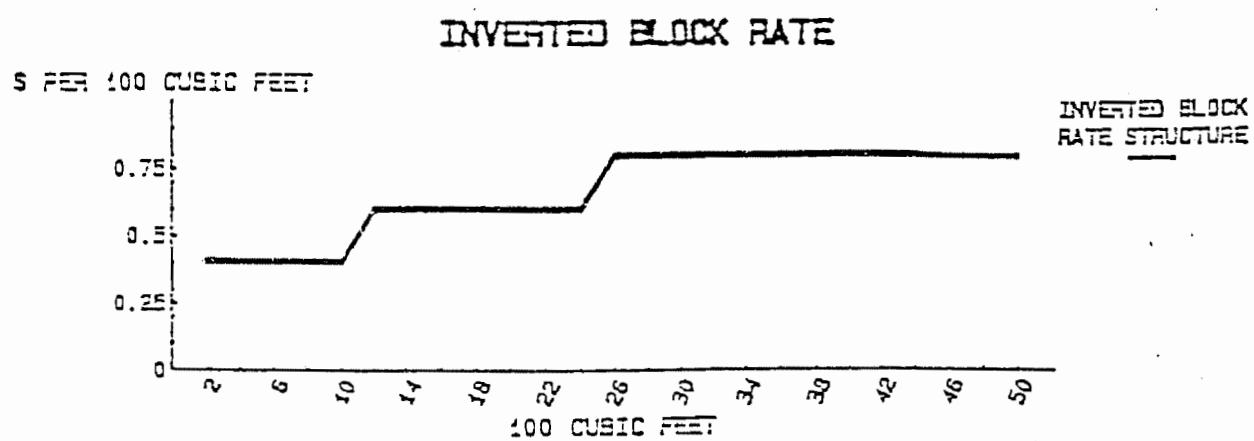


TABLE VI-1

Inverted block rate used to bill water users in the City of Phoenix. Note the differing rates for winter and summer consumption. The summer rates are higher to encourage conservation during this peak demand period. Modified from City of Phoenix Water Conservation Plan, July, 1986.

BLOCK RATE						
BLOCKS	RESIDENTIAL		COMM/INST		INDUSTRIAL	
	Winter	Summer	Winter	Summer	Winter	Summer
0-7,480 gal. 0-10 CCF	.34	.34	.34	.34	.40	.40
7,480-18,700 gal. 0-25 CCF	.47	.55	.45	.48	.50	.50
18,700 gal.-up 25 CCF up	.67	.92	.54	.63	.53	.53
SURCHARGE						.55

(9) Bill Showing Consumption History. Where applicable, County water resources staff will encourage water purveyors to have their billings show percentage increases and decreases in water use over the same period in the previous year. For systems in which individual customers are not billed for water use, purveyors should be encouraged and assisted in providing their customers with quarterly reports of the water system's consumption showing percentage increases and decreases in water use over the same period in the previous year. Such information has proven useful in encouraging voluntary water conservation efforts among consumers. Applicable computer software will be researched and recommended. Grants for system and software purchases and start up costs will be researched by staff.

(10) Reduce Pressure to 45 psi. A 30 percent

reduction in water pressure results in about 6 percent reduction in water use (New York State Department of Environmental Conservation Water Conservation Manual for Development of a Water Conservation Plan (draft), January, 1989). Reducing water pressures decreases leakage, the amount of flow through open faucets and stress on pipes and joints which may eventually result in leaks. However, some local conditions or fire flow requirements make this option unfeasible. County water resources staff should develop programs which provide incentives to install pressure reduction valves where water pressure exceeds 45 psi. A rebate or cost-reduction program to reduce the financial burden of valve installation for the water systems, as well as grants and other funding sources, will be investigated. ICC 13.03A.80 should be revised to state the maximum pressure requirements for water systems shall be 45 psi.

Following is the proposed ordinance revision:

ICC 13.03A.080 Minimum Design Requirements

"A. Pressure - Water systems shall meet pressure requirements of 248-54 WAC. Maximum water pressure shall not exceed 45 psi, except where made unfeasible by physical characteristics or where the public health is threatened. Water systems supplying fire flow shall do so with a minimum residual lead pressure of 20 psi during normal maximum instantaneous demand conditions."

(11) Water Recycling and Reuse. County staff should assist purveyors and other significant water users in examining opportunities for water recycling and reuse as an approach to reducing ground water withdrawal. Where safe and feasible, County policy should encourage recycling and reuse of water. Potential recycling and reuse program areas include:

- (1) Reuse of treated wastewater for the irrigation of non-food producing open space.
- (2) On-site wastewater treatment and recycling of effluent for non-potable uses in commercial buildings.
- (3) Support the DOH in development of greywater design standards for lawns, gardens,

trees, and other uses consistent with the protection of public health and water quality (90.54 RCW).

c. Policy and Future Conservation Needs.

(1) Water Meters. Water meters which record the amount of water delivered to each residence or business are very effective in reducing water demands where users pay according to the amount of water they use. Meters are the best source of data on actual water use, which is essential for effective program management. Additionally, studies have shown that, even where users are not charged for water used, once aware of actual usage and educated about the need for conservation, most users reduce water consumption. Metering public water systems improves efficiency, facilitates effective leak detection and repair, and makes water rates more equitable.

Island County Minimum Design Standards for Public Water Systems, ICC 13.03A, require individual and source meters on all new or expanding water systems. ICC 8.09, Potable Water Source and Supply, requires installation of source meters on each potable water source at the well head. In addition,

(a) Island County water resources staff should provide technical and financial advice and assistance for public water systems and individual well owners seeking to install meters. County staff should research and apply for grants for meter installation.

(b) Island County water resources staff should be responsible for recording selected wells and storing reports of water withdrawal amounts and/or consumption.

(2) Emergency Planning. An emergency plan for the implementation and enforcement of water use restrictions for all categories of water users in the event of a severe drought or other potable water supply crisis is outlined in Table VI-2. DOH funding is currently available for development of such plans. Both preventive and remediation categories are funded. Such a plan should include:

(a) An emergency ordinance or resolution which goes into effect upon declaration of the Board of Island County Commissioners. This ordinance could be divided into phases which could be enacted when necessary depending on the severity of conditions (Table VI-2). For instance, the ordinance could call for a watering alert which would reduce peak usage by limiting outdoor watering to every third day only during hours when water demand is reduced. If drought conditions persist, the ordinance could prohibit all outdoor watering until the Commissioners lift the restrictions. Included in Appendix L is Island County Resolution C-39-88, In the Matter of a GWAC Request to Alert Citizens Regarding Conservation of Water Resources from April, 1988. Also included in Appendix L are examples of water ordinances from around the country.

(b) A contingency fund to be used to ensure public health is not threatened in the event of a severe drought or other potable water crisis. This could be used to fund the construction of emergency interties, the distribution of bottled water, or other services as required to maintain the public health and safety.

(c) A plan to maximize the number of public water systems with effective contingency plans in place. This should include planning for system failure as well as preparing the possibility of regional water shortages.

(3) Landscape Management/Playfields.

(a) County water resource staff will actively promote low-water demand landscaping in all retail customer classes (private, public, commercial, industrial, etc.). The water resources staff should work with local nurseries, the WSU Cooperative Extension Service, USDA Soil Conservation Service and Conservation Districts to ensure the availability of appropriate seed stocks, plants and materials to achieve this objective.

TABLE VI.2

Possible measures to be incorporated into an emergency ordinance or resolution. From Guidelines for the Preparation of Water Shortage Response Plans, June, 1988.

Stage	Water Shortage Condition	Consumption Reduction Goal (Percent)	A. PUBLIC INFORMATION ACTIONS
1	Minor: Voluntary Measures	5-10	<ul style="list-style-type: none"> <li>. Prepare and distribute water conservation materials (bill insert, etc.).</li> <li>. Prepare and disseminate technical conservation information to specific customer types.</li> <li>. Prepare conservation retrofit kits.</li> <li>. Coordinate media outreach program.</li> <li>. Issue news releases to the media.</li> </ul>
2	Moderate: Mandatory Program	10-20	<ul style="list-style-type: none"> <li>. Distribute conservation retrofit kits.</li> <li>. Continue public information program.</li> </ul>
3	Severe: Rationing Program	20-30	<ul style="list-style-type: none"> <li>. Continue public information program.</li> </ul>

Stage	Water Shortage Condition	Consumption Reduction Goal (Percent)	B. GOVERNMENT ACTIONS
1	Minor: Voluntary Measures	5-10	<ul style="list-style-type: none"> <li>. Increase enforcement of hydrant opening.</li> <li>. Increase meter reading efficiency and meter maintenance.</li> <li>. Promote intensive leak detection and repair program.</li> </ul>

TABLE VI.2 (Continued)

			<ul style="list-style-type: none"> <li>. Draft and adopt ordinances* banning water waste. A typical ordinance could require:           <ul style="list-style-type: none"> <li>-No unfixed leaks;</li> <li>-No hosing of paved surfaces;</li> <li>-No fountains except those using recirculated water;</li> <li>-No water running onto streets;</li> <li>-No watering during the middle of the day; and</li> <li>-No irrigation runoff.</li> </ul> </li> <li>. Draft and adopt ordinances allowing a utility to declare a water emergency and requiring:           <ul style="list-style-type: none"> <li>-Fixed consumption allotments or percentage cutbacks (rationing).</li> <li>-All homes and businesses to have retrofitted showers and toilets.</li> </ul> </li> </ul>
2	Moderate: Mandatory Program	10-20	<ul style="list-style-type: none"> <li>. Reduce water usage for main flushing, street cleaning, public fountains, and park irrigation.</li> <li>. Watering of parks, cemeteries, etc., restricted to nights or designated irrigation days.</li> </ul>
3	Severe: Rationing Program	20-30	<ul style="list-style-type: none"> <li>. All public water uses not required for health or safety prohibited unless using tank truck water supplies or reclaimed waste water.</li> <li>. Irrigation of public parks, cemeteries, etc., severely restricted.</li> <li>. Pool covers required for all municipal pools.</li> </ul>

TABLE VI.2 (Continued)

			<ul style="list-style-type: none"> <li>.Main flushing allowed only for emergency purposes.</li> <li>.Reduce system pressure to minimum permissible levels.</li> </ul>
Stage	Water Shortage Condition	Consumption Reduction Goal (Percent)	C. USER RESTRICTIONS
1	Minor: Voluntary Measures	5-10	<ul style="list-style-type: none"> <li>.Implement voluntary water use reductions (see A.1 above.)</li> </ul>
2	Moderate: Mandatory Program	10-20	<ul style="list-style-type: none"> <li>.Implement ordinance banning water waste (see B.1 above.)</li> <li>.Adopt landscape irrigation restrictions incorporating one or more of the following: <ul style="list-style-type: none"> <li>-time of day (e.g., 7 p.m. to 7 a.m., etc.)</li> <li>-weekly frequency (e.g., odd/even, time per week, etc.)</li> <li>-sprinkle bans (e.g., hand)</li> </ul> </li> <li>.Commercial car washes should intensify voluntary use reductions.</li> <li>.Golf course irrigation restricted to 6 p.m. to 11 a.m. on designated irrigation days.</li> </ul>
3	Severe: Rationing Program	20-30	<ul style="list-style-type: none"> <li>.Implement ordinance allowing utilities to declare a water emergency and to require rationing (see B.1 above.)</li> <li>.Car washing permitted only during specified watering hours of designated irrigation days.</li> <li>.Times of day restrictions applied to commercial car washes.</li> </ul>

TABLE VI.2 (Continued)

			<ul style="list-style-type: none"> <li>.Golf course watering times and weekly watering limits reduced.</li> <li>.Manage water consumption to stay within water allotments.</li> <li>.Permissible watering hours and weekly frequency for landscaping irrigation further reduced.</li> </ul>
Stage	Water Shortage Condition	Consumption Reduction Goal (Percent)	D. PENALTIES
1	Minor: Voluntary Measures	5-10	.None.
2	Moderate: Mandatory Program	10-20	.Warning. .House call. .Shut off and reconnection fee.
3	Severe: Rationing Program	20-30	.Fines.

Stage	Water Shortage Condition	Consumption Reduction Goal (Percent)	E. PRICING
1	Minor: Voluntary Measures	5-10	.None.
2	Moderate: Mandatory Program	10-20	.Institute rate changes to encourage conservation. .Impose surcharges.
3	Severe: Rationing Program	20-30	.Same as above.

\*Ordinances should be adopted for all activities requiring legal

sanction or authorization. Determine which activities need such sanction or authorization and allow plenty of time to get ordinance passed.

- (b) The Island County Parks and Recreation Department should develop a landscape management program for all County parks and properties to utilize low-water demand landscaping.
- (c) Landscape practices which limit the amount of turf, require the use of native or low water use plantings, prohibit cleaning sidewalks, or driveways with water, prohibit over-flow of water from irrigation into streets and require automatic hand-held shut off nozzles for car washing are required in homeowner association covenants and bylaws and are a condition of final subdivision approval. Industrial, commercial, and multi-family residential projects are required to install efficient irrigation systems.
- (d) In future siting of golf courses and other large water consuming facilities, or where the location of such existing facilities warrants, the use of reclaimed wastewater will be required.

(4) Retrofitting.

- (a) Building remodels adding or replacing any plumbing fixture must follow the water conservation performance standards as outlined in 19.27.170 RCW subsection No. 4 (in advance of the July 1, 1993 effective date).
- (b) Long plat, planned residential development, and short plat proposals that include an existing residence will be required, as a condition of final approval, to retrofit all plumbing fixtures in the residence with the water conservation standards outlined in 19.27.170 RCW subsection No. 4 (in advance of the July 1, 1993 effective date.)

Implementation Plan:

The level of effort or action appropriate to each conservation measure is dependent on the considerations

specific to each public water system, including the competing demands for water, the existing and potential sources of water and unique conservation opportunities. In general, water systems should be encouraged to pursue conservation measures to the level where the cost of the measure is equal to the value of the water conserved, i.e., to the point where costs equal benefit.

Data on the cost and effectiveness of conservation programs are limited at this time. Consequently, data on the cost per unit of water saved is of limited reliability. Identification of the value of water in alternative uses represents an expanding, but still limited, area of economic analysis.

In view of these limits on both data and process, determination of the appropriate level of implementation of conservation measures must be made by individual water systems on a case-by-case basis.

Responsible agencies: As recommended in the CWSP, Public Works water resources staff will be responsible for implementation of the conservation program. Technical staff will be responsible for technical assistance elements; administrative staff will be responsible for elements of the education activities and for implementation of the metering and retrofitting programs.

Until the formation of a fully-staffed Public Works Department, Planning and Health Department staff will be responsible for implementation of the Conservation Program (see Table VI-3).

Schedule: It is recommended that the primary elements of the Conservation Program receive a high priority in funding. Of highest priority are:

- 1) education efforts, which are scheduled to begin during the first quarter following GWMP adoption;
- 2) the metering and retrofitting programs, both of which should begin upon receipt of CCWF financial assistance, which in turn is expected sometime during the second quarter of GWMP implementation.

A proposed schedule for implementation of the GWMP is presented in Table VI-4.

### Implementation needs

Personnel: Significant staff time will be required to guarantee effectiveness of the conservation measures. The equivalent of 20 hours per week is recommended for implementing the Conservation Program. See Table VI-8 for specific staffing levels required.

Operations/Administration: Significant mailing, printing, advertising, and other administrative expenditures will be required to support conservation measures to the level described here. Table VI-8 presents estimated costs for implementing the Conservation Program.

Materials/Equipment: High costs will accrue with purchase and distribution of meters, retrofit kits, pressure reduction valves, etc. (see Table VI-8 for estimates of these costs). It is anticipated that some of these costs will be recovered as consumers purchase these items; however, to maintain the incentive value of encouraging use of such items, some costs will inevitably be absorbed by the County.

References:

1. American Water Works Association Document M6. Water Meters--Selection, Installation, Testing, and Maintenance.
2. Beecher, J.A. and A.P. Lauback. 1989. Compendium on Water Supply, Drought, and Conservation. National Regulatory Research Institute, Columbus, Ohio.
3. City of Phoenix Water and Wastewater Department, 1986. Water Conservation Plan.
4. ICC 8.09. Potable Water Source and Supply.
5. ICC 13.03A. Minimum Standards for Water Works.
6. Island County Agriculture/Forestry Council, 1990. Second Draft Outline for AG and Forestry Water Resources Management in Island County.
7. Memorandum of Understanding between Washington State Department of Ecology, Water Resources Program and Island County, Washington, December, 1990.
8. Island County Coordinated Water System Plan, 1990.
9. New York State Department of Environmental Conservation, 1989. Water Conservation Manual for Development of a Water Conservation Plan (Draft).
10. RCW 19.27. State Building Code, 1989.
11. RCW 90.54. Water Resources Act of 1971.
12. Washington State Department of Ecology, Department of Health, and Water Utility Council, 1990. Interim Guidelines for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology, and Conservation Programs (Draft).
13. Washington State Department of Social and Health Services, Guidelines for the Preparation of Water Shortage Response Plans. June, 1988.

4. Data Collection and Management Program (also see option paper #5, p. V-25)

A general implementation plan for the Data Collection and Management Program (DCMP) is presented first, followed by more specific implementation needs for the six data collection categories identified. This format is designed to allow the various data collection categories to be phased in over a recommended five year period. In addition, it is intended that this program accurately reflect the level of local resources available on an ongoing basis after initial program implementation. If the existing level of local resources are maintained, data collection categories should be prioritized and those categories which are found to be highest priority to resource management should be implemented first. Table VI-9 depicts the estimated budget for the Data Collection and Management Program.

Implementation Plan

Responsible Agencies: The DCMP will require ongoing staff support and quality assurance and control. Until funding is identified, details of responsibilities are general. It is recommended that one department be lead agency in coordinating data collection and management efforts. If funding is not available for full program implementation, portions of the program could be implemented through different funding sources. The following designations of departmental responsibilities are suggestions only, and the appropriate agency for implementation should be determined at the time of program implementation.

It is envisioned that Island County Health Department (ICHD), Island County Planning Department (ICPD) water resource, and WSU Cooperative Extension staff will have roles in data collection and management. Presently the Health Department is primarily responsible for water quality, water usage monitoring, water level monitoring, and data entry. For QA/QC and efficiency reasons, water level measurements should be conducted by the same person collecting water quality samples, recording meter readings, and entering data.

ICPD water resource staff (hydrogeologist) and WSU Cooperative Extension staff will coordinate in weather data collection activities and in selecting volunteers and developing training programs for water level and weather monitoring. The Island County Engineering Department (ICED) will assist in designing a system to assess runoff in the County through stormwater

management efforts. ICPD staff will coordinate with ICED in runoff monitoring activities.

Once the Island County Public Works Department (ICPWD) is made fully operational and is adequately staffed, many of the data collection and management activities will be implemented by staff within this department. The ICPWD should have immediate access to existing ground water data and have the capability to input any additional data collected. Both the ICPWD and the ICHD should have access to the data management system. However, certain data collection and management activities described in this program will remain with the ICHD (see Section VI.D, Organizational Structure and Responsibilities, beginning on page VI-77; also see Table VI-3).

Schedule: Initial data collection efforts will remain focused and limited but will be expanded in incremental stages over a recommended five year period. Although ground water monitoring will be conducted throughout the County, the Focus Areas, in addition to other areas requiring special ground water protection, should be considered as the preliminary areas for study and data collection. If funding is available, a County-wide monitoring program should be established.

Startup activities for water level, usage, and quality monitoring programs will require a full year. Startup will consist of activities relating to monitoring well identification, owner contact and consent, and volunteer training programs. See Table VI-4 for the proposed implementation schedule.

The DCMP should be updated and modified to accommodate changes in ongoing data collection efforts and trend analysis, existing data categories may be expanded, limited, or if deemed adequate, eliminated altogether. New data collection stations may be added at this time. Suggested review schedules are identified in each data collection category.

The DCMP should be dedicated to providing annual reports of water resource measurements (such as annual "State of the Resource" reports) to guide policy makers. In addition, an annual transmittal to Ecology of ground water data collected in the County will be undertaken.

#### Implementation Needs

Personnel: Existing ICHD and WSU Cooperative Extension Office staff will assist in data collection and management efforts in Island County. In addition to efforts of these existing staff, a ICPD water resource staff (hydrogeologist) is recommended to assist in carrying out elements of the Data Collection and Management Program (see Exhibit VI-6). Additional data management, above that which presently exists in ICHD will be necessary to handle input of existing and new data, and therefore, a part-time data manager is recommended.

Operations/Administration: Monies should be allocated for the following activities: communications, advertising, mailing, printing, laboratory analysis, data entry and analysis, and travel costs.

Materials/Equipment: Additional office supplies and field equipment are necessary to implement this program. Specific equipment needs are detailed for each data collection category.

a. Well Inventory

Implementation Plan

Responsible Agencies: The ICPD administrative assistant will be responsible for carrying out activities associated with implementing the well inventory. Access to County Assessor records and ICHD records and public water system files will be necessary. Computer Services will provide assistance in developing a program to facilitate the implementation of the inventory.

Once fully operational, ICPWD water resource staff will take over activities associated with the well inventory, including survey follow-ups and data verification and management.

Schedule: A year and a half is recommended to complete the well inventory. During the first quarter following GWMP certification by Ecology, a well inventory survey form will be mailed to Island County property owners using addresses associated with County Assessor parcel numbers (See Appendix J for well inventory survey example). To avoid sending numerous survey forms to owners of more than one parcels, as would be the case with local farmers, parcel numbers should be sorted alphabetically. Consequently, a

listing of all parcels owned by a single individual would be included with the well survey. The property owner will be required to indicate which parcels have wells (if known).

Presently, the total number of parcels existing in the County is approximately 50,000. Approximately ten survey mailings should be scheduled over fifteen months. If the survey responses are not obtained within six weeks of the original mailing, two or three additional monthly survey mailings may be required. To be practical, follow-ups may have to involve house calls or phoning residents to track information. If well surveys have not been received by the third month following the initiation of the initial mailing, and follow-up measures have been unsuccessful, the parcel should be labeled "unknown" in the database.

Once completed surveys are received, information should be verified against ICHD files and recorded in a data base compatible with other the appropriate County departments. Best professional judgement by qualified ICHD and ICPD staff will be used to determine what information is considered valid and entered into the data base.

#### Implementation Needs

Personnel: Initially, additional ICPD staff (administrative assistant) will be necessary to implement the well inventory, including such activities as survey design, follow-up, and data verification and management. Technical support should be available from the ICPD water resources and ICHD staff. Additional ICHD staff time will be required to manage the data collection system as information is retrieved from the well survey.

Operations/Administration: The well inventory will incur communications, advertising, mailing and printing costs.

Materials/Equipment: The inventory will invoke paper costs.

#### **b. Ground Water/Lake/Wetland Level Monitoring**

##### Implementation Plan

Responsible Agencies: The ICHD will be the lead agency in implementing water level data collection and

monitoring activities. ICHD and ICPD water resources staff will coordinate data collection and management activities associated with water level monitoring with assistance of the WSU Cooperative Extension Office.

If funding is available, volunteers will be recruited and trained to conduct water level measurements and will be required to complete a special certification process designed by ICPD water resources and WSU Cooperative Extension staff. Appendix I lists possible volunteer groups and organizations which could potentially assist in water level monitoring efforts.

Wells, lakes and wetlands to be measured will be selected by coordination with County staff, Ecology, and USGS data. Water level data collected from monitoring wells will be stored in the ICHD. Water level measurements should be conducted by the person collecting water quality samples. ICPD water resources staff will conduct the majority of these activities.

Once the ICPWD is fully operational, ICPWD water resources staff will be responsible for water level monitoring and data management.

Schedule: If funding is available, water level measuring instruments will be obtained and specific sites selected during the first year following GWMP certification by Ecology (See Table VI-4, Proposed Implementation Schedule). The County should also request permission from Ecology to borrow e-tapes presently on reserve for use in the County. Water system managers and private well owners whose wells have been designated for monitoring will be notified and their permissions obtained. Eighty wells are recommended for water level monitoring.

For the first two years a well is monitored, well water levels will be measured semi-annually during the representative wet and dry season. In certain cases, quarterly sampling may be appropriate. After two years of monitoring, a review will be scheduled to assess water level data and to determine if wells should remain in the network and/or if additional wells should be incorporated. At this time, wells whose water level trends indicate the need for closer monitoring, should be put on a quarterly monitoring schedule.

The feasibility of conducting a well transducer study in the County with Ecology assistance should be evaluated during the first year following GWMP certification.

If feasible, a work plan for the well transducer study will be drafted.

#### Implementation Needs

Personnel: Additional ICHD and WSU Cooperative Extension staff time is necessary to effectively implement the water level monitoring program. In addition to efforts of existing staff, a hydrogeologist is recommended to assist in project design, monitoring, data management, and volunteer training.

Operations/Administration: Implementation of this program will invoke additional communications, data entry, and printing costs.

Materials/Equipment: Two hand held water level indicators (electrical tapes), ten graduated staffs and an altimeter should be obtained to implement the Water Level Monitoring Program.

#### **c. Ground Water Usage Monitoring Program**

##### Implementation Plan

Responsible agencies: To ensure QA/QC and efficiency, persons collecting water level data, water quality samples will also be responsible for reading the water meter. The ICHD will be the lead agency in water usage monitoring; however, ICPD water resources staff will be responsible for carrying out data collection and management activities. Necessary well information and records to analyze water consumption for systems selected should be obtained from ICHD.

Once the ICPWD is fully operational, implementation of the water usage monitoring program will be the responsibility of ICPWD water resources staff.

Schedule: After GWMP certification by Ecology and when DCAP funding becomes available, a list of metered water systems will be obtained from the DOH and ICHD. Some metered private wells will also be identified. Wells to be monitored will be selected during the first year following program certification (See Table VI-4, Proposed Implementation Schedule). Agricultural, commercial, industrial, public and private water users will be selected to represent all major geographic areas of the County. Permissions to include wells in the usage monitoring program should be obtained. If an

unmetered well is considered to be a valuable source of information for water usage, the County may consider purchasing and installing a meter on that source.

Water usage figures will be collected for a selected number of metered systems that are included as water quality and water level monitoring wells. Approximately eighty wells County-wide are recommended for monitoring usage. Meters for a selected group of wells will be read semi-annually during the wet and dry season (April and August) for the first two years of data reporting. A two year review will be conducted to assess program progress. At this time, more frequent meter readings may be found necessary. Limited voluntary effort from public and private water systems may be used to collect water usage figures.

Results of the first couple years of monitoring, data may indicate the need for more extensive usage reporting. If funding is available, the County may opt to design a program to monitor all new potable water supply wells with meters in the County, starting with public water systems and eventually including private wells. More comprehensive water usage monitoring could include recording usage from existing metered public water systems and private wells in the County. In this case, well owners of existing systems could maintain records for their own wells and submit annual or semi-annual (April and August) usage figures to the County.

#### Implementation Needs

Personnel: A ICPD hydrogeologist and data manager is recommended to implement this strategy. Additional effort from existing ICHD staff will be necessary to carry out monitoring and data management activities associated with implementation of the usage monitoring study.

Operations/Administration: Additional communications, advertisement, and printing costs will result from the implementation of the study water usage pilot study.

Materials/Equipment: Additional office supplies will be necessary. The GWMP Conservation Program implementation plan recommends meters be obtained and properly installed.

#### d. Water Quality Monitoring Program

### Implementation Plan

Responsible Agencies: The ICHD will be responsible for activities associated with water quality data collection projects and for housing the GWMP data management system. The ICHD and ICPD water resource staff will coordinate on monitoring study design, data collection, and data analysis. In some instances, assistance from trained volunteers may be considered.

Once the ICPWD is fully operational, the ICPWD water resources staff will be responsible for carrying out activities associated with water quality monitoring and data management. ICPWD and ICHD staff will coordinate water quality data collection and management activities. Both departments should have equal access to the data management system.

Schedule: Well sites and water quality parameters to be monitored County-wide, will be identified during the first year following program certification (See Table VI-4, Proposed Implementation Schedule). As with the water level and usage monitoring programs, approximately eighty wells will be selected for water quality monitoring. Selection of wells should be coordinated with wells selected for water level and usage monitoring. For all wells, chloride, specific conductivity, and nitrate will be monitored. At approximately 10% of the sites, samples will be collected for volatile organic chemicals analysis.

For convenience, samples may be collected from a tap nearest to the source, however, in some cases, samples may need to be collected directly from the well with a water quality sampler. In some cases, more frequent water quality analysis may be necessary. Additional quality parameters may be analyzed on a site specific need (see DCAP, Section V). In addition to the regular sampling program, some contingency sampling may be required to verify data.

During implementation startup, Well owners/purveyors should be contacted for permission to sample their wells. If funding is available, a training program will be developed to properly advise staff and volunteers of specific sampling procedures and sample handling techniques as described in the DCAP.

In addition, to the monitoring scheme described above, specialized monitoring studies could be conducted. For example, a pilot study could be designed to investigate

pesticides in ground water in areas where agricultural activities have been prevalent. The agricultural indicators which could be monitored are identified in Section V of the DCAP.

#### Implementation Needs

Personnel: Existing ICHD and additional ICPD water resources (hydrogeologist) staff time will be necessary to assist in the design of ground water quality monitoring projects, to conduct water quality sampling and analysis, and to enter data in the data management system.

Operations/Administration: Some additional communications, printing, laboratory, and data entry costs will result from the implementation of this program.

Materials/Equipment: Limited office supplies will be required to implement this program. A water well sampler and set up (bailer, bailer cable, tripod, bailer reel with casting support) and sampling bottles will be necessary.

#### e. Weather Data Collection Program

The Weather Data Collection Program consists of data collection and analysis for three components of a water budget: 1) rainfall; 2) evaporation; and 3) evapotranspiration and vegetative cover.

##### (1) Rainfall Data Collection

#### Implementation Plan

Responsible Agencies: The WSU Cooperative Extension and additional ICPD water resources staff will be the responsible agencies for the precipitation data collection effort. These agencies will coordinate a volunteer recruitment and training program targeting areas lacking precipitation data. A proposed Weather-Net Organization chart is presented in Appendix H. Volunteer groups and organizations are identified in Appendix I. The WSU Cooperative Extension Office is the headquarters of the existing precipitation monitoring effort and should remain the headquarters for this effort. Data entry and analysis will be conducted at the WSU Cooperative Extension Office by both WSU and water resources staff. A data manager will provide assistance in activities related to the data management

system.

Once the ICPWD is operational, precipitation data collection and management efforts will be implemented under this department.

Schedule: Following GWMP certification, rain gauges will be obtained. Within the first quarter of implementation, a precipitation organizational network will be established and region coordinators selected to manage the collection of data in their respective geographic areas. Efforts to expand the existing precipitation monitoring network will involve mailings to existing precipitation station managers and coordination with the GWMP education program. Once the expanded network is established and underway, an annual review will be scheduled to evaluate the need to eliminate or add any collection sites. The annual review should also include an assessment of data collected and a description of the anticipated approach to additional precipitation monitoring efforts.

Precipitation data will be submitted to the County on a monthly basis and entered into the data base. Periodic analysis and evaluation of data will be scheduled.

#### Implementation Needs

Personnel: Some additional staff, including a hydrogeologist and a data manager, will be necessary to implement this program. WSU Cooperative Extension and the hydrogeologist will analyze and evaluate data on a regular basis to determine the presence of trends. The data manager will manage records, accounting, and programming relating to precipitation monitoring at the WSU Cooperative Extension Office.

Operations/Administration: Some additional communications and printing costs will be necessary.

Materials\Equipment: Limited office supplies above those presently existing will be required. Fifty additional rain gauges will be required. Equipment necessary for two recording rainfall systems should be obtained.

#### (2) Evaporation Data Collection

#### Implementation Plan

Responsible Agencies: WSU Cooperative Extension, Soil Conservation Service, and ICPD water resource staff (hydrogeologist) will be the main operators and data managers of the pan evaporation stations. Additional research relating to the role of evapotranspiration and vegetation in ground water recharge will also be coordinated by these agencies. A data manager will provide assistance in activities related to the data management system.

Once fully operational, the ICPWD water resources staff will take the lead role in managing data related to evaporation data collection.

Schedule: During the first quarter following GWMP certification, materials to set up pan evaporation stations will be obtained and precise locations for equipment selected. Daily measurements at the pan evaporation stations will be conducted by WSU Cooperative Extension or County staff and input into the data management system on a regular basis. Annual reports of data analysis and evaluation will be presented.

#### Implementation Needs

Personnel: Assistance from a hydrogeologist and data manager will be necessary above existing staff to collect evaporation data. ICPD water resources staff and a data manager will be necessary to implement this program. WSU Cooperative Extension and ICPD water resources staff will be in charge of program coordination and analyzing and evaluating pan evaporation data. The data manager will input data into the data base on a monthly basis.

Operations/Administration: Some additional communications and printing costs will be necessary.

Materials\Equipment: Limited office supplies and materials for two pan-evaporation stations will be required.

#### (3) Evapotranspiration and Vegetative Cover Data Collection

#### Implementation Plan

Responsible Agencies: ICPD water resource staff will be

responsible for coordinating this research effort to improve evapotranspiration estimates. Research relating to the role of evapotranspiration and vegetation in ground water recharge will be coordinated by County and WSU Cooperative Extension staff.

Schedule: A literature review and evaluation will be followed up by annual updates and progress reports. If appropriate, a pilot study investigating the impacts of vegetation interception on recharge to ground water could be designed.

#### Implementation Needs

Personnel: Limited ICPD water resources staff (hydrogeologist) time will be required to conduct evapotranspiration research. Some WSU Cooperative Extension staff time will be devoted toward implementation of this strategy.

Operations/Administration: Limited communications and printing cost will be necessary. An extensive literature search will be conducted.

Materials\Equipment: No additional materials will be necessary.

#### **f. Runoff Data Collection**

##### Implementation Plan

Responsible Agencies: The ICPD water resources staff will be responsible for coordinating efforts in assessing runoff in one or more watersheds in Island County with assistance from ICED. The watersheds selected will be based on the classification scheme identified in the Island County Watershed Ranking Report. Initially, data will be entered and stored in the ICED database. The ICPD water resources staff should have complete access to the data in order to evaluate runoff flow trends.

Once the ICPWD is made fully operational in the County, runoff data collection and analysis will be the responsibility of ICPWD water resource staff.

Schedule: The schedule for this effort will depend on the ICED's schedule to conduct the facilities drainage inventory and other efforts associated with the Stormwater Master Plan. ICPD water resources staff will closely coordinate with ICED on their schedule to carry

out activities relating to runoff evaluation. As Table VI-4 indicates, the proposed implementation of the runoff study should begin in the third quarter following GWMP certification.

Implementation Needs

Personnel: Additional ICPD water resources (hydrogeologist) staff and ICED staff time will be required to implement this management strategy.

Operations/Administration: Limited communications and printing costs will be necessary.

Materials/Equipment: Materials and equipment for runoff measurement will be described in detailed plans prepared by ICED. The DCAP identifies a variety of runoff measuring techniques and equipments which can be used.

5. Ground Water Development Classification Matrix (also see option paper #6, p. V-49)

Implementation of the Ground Water Development Classification Matrix as a classification tool for new wells will assist the County in making ground water development decisions which better protect existing and future ground water users. The risk of impacts of a proposed well on neighboring wells will be estimated by well tests and available ground water information.

Implementation Plan:

Responsible Agencies: The ICHD will be the lead agency in coordinating activities relating to the Ground Water Development Classification Matrix. Once the matrix has been approved and a policy framework has been developed and approved, the ICHD will be responsible for implementing and administering the matrix.

Recommendations for land use proposals requiring ground water withdrawals which may increase seawater intrusion risks and matrix results will be referred to the ICPD Director. When appropriate, the ICPD water resources staff will provide technical support regarding decisions relating to the development of new wells which may cause seawater intrusion. The ICPD water resources staff will also assist the ICHD in using ground water data to refine boundaries of areas requiring special ground water protection, including areas which are critical aquifer recharge areas as defined by the Growth Management Act.

Administration of the matrix should remain in the ICHD. Public Works water resources staff should be given full access to information gathered through the use of the matrix to supplement existing knowledge of aquifer behavior and properties. See Table VI-3.

Schedule: A proposed implementation schedule is provided in Table VI-4. Implementation of the matrix should begin during the first quarter following GWMP certification by Ecology. Initially, the Ground Water Development Classification Matrix will be used prior to well site inspection to classify the potential seawater intrusion risks associated with a new well or withdrawal for a public water system, any subdivision, or individual well which requires special ground water protection. The matrix will be used in conjunction with the ICHD/DOH Salt Water Intrusion Policy to make site specific assessments and to determine well development

requirements. Because of staff and funding limitations, the matrix will be used as a classification tool for all public water systems, agricultural wells, and subdivisions. Individual wells County-wide will be subject to the matrix on a case-by-case basis. If additional funding becomes available, all proposed individual water systems and withdrawals may be subject to matrix classification.

Classification of wells and additional withdrawals through the use of the matrix will assist the County in evaluating land use activities which potentially threaten areas critical to aquifer recharge in Island County (see option paper #12, Critical Areas).

#### Implementation Needs

Personnel: Additional ICHD staff time will be necessary to implement the Ground Water Development Classification Matrix. To accommodate the additional work involved in using the matrix, the ICHD will consider adjusting fees accordingly. Additional ICPD water resources staff (hydrogeologist) may be necessary to assist in technical review of proposed wells and withdrawals.

Operations/Administration: Limited additional communications and printing costs will result from the implementation of this strategy. The cost of administering the matrix for all new wells and withdrawals in Island County will be covered by a fee to be determined by the ICHD. A user's guide will be designed for the public to define the types of information necessary to classify seawater intrusion risk. Minimal costs would incur from the development of the user's guide.

Materials/Equipment: No additional material or equipment costs will result from the implementation of this strategy.

6. **Ground Water Availability Criteria** (also see option paper #7, p. V-63)

Implementation of the recommended strategy in option paper #7 involves two major components:

- o defining the relationship which exists between the Ground Water Development Classification Matrix (option paper #6) and ICC 8.09 Potable Water Source and Supply;
- o making specific changes to ICC 8.09 to improve protection of new and existing withdrawals, especially concerning individual water systems and subdivisions where all resulting parcels are greater than 2.5 acres.

Implementation Plan

Responsible Agencies: The ICHD is responsible for administering ICC 8.09, and therefore, is responsible for making any revisions or amendments to the code. Additionally, ICHD will be responsible for implementing the Ground Water Development Classification Matrix and should develop and adopt policy language linking implementation of the matrix with ICC 8.09. The ICPD will assist in reviewing land use proposals requiring withdrawals or other proposed actions which may impact ground water. See Table VI-3.

Schedule: The proposed revisions to ICC 8.09 can be made immediately following certification of the GWMP by Ecology. Once the matrix and its regulatory framework has been approved, the matrix will be used to supplement requirements defined in the ICHD/DOH Salt Water Intrusion Policy and ICC 8.09. See Table VI-4.

Implementation Needs

Personnel: In addition to the ICHD staff time required to evaluate new withdrawals and subdivisions using the Ground Water Development Classification Matrix, initiation of the changes to ICC 8.09 will also temporarily require additional Health Department staff time. Limited ICPD water resources staff time will be needed to implement this management option.

Operations/Administration: No additional costs are required above existing costs.

Materials/Equipment: No additional materials or equipment are necessary.

7. Land Development Standards Revisions (also see option paper #8, p. V-71)

This preferred program element involves a change to existing Island County Code 11.01, the Land Development Standards. Specific code changes are listed in option paper #7, on page V-71. It requires evaluation and consideration of recharge as the preferred method of surface water management as associated with new development and with County road construction.

Implementation Plan

Responsible agencies: Code changes will be made as part of the GWMP adoption process. Surface water management staff will be responsible for implementing the revised code. Currently, this is the responsibility of Engineering Department staff; these responsibilities will be shifted to the Public Works Department when adequately staffed. See Table VI-3.

Schedule: The revisions can be made as part of the GWMP approval and adoption process; implementation of the revised code can then begin immediately following GWMP adoption. See Table VI-4.

Implementation Needs

Personnel: Staff normally responsible for review of drainage plans will implement the revised code. Drainage plans must be reviewed from health and hydrogeological standpoints. No additional staff are required to implement this option.

Operations/Administration: Minimal costs above normal operational costs will result from implementation of this strategy.

Material/Equipment: No additional materials/equipment costs will result from implementation of this strategy.

8. Environmentally Sensitive Area Designation (also see option paper #11, p. V-81)

This preferred program element involves a revision to Island County Code 16.14C, County Environmental Policy. It requires State Environmental Policy Act (SEPA) evaluation of certain actions which, though they may adversely affect ground water in Island County, are not currently required to undergo such evaluation. Specific language to be adopted is provided in option paper #11.

Implementation Plan

Responsible Agencies: The Planning Department will be responsible for initiation and ongoing implementation of this element of the preferred program. See Table VI-3.

Schedule: ESA designation will begin immediately upon GWMP certification. Implementation of the revised code can begin immediately. For removal of the categorical exemption dealing with 2,250 gpm withdrawals, Ecology must be petitioned. Planning Department staff will begin the petition process upon GWMP adoption. See Table VI-4.

Implementation Needs

Personnel: Existing Planning staff (lead agency in environmental review) will be able to adequately administer the additional environmental review required. Additional Island County Health Department staff time will be required to implement this program. Additional staff will probably not be required, though implementation of this option will create additional workload for existing staff.

Operations/Administration: Additional advertising and other administrative costs will result with implementation of this strategy.

Materials/Equipment: There will be minimal costs above current expenses with implementation of this strategy.

9. Critical Area Designation (also see option paper #12, p. V-87)

Under the Growth Management Act (GMA), Island County must enact interim regulations to protect critical recharge areas on or by September 1, 1991. The proposed WAC 395-190 Minimum Guidelines to Classify Agriculture, Forest, Mineral Lands and Critical Areas provides counties and cities general instructions to establish critical areas. This GWMP preferred program element is designed to define the process to designate Island County a critical area to implement a mechanism to identify land use activities which threaten these areas, and to establish regulations to preclude land uses incompatible with the hydrologic function of these areas.

Implementation Plan:

Responsible Agencies: ICPD will be responsible for following the necessary procedures in order to designate Island County a critical area pursuant to the Growth Management Act. The ICPD will develop a methodology to classify critical aquifer recharge following Ecology guidelines (Chapter 365-190 WAC) and will initiate the adoption of interim regulations that preclude land uses in an aquifer recharge area which are likely to contribute contaminants to ground water. Specific requirements for proposed land uses which may result in adverse impacts to aquifer recharge will be developed. Information pertaining to the recharge capability of the site provided by the applicant will allow the ICHD to classify recharge areas in terms of their susceptibility to contamination. The ICHD will be responsible for providing the necessary ground water information, surficial geology and soil types, to further characterize the recharge area. See Table VI-3.

Schedule: The ICPD should conduct the necessary activities to designate Island County as a critical recharge area on or before September 1, 1991. In addition, a classification scheme should be developed and interim development regulations should be adopted in the same time frame. The critical area designation and development regulations adopted by September 1, 1991 may be altered at a later date to insure consistency with local codes and the Comprehensive Plan. See Table VI-4.

Existing ground water data and performance standards represented in the Ground Water Development Classification Matrix will provide a mechanism to assist the County in assessing the potential adverse impacts of

certain land uses and developments to ground water recharge.

Implementation Needs

Personnel: Additional ICPD staff needed to implement this management strategy will be funded by GMA implementation grant monies. Some ICHD staff time will be necessary to ensure adequate coordination and consistency in permitting activities.

Operations/Administration: Some additional communications and printing costs will accompany the implementation of this strategy.

Materials/Equipment: Some additional office supplies will be required.

10. Areas of Special Concern (also see option paper #13, p. V-93)

This designation allows the local health officer to require specific criteria be met for on-site sewage systems in areas requiring special ground water protection, pursuant to WAC 248-96 On-Site Sewage Systems. Additional ground water information will help in defining these areas. Although these draft revisions have not yet been approved as WAC, procedures to implement this management strategy are identified.

Implementation Plan:

Responsible Agencies: ICHD will be responsible for implementing this management strategy (See Table VI-3). They will develop specific criteria aimed at preventing potential adverse impacts associated with on-site sewage systems in areas requiring special ground water protection. They will also be responsible for determining the feasibility of identifying areas of special concern as additional ground water data is collected. ICPD may offer additional assistance based on activities associated with critical area designation.

Schedule: At present, WAC 248-96 is in draft form, and is anticipated for adoption around mid-1991. The ICHD will design specific on-site sewage system criteria in order to evaluate potential ground water risks in areas known to be vulnerable to ground water contamination. With additional data collection in Island County, the ICHD will determine if delineating areas of special concern is appropriate. See Table VI-4.

Implementation Needs

Personnel: Additional Island County Health Department staff will be necessary to implement this strategy. Limited ICPD staff assistance may also be necessary.

Operations/Administration: Some additional printing and communication costs will accompany the implementation of this strategy.

Materials/Equipment: No additional materials or equipment will be necessary for successful implementation of this preferred program element.

11. Non-Regulatory Land Conservation (also see option paper #17, p. V-109)

This option recommends that the BICC consider implementation of the Conservation Futures Tax in Island County to support protection of lands valuable to ground water resource protection, particularly recharge.

Implementation Plan

Responsible agencies: ICPD staff and auditor's office personnel are responsible for preparing the necessary materials for BICC consideration of the conservation futures tax. See Table VI-3.

Schedule: It is recommended that the conservation futures tax be considered after the Education Program has had an opportunity to elevate awareness of the importance of recharge in Island County. See Table VI-4.

Implementation Needs

Personnel: Existing staff is adequate to support review and implementation of the conservation futures tax. The program is self-supporting.

Operations/Administration: Tax programs are self-supporting. Administration of the conservation futures tax can be funded through the tax itself.

Materials/Equipment: No additional materials or equipment are required for implementing the conservation futures tax.

12. Pollution Source Controls (also see option paper #18, p. V-113)

This option recommends development and/or adoption of specific criteria to prevent ground water contamination from industrial or commercial land use activities. Existing County ground water data and additional data collected will be used to assess the potential ground water contamination risk associated with specific land uses.

Implementation Plan:

Responsible Agencies: Criteria to be used to review potential ground water pollution sources associated with specific land uses will be developed by the ICHD in coordination from ICPD and ICED. The ICHD will be the lead agency in implementing the regulatory components of this management strategy. The ICHD will apply the Ground Water Development Classification Matrix to all land use proposals to assist in identifying any potential ground water risks. ICED will assist in administering pollution source control regulations where activities relate to land development standards, including drainage and recharge assessments. The ICPD and ICPWD may offer support where regulatory decisions pertain to land use and ground water resource planning activities (i.e. option paper #12, Critical Areas).

The ICPD will be the lead agency in implementing the educational component of this management option, through administration of the Education, Technical Assistance, and Data Collection and Management Programs. The ICPD water resource staff will assist the USDA Soil Conservation Service, the Whidbey and Snohomish Conservation Districts, and the WSU Cooperative Extension Office in encouraging the widespread use of the practices identified in the AG and Forestry water resource guidelines.

Once the Public Works Department becomes operational, only the non-regulatory aspects of this management strategy will be transferred to Public Works water resources staff. ICHD and ICED will continue to administer the regulatory component of pollution source controls. See Table VI-3.

Schedule: Implementation of this strategy should begin immediately upon GWMP certification and funding. Specific requirements should be developed by ICHD to adequately determine adverse impacts to ground water related to specific land uses. The requirements should

be reviewed by affected county and state agencies for possible adoption. Implementation of the GWMP Education, Technical Assistance, and Data Collection and Management Program should support ground water protection efforts in Island County. See Table VI-4.

Implementation Needs

Personnel: Additional ICHD and ICED staff time is required to implement the regulatory component of this management strategy. Additional ICPD water resources staff will be required to implement pollution source controls through the GWMP programs in order to ensure ground water pollution sources are recognized and consequently minimized.

Operations/Administration: No additional expenses will be required to implement this strategy.

Materials/Equipment: No additional materials or equipment will be necessary to implement this strategy.

13. Coordination Program (also see option paper #19, p. V-121)

This is a recommendation that County staff continue to track and participate in all local, state, and federal activities relating to water resource management.

Following are details of various activities which in combination comprise the Coordination Program.

a. Responsibilities and Capabilities of Agencies

To effectively manage ground water resources in Island County, responsibilities of each involved agency and specific coordination activities need to be identified.

Currently there is no cohesive and comprehensive ground water management policy in Island County. The development of a successful comprehensive ground water management strategy requires coordination and improvement of the existing framework of codes before new policies and programs are instituted.

Requirements for coordination between the lead agency (Planning Department) and other agencies include attending Ground Water Management Area (GWMA) lead agency meetings and other resource related meetings for better coordination between counties on water resources topics. These meetings provide a valuable exchange of ideas and discussion of other Ground Water Management Program difficulties.

(1) Intracounty Coordination

Ground Water Management Lead Agency efforts need to be closely integrated with other County departments to ensure a more comprehensive and effective management of ground water. The following coordination activities are necessary:

- o Understand and be aware of existing local policies related to ground water and any new provisions or legislation which may impact ground water planning efforts in the County, such as, for example, adoption of regulatory guidelines for construction of recharge facilities;
- o Keep other County departments and officials informed of the direction and efforts of the ground water management program through direct

correspondence, personal communication, and participation in Committee activities;

- o Invite County departments and officials to participate in the Ground Water Advisory Committee (GWAC) meetings or other meetings or workshops for official representation and input;
- o Participate with the GWAC to report progress of unresolved options, monitoring effectiveness, in addition to any other new applicable water resource developments.

In addition to the above activities, all activities associated with ground water monitoring at NAS Whidbey Island should be tracked. Progress of investigations conducted at the two National Priority List (Superfund) sites should be coordinated with ground water management efforts.

(2) State Coordination

(a) Seawater Intrusion

Ecology's Water Resources Program has formed a Seawater Intrusion Team to address the growing concern of seawater contamination in coastal aquifers of Washington State. The following list of objectives has been identified in preliminary drafts of the Seawater Intrusion Policy:

- o Define all aspects of the seawater intrusion problem;
- o Develop a seawater intrusion policy framework;
- o Develop analytical and predictive capabilities;
- o Educate the public, government agencies, and water purveyors about seawater intrusion causes and effects;
- o Develop and implement measures for prevention of seawater intrusion through protection of aquifers;
- o Improve coordination with state and local regulatory agencies;

- o Integrate seawater intrusion efforts with water rights administration and other planning activities;
- o Determine costs of implementing team recommendations and propose funding options.

To coordinate efforts with Ecology in developing a Seawater Intrusion Policy, Island County staff should:

- o Encourage Ecology progress toward promptly completing a State-wide Seawater Intrusion Policy;
- o Actively participate in the Seawater Intrusion Advisory Committee to provide counsel to the core group on various draft products, such as policy drafts, public information materials, and technical guidance;
- o Encourage public education activities once the Seawater Intrusion Policy is developed to gain public support and awareness;
- o Insist that technical questions relating to Island County groundwater resources are addressed adequately in defining the problem, developing predictive capabilities for seawater intrusion, and developing preventative measures;
- o Encourage case studies which follow a specific development application to better understand seawater intrusion instead of conducting technical studies. The application would be tracked with respect to all requirements for approval from the involved agencies.
- o Support guidelines provided in the Island County Salt Water Intrusion Policy and make sure the Ecology Seawater Intrusion Policy supports the existing County Policy.

(b) Well Identification and Well Abandonment

Through the GWMP process, the Island County GWAC has specified well identification and the abandonment of unused wells as a critical water

resource management concern.

A Well Identification Task Force (consisting of representatives from federal, state, and local government; well drillers; and consulting firms) has been established to guide the development of a unique well identification system. The task force is currently evaluating possible system designs and implementation schemes.

The establishment of a viable well identification program is also viewed as an initial step toward addressing the well abandonment problem. The proposed course of action is to shift the focus of the Well Identification Task Force to develop a strategy for abandonment.

The identified objectives of Well Identification Task Force include:

- o To have each well in the state tagged with an easily found, easily read unique number;
- o To have that unique number associated with all newly-collected ground water data (water quality, pumpage, construction, water level, etc.) stored for that well in each computer data base maintained by federal, state and local agencies and Indian tribes in Washington;
- o To associate that unique number with the appropriate ground water data already in existing data bases such as United States Geological Survey (USGS), Department of Health (DOH), Ecology, etc., so that all historical data can be merged and correlated with the appropriate well;
- o To develop a program which is cost effective and offers quality controls so that duplication and other errors do not occur;
- o To develop a system which makes information readily available and easy to use.

To coordinate with Well Identification Task Force efforts, Island County water resources staff should:

- o Actively participate in identifying practical ways to approach well identification

and abandonment problems;

- o Assisting in implementing program once the well identification system and implementation scheme has been established;
- o Encourage benefits of the Well Identification Program especially in promoting resource management capabilities and improving water rights administration;
- o Emphasize importance of well identification in Island County in:
  - providing inventory of wells in the County,
  - making field identification of wells easier by providing positive identification for all wells,
  - assisting in identifying abandoned wells, and
  - aiding in analysis/data correlation and trend analysis.

**b. Coordination between County and State**

(1) The following coordination activities involving both Island County and the State are recognized as vital for effective ground water management in Island County.

(a) Memorandum of Understanding (MOU)

In the early stages of the GWMP in Island County, the GWAC and the GWMP consulting engineer identified the need to establish a MOU between County and state agencies to coordinate ground water protection efforts (GWMP Policy Analysis document, 1990).

In an effort to coordinate methods and responsibilities for evaluating the consequence of additional ground water development, the Island County Health and Planning Department staff, working with Ecology staff, have developed an MOU, which was formally adopted on December 10, 1990 (Refer to option paper #20 for additional details on the MOU).

(b) The Growth Management Act (SB 2929)

This law requires counties and cities to adopt

interim regulations on or before September 1, 1991 and preclude land uses or development incompatible with designated critical areas. The critical area designation may refer to the following:

- o Wetlands
- o Aquifer Recharge
- o Fish and Wildlife Habitat Conservation Areas
- o Floodplains
- o Geological Hazardous Areas

Ecology has established minimum guidelines to assist counties in classifying critical areas. There are no specific mapping or inventorying requirements for critical lands. Mapping critical areas is advisable for informational rather than for regulatory purposes. However, performance standards are preferred for critical areas.

Option paper #12 (p. V-87) evaluates the designation of critical areas in further detail.

(2) Coordination activities related to the following regulations and programs require additional evaluation and will be reviewed following the schedule outlined in the Effectiveness Monitoring Plan (Table VII-1). The six options identified below are referred to as "ongoing options" and will be reviewed periodically for possible incorporation into the GWMP preferred program.

(a) Building Code Amendments (option paper #4, p.V-21)

The GWAC should track the results of water efficiency studies conducted by the Washington State Building Code Council. The Council will be conducting a study on the availability of water efficiency fixtures and their potential impact on sewerage and septic lines and treatment plants. The GWAC should evaluate the applicability of the study results to the conditions in Island County.

Additional discussion of the State Building Code amendments is provided in the Conservation Program (page VI-15).

(b) Recharge Facility Construction Guidelines (option paper #9, p.V-75)

The ICED is currently in the process of drafting and/or adopting guidelines for the construction of artificial recharge facilities, pursuant to the Stormwater Management Rule, WAC 173-275. It is recommended that the GWAC review those guidelines which are adopted for consistency with the goals and objectives of the GWMP.

(c) Water Resource Overlay Zone (option paper #10, p.V-77)

Additional ground water information will be collected through activities described in the Data Collection and Management Program. In addition, the Ground Water Development Classification Matrix will provide a framework for gathering valuable site specific information about ground water resources. The additional data and classification mechanism provided through these management options will provide an improved basis for evaluating the feasibility of implementing a water resource overlay in Island County.

The GWAC should keep abreast of the efforts which could facilitate the development of a water resource overlay in Island County, including data collection activities and the implementation of the classification matrix. The GWAC should evaluate the water resource overlay for incorporation into the GWMP.

(d) Ground Water Quality Standards (WAC 173-200) (option paper #14, p.V-97)

The new Ground Water Quality Standards (WAC 173-200) became effective in December 1990. These standards are designed to protect the State's ground waters from pollution. The standards establish numerical criteria which apply to all ground waters in the saturated zone and will be implemented through permits and regulatory orders for activities with discharge to ground water. For non-permitted activities and for activities regulated by other agencies, implementation will occur through Memoranda of Understanding, the development of Source Controls, and other appropriate means. The "activities" include water well withdrawals and water right permits.

Special protection areas (WAC 173-090) may be designated to address "ground waters which require

special consideration or increased protection because of one or more unique characteristics". The characteristics to guide designation of a special protection area can include areas which have received a sole source aquifer status by federal designation. Data to support the proposed designation and a description of the area's geographic and hydrologic boundaries are required. The Data Collection and Management Program and well site classification using the matrix will provide valuable ground water information to assist the County in mapping areas with special ground water protection needs.

The GWAC will perform the following coordination activities in addressing Ecology's proposed Ground Water Quality Standards:

- o Encourage Ecology staff to utilize the new standards in the issuance of new permits in Island County pursuant to RCW 90.44.
- o Evaluate the advantages or disadvantages in designating Island County as a special protection area. Request changes in the defined designation if deemed necessary to better suit the needs of Island County.

(e) Aquifer Protection Areas (RCW 36.36) (option paper #15, p.V-99)

The benefits of designating Island County, or parts thereof, as an Aquifer Protection Area (APA) merits future consideration. GWMP lead agency staff may review specific language requesting a broader usage of APA generated funds for the Washington State Legislature to consider. Language should address specific ground water management concerns which have been identified by the GWMP.

The benefits of designating Island County, or parts thereof, as an Aquifer Protection Area (APA) should be reevaluated as additional activities are eligible for APA funding and as public education and involvement on ground water issues becomes more widespread in the County. Presently, other funding sources for ground water management may be easier to obtain. The Education Program develops a plan for increasing public awareness on ground water quality and quantity issues. The Data Collection and Management Program encourages the help of

volunteers in collecting ground water information. Once awareness of ground water issues is relatively widespread, it may be appropriate to reevaluate the APA option.

After Ecology certification and BICC approval of the Island County GWMP, the GWAC should periodically assist the County in determining the likelihood of voters supporting the creation of Aquifer Protection Areas in Island County.

(f) Wellhead Protection Program (option paper #16, p.V-103)

Although inherent difficulties exist in establishing a Wellhead Protection (WHP) Program County-wide in Island County, this management option deserves future consideration in ground water management efforts. GWMP lead agency staff will identify specific recommendations to facilitate County acceptance of a wellhead protection program. The responsible Federal and State agencies should be presented with the recommendations for consideration as improvements are made to the program.

DOH and Ecology are developing strategies to assist counties in implementing wellhead protection programs locally and in unincorporated areas. A new state wellhead protection program is being designed to better define the link between septic tank systems, landfills, uses of pesticides and fertilizers, and salt application and the quality of ground water supply. DOH and Ecology are requesting the Washington State Legislature provide financial incentives or assistance for local government involvement which desire to implement a wellhead protection program.

The GWAC should keep informed of the state developments regarding the new wellhead protection program. Once a program has been finalized, the GWAC should evaluate the feasibility of implementing a local wellhead protection program and incorporating the program into the GWMP preferred program.

#### c. General Well Management

The following coordination activities are necessary to effectively manage ground water resources in Island County.

These activities involve all agencies involved in ground water management.

#### (1) Data Management

Agencies such as Ecology, DOH, USGS, EPA, utilities, municipalities and the County have all been independently involved in collecting groundwater data. As a result, some needed data has not been immediately accessible to help make prudent decisions about development and water resource management. It is difficult to identify a particular well in each of the databases. Duplication between the numerous databases is likely.

The following actions are recommended in an effort to provide for the use of existing and future groundwater data:

- o Agencies collecting data on any well regulated and use for ground water monitoring be required to report that data to the County;
- o The public needs to have more access to well and any associated ground water data and they need to know where they can obtain it. The information collected on any well will be available to the public for a fee.

#### (2) Well Enforcement

There are numerous existing regulations for managing water resources in the County. Some include state regulations for well construction, driller licensing, and water rights. In most cases, stronger enforcement of provisions is necessary to meet the needs of Island County.

- o Ecology should review its present enforcement of regulations to determine if additional staff and resources are required;
- o Change Construction and Maintenance of Wells (WAC 173-160) so that the start card notification includes reasonable notice to the County so that it provides the County with the opportunity to meet any data management, standard of construction, or mitigation requirements.

#### (3) Monitoring of New Wells

Adequate ground water information, including well logs, water quality reports, pump tests, and water levels, used to evaluate resource development is not available for many wells. Information regarding water use and water levels would especially be useful in those areas which are presently affected by seawater intrusion. Although in some areas instruments may be installed on existing wells, reading and recording of data is not consistently taking place nor is it taken on a regular basis.

Chapter 8.09 ICC outlines data requirement for new wells. Individual (ICC 8.09) and public (WAC 248-54) well owners are required to provide any measurements established as a condition of approval. In addition, an incentive program is designed to share the cost of installation of meters and data reporting for these new wells.

To ensure regular monitoring of wells in the County, a specific policy should be developed which requires wells included in a County ground water monitoring program to be provided with, at least, an instrument to measure water levels and a flow totalizing meter.

#### (4) Standard Testing for New Wells

Currently, the County, Ecology and DOH regulate the different aspects of siting, construction and approval of new wells. Each of these agencies has varying needs for information and may accept different methods. The DOH and ICHD's pumping test procedures requirements differ from Ecology's aquifer test procedures. ICC 8.09 and WAC 248-54 represent pumping test requirements and drinking water regulations, respectively, presently applicable to new wells in Island County.

The following measures are necessary for standard testing for the authorization of new wells in Island County:

- o Ensure that information which can only be collected during well construction is collected and submitted prior to authorization of the well;
- o Ensure that collection of groundwater data meets minimum quality standards. Water quality sampling and analysis procedures can be found in Section VI of the Data Collection and Analysis Plan;
- o Criteria for evaluating any proposed actions

potentially impacting ground water resources should be developed. These criteria would serve to refine existing data and eventually provide support for the delineation and mapping of areas which require special ground water protection. See option paper #6, Ground Water Development Classification Matrix, for more details.

#### Implementation Plan:

Responsible Agencies: In the interim, both Planning and Health Department staff have responsibilities in coordinating ground water management activities related to this program. Once the Public Works Department is formed, staff located there will take over the lead in coordinating with federal, state, and local water resource activities. All departments, however, should track those activities which closely relate to their respective areas of expertise. See Table VI-3.

Schedule: Activities recommended in this program are presently ongoing in the County. These efforts should continue and be further encouraged following the approval of the GWMP. See Table VI-4.

#### Implementation Needs

Personnel: Current County staff are adequately accomplishing most elements of the Coordination Program, though some additional staff time will be required to cover all elements of the Coordination Program.

Operations/Administration: Some additional communications, printing, and travel costs will be incurred with full implementation of the Coordination Program.

Materials/Equipment: No additional materials or equipment will be required.

14. Memorandum of Understanding (also see option paper #20, p. V-125)

The implementation of this preferred management strategy is intended to support provisions of the MOU between Ecology and Island County to improve coordination, communication, monitoring, and the processing of water right applications in Island County. The MOU was approved by the BICC and Ecology on December 10, 1990.

Implementation Plan

Responsible Agencies: Although the MOU has been adopted, details of implementation have yet to be defined. ICHD and ICPD staff are currently working with Ecology Water Resources staff in developing an implementation plan for the MOU. These staff will be responsible for ongoing implementation of the provisions of the MOU. See Table VII-3.

Schedule: Specific activities and tasks to which Ecology and Island County have committed under the MOU are classified as either short-term, long-term, or ongoing activities. Readers are referred to the MOU for the specific schedule for the tasks identified. Also see Table VI-4.

Implementation Needs

Personnel: Existing ICHD and ICPD staff will be adequate to implement the provisions of the MOU. Additional staff time will be required.

Operations/Administration: Limited additional travel, communications, and other administrative costs will result from implementation of the MOU.

Materials/Equipment: No additional materials or equipment are required.

## D. ORGANIZATIONAL STRUCTURE AND RESPONSIBILITIES

WAC 173-100-120(4) states that, once the GWMP is certified by Ecology, "...state agencies and affected local governments shall adopt or amend regulations, ordinances, and/or programs for implementing those provisions of the ground water management program which are within their respective jurisdictional authorities." The authorizing legislation also states that Ecology, the State Department of Health, and local affected governments will be guided by the adopted program when reviewing or considering for approval any studies, plans, or facilities which may impact implementation of the GWMP.

Table VI-3 lists elements of the management options recommended for implementation and recommends which agencies should be responsible for their implementation. Detailed recommendations of the proposed responsibilities of the various agencies and jurisdictions involved in ground water management are provided below.

### 1. State

#### a. The Washington State Department of Ecology (Ecology)

Ecology has vested in it by state law (RCW 90.44 and RCW 90.54 in particular) the responsibility for managing ground water in the state. Existing statutory language provides direction for managing ground water resources. Funding support for Ecology's Water Resources Program has proven inadequate, however, to provide appropriate administration of statutory ground water management authority.

Through the Ground Water Management Area process, Ecology has delegated part of its responsibility in ground water resource management to local governments. This delegation of responsibility should be accompanied by adequate funding. Funding has been made available for development of the GWMP; ongoing funding should be made available for implementation of the GWMP.

Recent events at the State level, such as the formation of the Water Resources Forum, and, on a smaller scale, the participation of Ecology staff in the development of a Memorandum of Understanding with Island County, are indicative of progress towards a more effective State role in ground water resource management.

The following are specific recommendations to Ecology

for implementation of the Island County GWMP:

1. Provide adequate funding and staffing levels to fully implement the provisions of RCW 90.44 in Island County.
2. Implement the provisions of the Island County/Ecology MOU. As appropriate, these or similar provisions should be considered for adoption as State legislation.
3. Provide funding assistance for Island County ground water management activities, such as a metering program, comprehensive watershed planning for water systems and other regional planning efforts, and for pilot studies outlined in the data collection and monitoring program, conservation, and education projects, and for ground water management activities in general.
4. Continue efforts to coordinate with the State Department of Health to maximize the effectiveness of water resources management at the State level.
5. Initiate a process to phase out the 5000 gallon per day threshold on water right requirements. Provide staffing adequate to evaluate and process the additional water rights which would result from elimination of the threshold.
6. Continue to provide educational materials, literature, and other assistance in public involvement and assistance. Continue to provide assistance with encouraging conservation through workshops and other speaking engagements and the preparation and distribution of conservation materials.
7. Clearly define the role of the GWAC in ongoing implementation of the GWMP in the Island County Ground Water Management Area.

b. Washington State Department of Health (DOH)

Because of DOH's role in water system regulation, its policies and programs are directly related to ground water resource management. To ensure cooperative and effective water resource management in Island County, DOH should:

1. Ensure all water system plans and activities under

DOH's jurisdiction are reviewed for consistency with the GWMP.

2. Continue and, if possible, expand technical assistance, conservation, and public education activities in Island County. Provide assistance with the development and maintenance of a Technical Resources Library (see Technical Assistance Program). Continue to provide and distribute educational and technical materials. Continue to encourage the use of water-use-efficient practices in the design and management of water systems.
3. Continue and support implementation of the CWSP in Island County.
4. As appropriate, provide funding assistance for water system management activities in Island County.
5. Participate in efforts to improve the State's role in water resources management.

## 2. County

Implementation of the GWMP will require the commitment of considerable human resources. Adequate funding and staffing at the County level is essential to ensure adequate ground water management.

A single central office tasked with the administration of all elements of water resource management might seem, at first glance, to be the most efficient organizational structure. A review of applicable State regulations and the practical aspects of changing the current County structure, however, reveals that certain aspects of water resource management are best delegated to specialized departments.

### a. Public Works Water Resources Division

A Public Works Department was established in 1973, pursuant to ICC 13.01, but was never fully supported with staff and funding. Though no specific organizational structure has yet been formulated, the CWSP (page I-22) recommends that the Public Works Department be tasked with specific elements of CWSP implementation. The GWMP supports this recommendation. Furthermore, it is recommended that a Water Resources Division (or equivalent) be created within the Public Works Department and that such division be adequately staffed to effectively manage and implement the GWMP.

recommended management strategies.

It is recognized that formation of a fully functioning and adequately staffed Public Works Department will not occur immediately. It will likely take several years to acquire the necessary equipment, space, and funding to support the staffing requirements. It will be necessary for existing departments to carry out the elements of the GWMP until such a department is formed. While a centralized nucleus of water resource staff could implement the GWMP with more organization and greater efficiency, existing departments could, if necessary, provide the recommended level of ongoing ground water management. In either case, additional staff are required.

Planning and Health Department staff must initiate and continue implementation of as many elements of the GWMP as staffing, equipment, and space permits until the Public Works Department is adequately funded and staffed. Details of these responsibilities are provided above in the "Responsible Agencies" sections of the Implementation Plans drafted for each recommended option, and are repeated in terms of the responsibilities of each department, below.

Recommendations for Public Works Department water resource staff are detailed below.

1. Except where indicated below, currently existing Planning Department and Health Department approval and permitting procedures should remain in place. Public Works water resources staff, however, should be prepared to review water system plans for consistency with the Minimum Standards for Water Systems, Chapter 13.03A ICC. Also, the Public Works division assigned water resources functions should assist Health and Planning Department staff in data collection and management, and should provide technical assistance in water resources decisions.
2. The Public Works Department should be the lead agency in implementing the Conservation Program. Activities involved in implementation of this program include:
  - o conducting public education activities which encourage the use of water use efficiency techniques and practices;

- o acquiring, preparing and distributing information on water use efficiency to purveyors and individuals;
- o continuing the metering program initiated the Planning Department (see below) by devising incentives to maximize usage monitoring in the County; identifying water systems appropriate for metering program assistance; purchasing meters and providing them at cost to eligible ground water users; and continuing research into methods to provide source and connection meters for as many ground water users in Island County as possible;
- o distributing water-saving retrofit kits to ground water users;
- o continuing development of County-wide metering and conservation policy;
- o providing ongoing technical assistance and advice on rate structures for water systems seeking to improve efficiency of water use; and,
- o conducting research into the use of alternative water sources, such as cisterns, catchment basins, lagoons, re-use of water, and other innovative means of reducing demands on available ground water.

3. Take over the lead in Education Program implementation from the Planning Department. Activities include:

- o coordinating distribution of educational materials, development of a mailing list of purveyors and interested individuals, encouraging power companies and other utilities to include educational materials in their billings, and coordinating with State agencies to acquire brochures and other materials;
- o coordinating any professional services, such as printing or graphic arts work, associated with the Education Program; and,
- o preparing quarterly press releases, and, if necessary, purchasing advertising space for quarterly articles or features on ground water protection and management.

4. Take the lead in Technical Assistance Program implementation by providing technical assistance to water purveyors, and expanding activities initiated by the Health Department. This includes:
  - o assisting with the maintenance of a Water Resources Library;
  - o the distribution of information on funding sources available to water systems;
  - o implementing a mechanism and fee structure to handle data base research requests; and,
  - o providing information and other assistance to parties interested in improving efficiency of water use.
5. The Public Works Department should become the central location for data management and collection activities. Implementation of the Data Collection and Management Program includes:
  - o coordinating ongoing development and refinement of a comprehensive computerized data management system with existing State and County data base information sources;
  - o coordinating and assisting with ongoing weather data collection efforts of the WSU Cooperative Extension office;
  - o coordinating and conducting special projects, such as improving estimates of evapo-transpiration based on vegetative cover;
  - o continuing studies designed to refine estimates of runoff and recharge in Island County; and,
  - o working with Health and Planning Department staff to provide ongoing use and evaluation of ground water data to track ground water quality and quantity trends.
6. Public Works Department staff should comprise the link between County water resources policy and implementation at the user level. Communication and coordination with volunteer groups (including the GWAC) and local jurisdictions should be a primary function of Public Works water resources

staff.

7. Ongoing coordination with Ecology on matters related to water resource management should be the responsibility of the Public Works Department water resource staff.
8. Continue to coordinate with other departments in their efforts to manage water resources in Island County.
9. The Public Works Department Water Resource Division should prepare annual and other reports on GWMP implementation for the BICC, Ecology, and the GWAC.
10. The Public Works Department should take steps towards increasing the County's role in water system management. Recent State legislation (SSB 6447) requires, in certain situations, that County governments assume responsibility for management and operation of failing water systems. The County may designate a County agency to operate the system, or may contract with an existing water system to provide management. In the absence of feasible alternatives, the Island County Public Works Department should be prepared to assume the role of purveyor.
11. Public Works Department staff should take the lead in promoting consolidation or cooperation between water systems. Formation of Regional Water Associations (RWA's), water districts, Satellite System Management Agencies (SSMA's), and other regional water system structures can pool resources and increase the effectiveness of County efforts in water resources management.
12. Review of drainage plans pursuant to ICC 11.01, Land Development Standards (see option paper #8), and review of recharge facilities for consistency with BMP's adopted pursuant to WAC 173-290 (see option paper #9), is currently the responsibility of Surface Water Management staff in the Island County Engineering Department. These roles will be assumed by the Public Works Department when formed.
13. Public Works Department staff should continue participating in watershed planning efforts initiated by the Planning Department (see below). These efforts should focus on protection and enhancement of water resources.

b. Health Department

The Health Department has the responsibility for specific health-related functions as vested by State law. It is recommended here that all functions currently carried out by the Health Department continue, except that certain functions, such as data management and some educational and technical assistance functions, should be transferred to the Public Works water resources staff when in place. The following recommendations are presented as interim activities to be carried out until the Public Works Department is fully functional. Activities intended to be taken over by the Public Works Department are indicated by (PW).

1. Continue data collection and management activities, including:
  - o working with Planning Department staff (and later, PW staff) to expand and improve data management and collection activities and procedures;
  - o continuing current data collection and input activities; and,
  - o assisting in ongoing evaluation of data and use of data in making land use decisions.
2. Ensure that the Ground Water Development Classification Matrix is implemented properly and that new ground water data collected through implementation of the matrix is incorporated into the County data base. Refine the matrix and its implementing policies as necessary and appropriate. Develop a fee schedule to accomodate the staff time necessary to implement the matrix.
3. Continue providing technical assistance to water purveyors, and expand current activities by participating in the development and ongoing operation of the Technical Assistance Program (option paper #2). This includes:
  - o assisting with the setup and maintenance of a Water Resources Library (PW);
  - o the distribution of information on funding sources available to water systems (PW);

- developing a mechanism and fee structure to handle data base research requests; and,
- providing information and other assistance to parties interested in improving efficiency of water use (PW, also see Conservation Program).

4. Assist Planning Department staff in initiation and implementation of the Education Program, including:

- preparation and selection of newsletters, brochures, and other literature for handout to purveyors and to the general public; and,
- participation in workshops, seminars, and other Education Program meetings;

5. Assist Planning Department staff in initiation and interim implementation of the Conservation Program; including:

- assist in identifying water systems appropriate for metering program assistance (PW);
- providing ongoing technical assistance and advice on rate structures for water systems seeking to improve efficiency of water use (PW);
- assist in acquiring, preparing and distributing information on water use efficiency to purveyors and individuals; (PW) and,
- conduct additional research into the use of alternative water sources, such as cisterns, catchment basins, lagoons, re-use of water, and other innovative means of reducing demands on available ground water (PW).

6. Continue working with the State Departments of Ecology and Health to improve the State's role in water resource management, and to increase the effectiveness of State programs. Continue refinement and facilitate implementation of the Island County/Ecology Memorandum of Understanding (MOU).

7. Facilitate and implement the revisions to ICC 8.09 as proposed in option paper #7 (see p. V-63).

8. Continue to coordinate with other departments in their efforts to manage water resources in Island

County.

c. Planning Department

The role of the Planning Department in ongoing management of ground water in Island County is primarily land-use oriented. Because the Planning Department is the lead agency in GWMP development, many of the interim tasks of GWMP implementation will become the responsibility of Planning Department staff by default. When a Public Works Department water resources division becomes fully operational, many of the responsibilities defined below can be shifted to the new department. These interim activities intended to be taken over by the Public Works Department are marked (PW).

1. Initiate and implement the regulatory and policy elements of the Ground Water Management Program under Planning Department jurisdiction. This includes:
  - o the Critical Area designation pursuant to the Growth Management Act;
  - o designation, mapping, and ongoing enforcement of Environmentally Sensitive Areas; and,
  - o ongoing implementation and refinement of the MOU with the Department of Ecology.
2. Take the lead in encouraging and participating in watershed planning efforts focusing on protection and enhancement of water resources. Pursue Centennial Clean Water Fund monies for assisting in development of watershed plans for the Oak Harbor, Coupeville, and Langley areas, and other areas as appropriate and necessary. (Also see Affected Local Governments, p.VI-89).
3. Encourage and support formation of Regional Water Associations (RWA's), water districts, and Satellite System Management Agencies (SSMA's). More information on these water system structures is provided below.
4. Continue research and application of innovative incentives to encourage use of water efficient techniques and practices through Planning Department review and approval procedures.
5. Research and pursue alternative funding sources for

ground water management activities.

6. Initiate implementation of the Education Program, including:

- o coordinating distribution of educational materials, development of a mailing list of purveyors and interested individuals, encouraging power companies and other utilities to include educational materials in their billings, and coordinating with State agencies to acquire brochures and other materials (PW);
- o coordinating any professional services, such as printing or graphic arts work, associated with the Education Program (PW); and,
- o preparing quarterly press releases, and, if necessary, purchasing advertising space for quarterly articles or features on ground water protection and management (PW).

7. Initiate elements of the Conservation Program, including:

- o conducting public education activities encouraging the use of water use efficiency techniques and practices (PW);
- o conducting the metering program by devising incentives to maximize usage monitoring in the County, by purchasing meters and providing them at cost to eligible ground water users, and continuing research into means to provide source and service connection meters for as many ground water users in Island County as possible (PW);
- o distributing water-saving retrofit kits to ground water users (PW); and,
- o continuing development of County-wide metering and conservation policy.

8. Begin implementation of the Data Collection and Management Program, including:

- o coordinating development of a comprehensive computerized data management system compatible with existing State and County data base information sources;

- o managing well inventory efforts, including data verification, recording, and follow-ups (PW);
- o input of existing and new data not currently handled by the Health Department (PW);
- o coordinating and assisting with ongoing weather data collection efforts of the WSU Cooperative Extension office (PW);
- o assisting the WSU Cooperative Extension in volunteer water level monitoring training and other volunteer training efforts (PW);
- o coordinating and conducting special projects, such as improving evapotranspiration estimates based on vegetative cover (PW); and,
- o coordinating with Engineering Department (and later, Public Works Department) staff to conduct studies designed to refine estimates of runoff and recharge in Island County.

d. Engineering Department

The current functions of the Engineering Department will be taken over by Public Works Department staff, once operational.

Specific interim responsibilities of the Engineering Department in GWMP implementation are:

1. Initiate the proposed amendments to ICC 11.01, the Land Development Standards, as proposed in Option Paper #8, and continue enforcement of the revised code.
2. Adopt regulatory criteria for construction of artificial recharge facilities pursuant to the Stormwater Management Rule, WAC 173-275, and implement the guidelines as appropriate.
3. Participate with Planning Department staff and local jurisdictions in developing watershed management plans.
4. Participate with Planning Staff in those elements of the Data Collection and Management Program which relate to refinement of estimates of quantity, quality, and effects of surface water runoff.

5. Assist in developing and administering specific pollution source control criteria for land development proposals relating to land uses which have the potential to contaminate ground water.

### 3. Affected Local Governments

Pursuant to WAC 173-100-120, affected local governments are to review the GWMP for technical accuracy, economic feasibility, and consistency with RCW 90.44 and WAC 173-100. Following certification of the GWMP by Ecology, these affected local governments are to adopt or amend ordinances, policies, or programs to implement provisions of the GWMP which lie within their respective jurisdictions.

Affected governments include all incorporated municipalities and special districts. Each of these affected local governments should continue to participate in ongoing development of Island County water resource policy. Following is a listing of the affected governments, along with specific recommendations to ensure their consistency with the GWMP.

#### a. City of Oak Harbor

The City of Oak Harbor has developed an off-island water source in addition to local wells and has established monitoring and sampling procedure to track ground water quality and quantity. Following are recommendations for the City of Oak Harbor.

1. Promote water conservation within the Oak Harbor water system. Oak Harbor should consider drafting a water conservation plan which is consistent with the GWMP Conservation Program and the "Interim Guidelines for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology, and Conservation Programs", as drafted by the State Departments of Health and Ecology and the Washington Water Utilities Council.
2. Continue to participate in data collection efforts, including assisting with the GWMP Data Collection and Management Program. This includes quarterly submittals to the Island County Health department of usage figures from wells tied into the Oak Harbor water system and any ground water quality or quantity data collected by the City.
3. Participate in implementation of the GWMP Education Program. Activities include:

- providing for distribution of education materials, including use of billing inserts where appropriate;
- providing input to the quarterly newsletter element of the Education Program, and mailing the newsletter to water system customers; and,
- participating in workshops and other interactions with the public.

4. Oak Harbor is currently involved in watershed planning pursuant to a Centennial Clean Water Fund grant. It is recommended that Oak Harbor continue to participate in watershed planning efforts to ensure sustained protection of ground water quality and preservation and protection of aquifer recharge. In cooperation with Island County, Oak Harbor is expanding the focus of its watershed planning efforts to include areas which, though outside the incorporated areas of the City, are hydrologically related to the Oak Harbor watershed.
5. Participate in County-wide efforts to obtain relinquishment of water rights which are currently unused and which will not likely be used in the future. Encourage relinquishment of currently unused water rights held by water systems or individuals now served by the Oak Harbor water system service area, and, in coordination with Ecology, require relinquishment of water rights as condition for new hookups to the City water system.
6. Participate in ongoing development of Island County water resource policy.

b. Town of Coupeville

The Town of Coupeville has had a history of ground water quality and quantity problems, and is currently seeking possible solutions to these problems.

Specific recommendations for Coupeville are:

1. Participate with Island County in comprehensive watershed planning efforts to ensure sustained enhancement of aquifer recharge and protection of ground water supplies. The planning area should encompass the entire hydrological basin associated with Coupeville's water supply. Cooperative

planning for areas outside the incorporated town.

2. Coordinate with County staff in deciding on possible water resource alternatives and solutions.
3. Continue measures to increase efficiency of ground water use in the Coupeville Water System, including developing and implementing a conservation plan consistent with the GWMP Conservation Program and the "Interim Guidelines for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology, and Conservation Programs", as drafted by the State Departments of Health and Ecology and the Washington Water Utilities Council.
4. Participate in the GWMP Data Collection and Management Plan by providing County staff with quarterly reports of ground water usage, and by submitting any pertinent ground water quality and quantity data as collected.
5. Participate in implementation of the GWMP Education Program. Activities include:
  - o providing for distribution of education materials, including use of billing inserts where appropriate;
  - o providing input to the quarterly newsletter element of the Education Program, and mailing the newsletter to water system customers; and,
  - o participating in workshops and other interactions with the public.
6. Participate in ongoing development of Island County water resource policy.

c. City of Langley

Langley's water supply is obtained entirely ground water sources. Recommendations to protect the City's ground water sources and improve ground water management and resource efficiency include:

1. Participate with Island County in comprehensive watershed planning efforts to ensure sustained enhancement of aquifer recharge and protection of ground water supplies. For the purposes of providing additional ground water protection, the City of Langley should consider expanding planning

areas to encompass the watershed area which contributes to and affects Langley's water supply.

2. Coordinate with County staff in deciding on possible water resource alternatives and solutions.
3. Continue measures to increase efficiency of ground water use in the Langley Water System, including developing and implementing a conservation plan consistent with the GWMP Conservation Program and the "Interim Guidelines for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology, and Conservation Programs", as drafted by the State Departments of Health and Ecology and the Washington Water Utilities Council.
4. Participate in the GWMP Data Collection and Management Plan by providing County staff with quarterly reports of ground water usage, and by submitting any pertinent ground water quality and quantity data as collected.
5. Participate in implementation of the GWMP Education Program. Activities include:
  - o providing for distribution of education materials, including use of billing inserts where appropriate;
  - o providing input to the quarterly newsletter element of the Education Program, and mailing the newsletter to water system customers; and,
  - o participating in workshops and other interactions with the public.
6. Participate in ongoing development of Island County water resource policy.

d. Water Districts

Though water districts formed pursuant to RCW 57.02 do not comprise a majority of ground water users in Island County, they have the responsibility to participate in ground water management, and are therefore included in this section. Additionally, water districts have available to them funding options not available to privately-operated water systems. As of November, 1990, there were 17 water districts in the County, few of which served more than 100 connections.

Recommendations for water districts in Island County are:

1. Participate with Island County in comprehensive watershed planning efforts to ensure sustained enhancement of aquifer recharge and protection of ground water supplies.
2. Coordinate with County staff in deciding on possible water resource alternatives and solutions.
3. Continue measures to increase efficiency of ground water use in each water district, including developing and implementing a conservation plan consistent with the Conservation Program and the "Interim Guidelines for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology, and Conservation Programs", as drafted by the State Departments of Health and Ecology and the Washington Water Utilities Council.
4. Participate in the GWMP Data Collection and Management Plan by providing County staff with quarterly reports of ground water usage, and by submitting any pertinent ground water quality and quantity data as collected.
5. Participate in implementation of the GWMP Education Program. Activities include providing for distribution of education materials, including use of billing inserts where appropriate.
6. Encourage annexation and expansion of water districts where appropriate to maximize the benefits of water district membership. Increasing the revenue base, increasing the effectiveness of the GWMP, widening the area of a professionally managed and operated water system, and providing solutions to areas with water resource problems are a few considerations which may motivate water districts to expand. The advantages of water district formation are further detailed below.

e. Drainage Districts and Diking Districts

Drainage districts and diking districts are not involved in activities directly related to distribution or management of ground water. Because of their role in surface water management, however, these districts should be made aware of how their surface water management activities can

affect ground water ground water resources.

Prior to County approval of any new plans for activities or facilities developed by drainage or diking districts, these plans should be reviewed by Island County staff for consistency with the the GWMP goal of protecting and preserving ground water quality, quantity, and recharge in Island County.

#### 4. Water Systems

Water systems must cooperate and participate with the County in order for the GWMP Data Collection and Management and Conservation Programs to be successful. There are no regulatory requirements of the GWMP that apply to existing non-expanding water systems. Instead, water systems are encouraged to participate in non-regulatory elements of the GWMP. If it is found that these non-regulatory programs are ineffective, it may be necessary to implement regulations applying to non-expanding water systems in the future.

It is recognized that capabilities of water systems vary with their size and type. The following recommendations have been developed with this awareness.

##### a. Water systems serving 100 or more customers

Recommendations for larger public water systems include:

1. Voluntary participation in data collection efforts. Participate in the GWMP Data Collection and Management Plan by providing County staff with quarterly reports of ground water usage, and by submitting any pertinent ground water quality and quantity data as collected.

These water systems can directly benefit from such participation through increased knowledge of local aquifer characteristics, discovery of any water level or water quality trends, and any relationships between usage and water quality and quantity.

2. Participate in implementation of the GWMP Education Program. Activities include providing for distribution of education materials (including use of billing inserts where appropriate), and participating in workshops for water system customers.

Through increasing awareness among customers of local water resource problems and domestic water conservation techniques and practices, seasonal water shortages can be averted, operation and maintenance costs can be decreased, and overall system efficiency can be increased.

3. Increase efficiency of ground water use in within each water system, including developing and implementing a conservation plan consistent with the Conservation Program and the "Interim Guidelines for Public Water Systems Regarding Water Use Reporting, Demand Forecasting Methodology, and Conservation Programs", as drafted by the State Departments of Health and Ecology and the Washington Water Utilities Council.
4. Participate in all elements of the Conservation Program, particularly the County's metering program, and implement rate structures conducive to conservation.

b. Water systems serving fewer than 100 customers

It is recognized that small public water systems have fewer financial capabilities than other, larger water systems. Therefore, the level of participation of these systems may be necessarily limited. It is recommended that these systems, to the best of their capabilities, follow these recommendations:

1. Voluntary participation in data collection efforts. Participate in the GWMP Data Collection and Management Plan, as requested, by providing County staff with quarterly reports of ground water usage, and by submitting any pertinent ground water quality and quantity data as collected.

These water systems can directly benefit from such participation through increased knowledge of local aquifer characteristics, discovery of any water level or water quality trends, and any relationships between usage and water quality and quantity.

2. Participate in implementation of the GWMP Education Program. Activities include providing for distribution of education materials (including use of billing inserts where appropriate), and participating in workshops for water system

customers.

Through increasing awareness among customers of local water resource problems and domestic water conservation techniques and practices, seasonal water shortages can be averted, operation and maintenance costs can be decreased, and overall system efficiency can be increased.

3. Participate in all elements of the Conservation Program, particularly the County's metering program, and implement rate structures conducive to conservation.

c. Agricultural water systems

Agricultural water systems can withdraw significant amounts of ground water for irrigation and other purposes. These systems are asked to abide by the following recommendations:

1. Participate in the GWMP Data Collection and Management Plan, as requested, by providing County staff with quarterly reports of ground water usage, and by giving permission and providing access for County staff and/or volunteers to collect pertinent ground water quality and quantity information.

2. Participate in the Conservation Program.

3. Follow guidelines for water use efficiency in agriculture provided by the Ag/Forestry Council (Appendix K).

d. Individual water systems

1. Participate in the GWMP Data Collection and Management Plan, as requested, by providing County staff with quarterly reports of ground water usage, and by giving permission and providing access for County staff and/or volunteers to collect pertinent ground water quality and quantity information.

2. Utilize techniques provided in the Conservation Program to maximize efficiency of ground water use.

5. Regional Water System Organizations

The Ground Water Management Program is written from the perspective that Island County government will be the main implementor of the preferred program elements. All of the

recommendations focus on what responsibilities County staff can or should assume. It is clearly recognized that County government must take the lead in ground water management. Local jurisdictions and State agencies are also identified as having certain responsibilities under the GWMP.

There are numerous tasks facing County government in ground water protection. Any shifting of responsibility can increase the effectiveness of the GWMP. While regulatory elements of the GWMP can be implemented only through County government, parts of the non-regulatory programs of the GWMP can be delegated, as appropriate, to entities having the necessary funding capabilities, structure, and willingness. Initial effort must begin with the County. With current funding and staff limitations, implementing relatively intensive programs, such as the Conservation Program, may prove difficult, especially when it is recognized that these efforts would be spread over approximately 650 public water systems and an uncounted number of private wells.

Late in the development of the GWMP, it was suggested that water systems should be the focus of the GWMP. The intended focus of the Ground Water Management Program, however, is not on public water system management. Instead, the GWMP addresses concerns of ground water protection and aquifer recharge enhancement. Other planning documents address public water system management and operations - the Coordinated Water System Plan and the Island County/DOH Salt Water Intrusion Policy, for example, have been prepared to address issues of water system management, and the State Department of Health has responsibility to ensure compliance of water systems with applicable State law.

It is not possible, however, to completely separate water resource management from the management of distribution of the resource. Public water systems have a role in GWMP implementation; indeed, successful implementation of certain elements of the GWMP relies, to some extent, on the cooperation of Island County's public water systems. Efforts should therefore be made to enlist and organize water system support of GWMP non-regulatory programs. It must be recognized, however, that it would be unrealistic to assume that current water system management structures are capable and willing to take the lead in full GWMP implementation.

If in the future regional water system organizations are formed, it may be possible to shift some of the responsibility of GWMP implementation to public water systems. Possible structures for these regional water system organizations are described below. Formation of such regional organizations is encouraged by the GWMP, and, as

noted above, should be promoted and facilitated by County government. It could be several years before regional organizations become viable; until such time, GWMP implementation will be the responsibility of the County.

a. Regional Water Associations (RWA's)

In the Coordinated Water System Plan, an RWA is defined as:

"A group of water purveyors who have joined together through a formal process to resolve mutual problems relating to water quantity and quality; to reduce capital costs of improvements through economy of scale; to share information relating to common problems; and to provide joint management, coordinated testing, and contingencies planning" (p. xiii).

During the public hearings on the CWSMP, concerns were raised that the RWA concept would lead to privatization of a resource that is clearly labeled a public resource under state law. RWA's do not have the legislative authority to preempt State or local land use and water resource policies and regulations; however, large associations of water systems managed solely by small groups of water purveyors were perceived by some as placing too much water resource authority in the hands of a private entity.

The RWA's, along with water districts and local jurisdictions, could serve as the fulcrum of County water resource policy through the implementation of elements of the conservation program, the providing of technical assistance and resource management advice, and the distribution of educational materials and information.

Funding capabilities of RWA's are more limited than those available to publicly-managed systems, such as water districts (see below). Revenues are generated through water distribution rates, and can also be acquired through membership assessments.

It should not be assumed that the benefits accruing from RWA membership will encourage all water systems in the County to join them. Should the RWA concept be accepted by groups of water systems, however, these organizations can assume the responsibility of many aspects of GWMP implementation, particularly the Conservation, Technical Assistance, and Education Programs. Leadership towards

RWA formation and ongoing program implementation must come from the County. Readers are referred to the CWSP for more information on RWA formation.

b. Local Associations of Water Systems (LAWS's)

Because of the concerns often expressed about the creation of RWA's, it may prove useful to introduce an alternative water system association structure: Local Associations of Water Systems (LAWS's). The LAWS's differ from RWA's in that they are represented by a Board of Commissioners, consisting of not only water purveyors, but also of private well owners and representatives of other interests (such as incorporated areas, special interest groups, homeowner's associations, etc.), all elected by citizens within the RWA boundary. LAWS issues would also include those pertinent to owners of single-home domestic and agricultural wells.

LAWS's are similar to RWA's in that they consist of a group of water systems sharing water resource concerns common to the area within the LAWS geographic boundaries; they are formed to pool resources to address these joint concerns; and to provide joint, cooperative management of water resources within the LAWS boundaries.

Revenue sources for LAWS's are similar to those available to RWA's: water distribution rates and assessments on member systems.

Responsibilities of the LAWS Board of Commissioners could include:

- o Coordinating with County water resources staff to implement elements of the Conservation Program, the Technical Assistance Program, and the Education Program.
- o Providing a central "clearinghouse" for data collected within the LAWS boundary and transmitting the data to the County.
- o Other duties identified as being necessary to support and supplement County ground water management efforts.
- o Deciding whether to impose assessments on citizens within the LAWS boundary, the amounts of any assessments, and how to fairly disburse these

assessments.

c. Regional Public Water Districts

Formation or expansion of Public Water Districts, pursuant to Title 57 RCW, should be encouraged as a means to increase the effectiveness of County water resources management efforts. The term "regional", as used here, refers to water districts which cover a wide geographic area, and which include or consolidate several smaller public water systems. Water districts have available to them funding opportunities which place them in a position of being able to effectively maintain and operate water systems within their jurisdictions. Funding is available through property tax assessments on water district members, or, because they are considered a public body, through State loan and grant programs.

Large water districts, defined by hydrogeological or jurisdictional boundaries, could be formed through consolidation of several smaller water systems.

Consolidation of ground water users in an area into a water district can provide several benefits:

- o Regional planning of water resource strategy can become possible with formation of large water districts. Water district management is carried out through an elected board of commissioners. Decisions made by the district commissioners on regional water resource policy can reflect the unique views and concerns of citizens within each region, as each property owner within the district has a voice in the district's operations. Economies of scale can be realized through consolidation of smaller water systems, enabling efficient solutions to regional problems. If spread over large regions, projects such as redistribution of water resources from areas of availability to problem areas become possible.
- o Improvements to water systems experiencing quantity, quality, or management problems can be funded either through monies generated within the water district or through State grants and loans.
- o Consolidation of smaller water systems into large water districts can increase the efficiency of County and State functions in water resource management. Difficulties that arise with dealing with several hundred individual water systems could

be significantly reduced by combining water systems into larger water districts.

Island County should take the lead in encouraging and facilitating formation of regional water districts. Such regional cooperation and organization can increase the effectiveness of County water resource management efforts.

d. Public Utility Districts (PUD's)

A PUD, like a water district, is a public agency governed by a board of commissioners elected by citizens within the PUD boundaries. Many of the advantages and benefits of water districts are also true of PUD's. PUD's, however, may operate other utilities besides water systems.

In addition to normal rates and service charges, property tax assessments can provide funding for PUD's. Local improvement districts can be formed within PUD boundaries to assess monies for needed water system improvements. Because they are public entities, PUD's are eligible for State loan and grant programs.

e. Satellite System Management Agencies (SSMA's)

An SSMA is defined in the CWSP as an "entity or individual which owns, operates, and/or provides technical assistance to small water systems" (pg. xiii) A fully-staffed Public Works Department could assume this role, as could a private agency or existing water system. The SSMA operates under contract to water systems to provide operations and management assistance. Funding capabilities of SSMA's is derived from payments for services received. Interested readers are referred to Section VI of the CWSP for further information.

6. Volunteer Assistance

Volunteer effort can be an effective supplement to County activities, especially in the areas of conservation, technical assistance, and public education. Minimal investment in organizing, training, and educating volunteer groups can produce significant returns in the area of ground water management.

There is risk, however, in relying on volunteer efforts to implement the GWMP: should the recruitment of volunteers fail to generate adequate interest and willingness to contribute, the program itself could fail to provide any significant

ground water protection. An appropriately balanced application of organized community and volunteer effort and County staff and resources can effectively accomplish the goals of the GWMP.

Specific activities that volunteer groups could undertake to assist in GWMP implementation include, but are not limited to:

- o Distributing educational materials
- o Participating in speaking engagements and school outreach efforts
- o Distributing conservation retrofit kits
- o After receiving proper training, volunteers could provide significant contributions to certain data collection activities, such as weather data, water level monitoring, and well identification and location

Appendix I provides a list of organizations which should be considered as possible sources of volunteer assistance with GWMP implementation.

#### **E. RECOMMENDED SOURCE OF FUNDING**

The GWAC recognized the importance of having designated monies within the Island County budget to support the GWMP. For this purpose the GWAC recommends that the BICC establish a fund County-wide in an amount sufficient to provide full funding for the immediate and exclusive implementation of the GWMP.

#### **F. POTENTIAL SOURCES OF FUNDING**

Instead of identifying specific funding sources for each program element, this section spells out a variety of potential sources from which decision makers may select the most appropriate.

Because implementation funding through Centennial Clean Water Funds (see below) may not be available for some time after GWMP approval, it is recommended that interim funding, whether through County general funds, through pilot study grants, or through some other source, be sought to immediately implement certain elements of the preferred program. An application for Fiscal Year 1992 Centennial Clean Water Fund grant assistance has been submitted; the application is summarized in Exhibit VI-5.

One potential source of this interim funding could come from grant monies left over from GWMP development, if the Island County GWMP is completed under budget. These funds could be used for implementation, given Ecology's approval of the GWMP, and given Ecology's approval of a grant amendment to allow this use of the remaining funds. The remaining funds could potentially carry implementation of the GWMP to the point where Centennial Clean Water Funds are made available to continue implementation of the GWMP.

Ecology may be requested to amend the GWMP grant for Island County to allow funds remaining in the budget to be used for initiation of the GWMP preferred program. The BICC, upon approval of this document, is requested to provide matching funds to begin implementation of the GWMP.

Following are brief descriptions and evaluations of various local, state, and federal funding sources.

#### **1. Island County Current Expense Fund**

The Island County Current Expense fund is divided up among the various County departments and programs. The funds are allocated by decision of the Board of Island County Commissioners, based on recommendations and requests by department heads. Capability of the current expense fund to finance extensive new programs or activities is limited in the absence of new sources of revenue. Additional ground water management activities would have to compete with existing programs for funding through the general fund. Some County programs are self-supporting, i.e., Solid Waste Department activities. For some of the preferred program elements, fees could be charged for certain services, generating revenue to support GWMP implementation.

The County 1991 budget provides for one half-time Water Resource Planner position in the Planning Department. This is supplemented by 1.5 temporary, grant-dependent positions, which are to be terminated upon completion of the GWMP. The 1991 budget was completed and submitted before completion and adoption of the GWMP, and thus could not include funding for GWMP implementation. A budget amendment may be requested, as appropriate, during the budget year.

#### **2. Other County Revenue Sources**

Upon development of a water and/or sewerage general plan and adoption of the plan into the comprehensive plan pursuant to RCW 36.94, counties are authorized to

institute a variety of mechanisms to generate revenue to implement the plan. Such a plan may be adopted when "the county legislative authority deems it advisable and necessary for the public health and welfare of the inhabitants of the county to establish, purchase, acquire, and construct a system of sewerage and/or water...", among other activities (RCW 36.94.030).

Island County government has been traditionally hesitant about getting into the water business, and has for this reason not yet adopted a water and/or sewerage general plan.

Revenue options which become available upon adoption of such a plan and taking over utility operation include the application of rates and charges, and the issuance of general obligation bonds and revenue bonds.

Because of the scope of the requirements and duties which would become the responsibility of County government with adoption of a sewerage and/or water plan, the implications should be evaluated in detail before any action is taken.

Another potential revenue source for GWMP implementation that should be considered is a well registration fee imposed on proponents of new withdrawals. Collected through the Health Department upon granting well site approval, a relatively large fee (perhaps \$250, or more) could provide a significant contribution to alleviating County burden of implementing the GWMP.

Other revenue sources, such as permit or application surcharges, should be explored.

### 3. Centennial Clean Water Fund

The Centennial Clean Water Fund (CCWF) is authorized through RCW 70.146, RCW 82.24, and RCW 83.32, and is allocated by the Department of Ecology to fund water quality pollution control projects, including planning, facility construction, and other water quality programs. Funds may be in the form of grants or loans. Ceiling amounts for individual projects vary. The grants or loans from the CCWF usually require local match, with some exceptions. Five general categories of water quality projects are identified: Marine Water Facilities; Ground Water Activities and Facilities (such as the Island County GWMP); Freshwater Lakes and Rivers;

**Nonpoint Pollution Control Activities and Facilities;  
and Discretionary Projects.**

By applying for CCWF funding, projects are automatically considered for funding under other programs, such as the Federal Clean Water Act grant programs. This and similar programs, which are included under the CCWF program, are thus not considered separately in this section.

The CCWF program should be considered the primary source of funding assistance for the implementation of the GWMP. By funding the development of a GWMP, the State is in a sense requesting local government to accept delegation of the responsibility to manage ground water. The State Department of Ecology, then, should reimburse local government for accepting these responsibilities. This could be accomplished through long-term funding designated for GWMP implementation.

A summary of a proposed application for the 1992 CCWF funding cycle is provided in Exhibit VI-5.

**4. Aquifer Protection Area**

Aquifer Protection Area designation, authorized by RCW 36.36, allows local governments to collect fees from ground water users and onsite sewage system users. The funds can be used to finance limited aquifer protection activities, primarily planning and/or construction of facilities to prevent ground water contamination. The designation of an APA must be approved by the majority of voters in an area.

The APA designation was evaluated as a ground water management option and potential funding source in option paper #15. Because the number of activities that can be supported through APA funds is quite limited and not easily applicable to the needs of Island County, the designation in Island County may not be appropriate except in limited areas. Should the scope of the activities eligible for APA funding be broadened by future legislation, it is recommended that the APA be reconsidered as a possible financial solution to GWMP funding problems (see Coordination Program).

**5. Puget Sound Water Quality Authority (PSWQA) Management Plan Implementation**

Technical assistance is offered to local governments in activities which relate to the goals of the PSWQA

Management Plan under this program. No actual funding is offered; however, the assistance can effectively accomplish tasks that would otherwise be the responsibility of County staff, and can thus result in direct savings to the County.

The technical assistance is offered in activities such as ground water protection, watershed management planning, and nonpoint pollution reduction projects. Because watershed planning, in particular, is stressed in the GWMP, the benefits of this program should be used. The technical assistance is authorized pursuant to RCW 90.70. There are no requirements for local matching funds.

#### **6. State Revolving Fund (SRF) for Pollution Control**

Authorized through the Federal Clean Water Act and RCW 90.50A, the SRF provides low-interest loans to local governments with the program priority being to help these local governments meet wastewater discharge standards. Additional goals are to help curtail nonpoint source water pollution control and to assist with estuary management projects.

#### **7. Farmers Home Administration (FmHA) Loans**

The FmHA provides relatively low-interest loans, and some grant funding, to local governments and other public entities in rural areas to improve or enlarge water and wastewater facilities. Because Island County has no involvement in either water nor wastewater facilities, this program is limited in its applicability. Water and sewer districts are eligible for this loan source, and should consider FmHA loans when making needed improvements.

#### **8. Drought Relief Program**

The State Legislature has appropriated 3.2 million dollars to the State Department of Health for drought relief. This funding source is available to water systems only. This program could be especially effective in achieving the goals the Conservation Program.

Two funding categories, preventative and remedial, currently have funding available. Each category will have twenty to forty percent grants; water systems applying for the funds must provide the remaining sixty to eighty percent. Eligible projects include both

planning and construction activities. These projects must be identified and justified in a Water Shortage Response Plan. Copies of "Guidelines for the Preparation of Water Shortage Response Plans" are available from the Island County Health Department or the Department of Health.

Because this funding source is available only to entities which operate water systems, it has limited applicability in funding County government activities. However, it can be a valuable source of funding for the many public water systems currently experiencing water quantity problems. County staff should provide assistance and support to water systems pursuing these funds.

The following items are eligible under the respective grant categories:

Preventive Grants

- o Preparation of Water Shortage Response Plans
- o Purchase, development and distribution of conservation materials satisfactory to the Department of Health
- o Purchase and installation of flow restricting devices at customer meters
- o Source monitoring equipment, including source meters
- o Appropriate leak detection equipment or water audit studies
- o Interties (20% grant)

Remedial Grants

- o Interties
- o New or deeper wells
- o Redevelopment or rehabilitation of existing wells
- o Pumping facilities for wells and intakes
- o Potable treatment equipment
- o Emergency trucking of water supply

- o Repairs to reduce water loss
- o Portable pumping equipment

This section presents some of the more important sources of funding which could be used to support ground water management goals in Island County. This list is not intended to be exhaustive; other sources of funding should be explored should the above fail to meet the funding needs of the GWMP.

#### Exhibit VI-5

Summary of Implementation Grant Application for Centennial Clean Water Funds, based on Table VI-5.

##### Block Grant - GWMP Implementation FUNDING SOURCES

<u>Total Eligible Cost:</u> \$177,490		
<u>Fund Source</u>	<u>% match</u>	<u>maximum funding</u>
CCWF - Groundwater	50	\$88,745
<u>Match</u>	<u>% match</u>	
County	50	\$88,745
Cash	25	\$44,370
In-Kind(1)	25	\$44,370

(1) Includes, for example, studies and activities conducted at NAS Whidbey Island and volunteer assistance with GWMP implementation.

#### G. GWMP STAFFING NEEDS<sup>o</sup>

Full implementation of the GWMP will require staffing levels beyond those currently in place. A summary of the Ground Water Management Program staffing needs, including general descriptions of the equivalent three existing and the equivalent 2.5 proposed positions, is provided below. Additional details of preferred program implementation needs are provided earlier in this section. Estimated costs of this level of staffing are presented in Table VI-5.

## EXISTING POSITIONS

### Environmental Health Specialists - Water System Review

The equivalent of approximately two full-time positions involved in ground water management currently exist in the Health Department. These staff members are involved in the evaluation of ground water withdrawals and the enforcement of State and local water resource regulations. Together, these staff members will be responsible for implementation of ICC 8.09, Potable Water Source and Supply; the Ground Water Development Classification Matrix; and certain provisions of the Ecology/Island County Memorandum of Understanding. As noted, these are not new positions, but are discussed here for the purpose of presenting a complete ground water management staff organizational structure. They will also be included in the application for Centennial Clean Water Fund grant monies as elements of local match.

Following formation of a Public Works Department, these staff will remain in their present location in the Health Department.

Associate Planner - Water Resources - A half-time position currently exists in the Planning Department budget; this position involves implementation of the Coordinated Water System Plan and review of land use proposals for consistency with the CWSP and principles of ground water management.

Administrative Assistant - At least 20 hours per week of administrative assistance is currently devoted to support of ground water management activities in the Health Department.

## NEW POSITIONS

Associate Planner - Water Resources Planner - In addition to the duties described above, the Water Resources Planner should be hired for an additional 20 hours per week, and will be responsible for reviewing land use applications for consistency with the GWMP; coordinating with Health Department staff in implementation of the Ground Water Development Classification Matrix; assisting with activities associated with Critical Aquifer Recharge Area delineation pursuant to the GMA; and assisting with data management and computer activities assisting with implementation of the GWMP Technical Assistance and Data Collection and Management Programs; and taking the lead

in the Education and Conservation Programs.

Some of these activities will shift to the Public Works Department, once fully operational. Others, such as review of land use applications, should remain in the Planning Department. It is anticipated that Public Works Department formation will require considerable restructuring of existing County staff and responsibilities; details of these responsibilities should be determined at that time.

Associate Planner - Hydrogeologist - This full-time position is primarily involved in activities relating to data collection and monitoring activities, data management, and analysis of existing and new ground water data according to procedures outlined in the Data Collection and Analysis Plan and defined in the Data Collection and Management Program. Specific duties relating to GWMP implementation will be necessarily broad in scope, however, special emphasis will be in providing technical support to ground water related decisions. Other responsibilities will include support in implementation of the Conservation, Education, Technical Assistance, and Coordination Programs. This position entails review of ground water data collected through 1) ground water withdrawal review and approval procedures pursuant to the Ground Water Development Matrix and pumping test data, and 2) implementation of the Memorandum of Understanding with Ecology prior to database entry.

In addition, the hydrogeologist will be involved in designing and participating in a program to train volunteers in measuring water levels in wells in the County conducted by the WSU Cooperative Extension.

Once data collection and management responsibilities are shifted to the Public Works Department, staff and hardware will also be moved accordingly.

Administrative Assistant - As noted above, the equivalent of at least 20 hours per week of administrative assistance is devoted to ground water management activities in the Health Department. It is recommended that Planning Department personnel receive an additional 20 hours per week of administrative assistance to facilitate activities related to the Education, Conservation, Data Collection and Management, and Technical Assistance Programs; and paperwork, record-keeping, and other activities associated with GWMP implementation.

Data Manager - A temporary, part-time (16 hours/week)

position currently exists in the Health Department. This position involves the routine input and management of data currently collected. This includes well log data, Department of Health water quality data, and data from monitoring wells in Island County. Because this position is dependent on GWMP grant funding, and will not continue in the absence of additional funding, it is not included in the above listing of existing positions.

A data manager with the ongoing responsibilities described above is necessary to effectively carry out data collection and management activities. If funding is available, a part-time staff (16 hours/week) with the necessary training should continue to input data.

In addition to the data management presently ongoing in the ICHD, data management assistance is requested to help WSU Cooperative Extension and ICPD water resources staff in data input activities related to precipitation and evaporation data collection. This position does not exist presently. A part time position (4 hours/week) would be adequate to fulfill the necessary tasks; thus, a total of 20 hours per week for data management are recommended.

Workshop Coordinator - As presented in the Education Program, a temporary, part-time (20 hours per week) employee is recommended to conduct educational workshops and carry out other education-related functions. This is an 18-month long position. It is proposed that this position be grant funded, and that it begin approximately one year after GWMP implementation.

In summary, the equivalent of 2.5 immediate additional full-time positions are proposed to supplement the approximately 3.0 full-time positions already involved in ground water management activities. These are: 1 half-time Water Resources Planner, 1 full-time Hydrogeologist, 1 half-time Administrative Assistant, and 1 half-time Data Manager (see Exhibit VI-6)

In addition, one temporary half-time Workshop Coordinator, to be hired one year after GWMP implementation, is proposed.

### Exhibit VI-6

Existing and proposed staff for GWMP implementation.

#### EXISTING COUNTY STAFF

Department	Position	FTE
ICHD	Environmental Health Specialists (2)	2.0
	Administrative Assistant	.5
ICPD	Water Resources Planner	.5
Total		3.0

#### RECOMMENDED ADDITIONAL STAFF (a)

Department	Position	FTE
ICHD	Data Manager	.5
ICPD	Water Resource Planner	.5
	Water Resource Planner (Hydrogeologist)	1.0
	Administrative Assistant	.5
Total		2.5

(a) Not included in this table is the temporary, half-time Workshop Coordinator, to be hired approximately one year after GWMP certification for a period of 18 months.

#### H. BUDGET ESTIMATES

Table VI-5 presents an estimate of total GWMP costs for the first six months of implementation and for annual costs of ongoing implementation. Only additional expenditures to the 1991 County budget are presented.

Tables VI-6 through VI-9 give estimates for those preferred program elements requiring significant additional expenditures.

Where no significant additional costs are associated with a particular preferred program element, no budget estimates are provided. Non-programs, for example, do not have significant additional expenditures.

## I. PROPOSED IMPLEMENTATION SCHEDULE

Table VI-4 presents a proposed schedule for implementation of the GWMP preferred program elements.

The Education, Technical Assistance, Conservation, Data Collection and Management, and Coordination Programs require ongoing application of resources to ensure their successful implementation, are thus indicated as requiring such in Table VI-4.

The regulatory elements of the GWMP preferred program, such as items 5 through 10 in Table VI-4, require initial implementation activities, and will then be routinely applied by the responsible agencies (see footnote to Table VI-4).

TABLE VI-3  
ISLAND COUNTY GROUND WATER MANAGEMENT PROGRAM  
DEPARTMENTAL RESPONSIBILITIES (1)

Preferred Program Elements	Initiation Responsibility		Ongoing (3) Responsibility	
	Lead	Support	Lead	Support
1. Education Program	PD	WSU	PD (PW)	HD, PD, WS, LJ WSU
2. Technical Assistance Program	HD	PD	HD (PW)	HD, PD, WS, LJ
3. Conservation Program	PD	HD	PD, HD (PW)	WS, LJ (PD, HD)
4. Data Collection & Management	HD	PD WSU	PD(PW) HD	WS, LJ ED WSU
5. Grd. Wtr. Class. Matrix	HD	PD	HD	PD(PW)
6. Grd. Wtr. Availability Criteria	HD	PD	HD	PD (PW)
7. Land Dev. Std. Revisions	ED	---	PD(PW)	---
8. Environmentally Sensitive Areas	PD	---	PD	---
9. Critical Areas Designation	PD	HD	PD	HD
10. Areas of Special Concern	HD	PD	HD	PD
11. Non-regulatory Land Conservation	AO	PD	AO	PD
12. Pollution Source Controls	HD, PD	SCS, WSU ED	PD(PW) HD	SCS, WSU ED
13. Coordination Program	PD, HD	(2)	PD(PW)	(2) (PW)
14. DOE/Island Co. MOU	---	---	HD, DOE	PD (PW)

TABLE VI-3 (cont.)  
ISLAND COUNTY GROUND WATER MANAGEMENT PROGRAM  
DEPARTMENTAL RESPONSIBILITIES (1)

(1) Acronyms used:

AO - Island County Auditor's Office  
DOE - Washington State Department of Ecology  
ED - Island County Engineering Department  
HD - Island County Health Department  
LJ - Local Jurisdictions (e.g., Coupeville, Langley,  
Oak Harbor, water districts)  
PD - Island County Planning Department  
PW - Island County Public Works Department  
SCS - Whidbey Island Soil Conservation Service  
WSU - Washington State University Cooperative Extension  
Service  
WS - Water systems

(2) All departments are responsible for ongoing coordination.

(3) Where it is recommended that the Public Works Department take  
over a particular function, it is indicated with (PW). Other  
parenthesized notations indicate the placement of  
responsibility following formation of the Public Works  
Department.

TABLE VI-4

## ISLAND COUNTY GROUND WATER MANAGEMENT PROGRAM

## PROPOSED IMPLEMENTATION SCHEDULE

PREFERRED PROGRAM ELEMENTS	Quarter following GWMP certification										
	1	2	3	4	5	6	7	8	9	10	ongoing
1. <u>Education Program</u>											
A. Purveyor information	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****
B. Press releases	****	****	****	****	****	****	****	****	****	****	****
C. Newsletters	****	****	****	****	****	****	****	****	****	****	****
D. Workshops											
2. <u>Technical Assistance Program</u>	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****
3. <u>Conservation Program</u>	****	****	****	****	****	****	****	****	****	****	****
A. Education	****	****	****	****	****	****	****	****	****	****	****
B. Metering	****	****	****	****	****	****	****	****	****	****	****
C. Conservation Assistance	****	****	****	****	****	****	****	****	****	****	****
D. Policy											
4. <u>Data Collection Program</u>											
A. Well Inventory	***	***	***	***	***	***	***	***	***	***	***
B. Water Level Monitoring	***	***	***	***	***	***	***	***	***	***	***
C. Usage Monitoring	***	***	***	***	***	***	***	***	***	***	***
D. Quality Monitoring	***	***	***	***	***	***	***	***	***	***	***
E. Weather Data Collection	**	**	**	**	**	**	**	**	**	**	**
F. Runoff Data Collection											

TABLE VI-4 (continued)

ISLAND COUNTY GROUND WATER MANAGEMENT PROGRAM  
PROPOSED IMPLEMENTATION SCHEDULE

\* Implementation startup; single star equals approximately 3 weeks.

## > Continuing implementation

(a) These preferred program elements are regulatory. Specific regulations or changes to existing regulations are recommended for adoption. Once adopted, the responsible agencies will provide ongoing administration of the new regulations.

(b) Implementation of the conservation futures tax in Island County should be considered by the BICC during this time period.

(c) There is both a regulatory and non-regulatory component to this management strategy. Specific regulations should be adopted early on. Non-regulatory activities should be ongoing through out GWMP preferred program implementation.

FILE VI-5  
 BUDGET ESTIMATE SUMMARY  
 ISLAND COUNTY GROUND WATER MANAGEMENT PROGRAM

Budget Items	Initial costs (first 6 mo.)		Ongoing Annual Costs	
	hrs/wk	total costs for 6mo.	hrs/wk	total annual costs
<u>Personnel:</u> (a)				
Water Resources Planner	20	\$ 8,580	20	\$17,160
Hydrogeologist	40	17,160	40	34,320
Data Manager	20	8,580	20	17,160
Administrative Assistant	20	5,840	20	11,700
<u>Operations/Administration:</u>				
<u>Administrative overhead</u> (c)				
advertising	3,760		7,500	
printing	3,250	(b)	2,600	
copying	5,500	(b)	8,150	
travel	1,450	(b)	1,900	
computer supplies	1,650		3,300	
mailing	300		700	
professional services	9,500	(b)	14,500	
communications	4,000		16,700	
<u>Materials/Equipment:</u>				
computer	2,500		-	
printer	2,100		-	
software	800		-	
educational materials	3,000		5,000	
meters	15,000		30,000	
water saver kits	2,500		5,000	
data collection equipment	6,420		-	
miscellaneous	1,000		2,000	
Total, GWMP		\$103,290		\$177,490

(a) The following salary assumptions were made: Water Resources Planner @ \$34,320/yr., Hydrogeologist @ \$34,320/yr., Data Manager @ \$34,320/yr., Workshop Coordinator @ \$33,800/yr., and Administrative Assistant @ \$23,400/yr. Benefits are also added @ 30% of salary.

(b) For the first 6 months of GWMP implementation, estimates of these administrative costs include costs associated with the codification and implementation of regulatory elements of the GWMP preferred program.

(c) Administrative overhead is assumed to be approximately \$3,000/yr. per employee.

(d) The Workshop Coordinator position, a temporary (18-month), half-time position which is to start approximately one year following GWMP certification, is not included here. This position would add approximately \$16,900 to the GWMP budget while the workshop program is underway.

TABLE VI-6  
ESTIMATED BUDGET  
EDUCATION PROGRAM

Program Elements: Surveyor info program; newsletters; press releases; workshops	Initial Costs (first 6 mo.)		Ongoing Annual Costs	
	hrs/wk	total costs for 6mo.	hrs/wk	total annual costs
<u>Personnel:</u>				
Water Resources Planner (a)	5.0	\$2,145	5.0	\$4,290
Hydrogeologist (a)	7.5	3,220	7.5	6,440
Administrative Assistant (a)	5.0	1,460	5.0	2,930
<u>Operations/Administration:</u>				
administrative overhead (b)				
advertising	660		1,310	
printing	600		1,300	
copying	3,500		7,000	
travel	500		1,000	
computer supplies	350		700	
mailing	200		500	
professional services (c)	2,500		5,000	
communications	2,500		2,500	
Materials/Equipment:				
computer	2,500		(d)	
printer	2,100		"	
software	800		"	
educational materials	2,000		3,000	
Total, Education Program		\$25,135		\$36,170 (e)

(a) The following salary and benefit assumptions were made: Water Resources Planner @ \$34,320/yr., @ \$23,400/yr. Benefits are added @ 30% of salary.

(b) Administrative overhead is assumed to be approximately \$3,000/yr. per employee.

(c) Professional services may take the place of some employee time, but to an undetermined extent.

(d) Computer and peripherals listed under Education Program will be used for other elements of the GWMP preferred program.

(e) The Workshop Coordinator is not included in this total. This is a temporary (18-month) position starts approximately 1 year after GWMP approval, and which will add another \$16,900 (plus administrative overhead) to the annual budget for the year.

TABLE VI-7  
ESTIMATED BUDGET  
TECHNICAL ASSISTANCE PROGRAM

Program elements: conservation assistance, system management, data resources, library maintenance	Initial Costs (first 6 mo.)		Ongoing annual costs	
	hrs/wk	total costs for 6mo.	hrs/wk	total annual costs
<u>Personnel:</u>				
Water Resources Planner (a)	2.5	\$1,075	2.5	\$2,150
Hydrogeologist (a)	10.0	4,290	10.0	8,580
Administrative Assistant (a)	5.0	1,460	5.0	2,925
<u>Operations/Administration:</u>				
administrative overhead (b)		660		1,310
advertising		200		400
printing		200		200
copying		100		200
mailing		500		1,000
travel		500		1,000
computer supplies		-		-
professional services (c)		1,500		-
communications		100		200
<u>Materials/Equipment:</u>				
computer		-		-
printer		-		-
software		-		-
educational materials		500		1,000
Total, Technical Assistance Prgm		\$11,085		\$18,965

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- (a) The following salary assumptions were made: Water Resources Planner @ \$34,320/yr., Hydrogeologist @ \$34,320/yr., and Administrative Assistant @ \$23,400/yr. Benefits are also added @ 30% of salary.
- (b) Administrative overhead is assumed to be approximately \$3,000/yr. per employee.
- (c) Professional services may take the place of some employee time, but to an undetermined extent.
- (d) Computer and supplies listed under "A. Purveyor Information Program" will be used for other program elements.

TABLE VI-8  
ESTIMATED BUDGET  
CONSERVATION PROGRAM

Program elements: Technical assistance, meter distribution, retrofit kit distribution, etc.	Initial Costs (first 6 mo.)		Ongoing annual costs	
	hrs/wk	total costs for 6mo.	hrs/wk	total annual costs
<u>Personnel:</u>				
Water Resources Planner (a)	12.5	\$5,360	12.5	\$10,720
Hydrogeologist (a)	2.5	1,070	2.5	2,140
Administrative Assistant (a)	5.0	1,460	5.0	2,925
<u>Operations/Administration:</u>				
administrative overhead (b)		750		1,500
advertising		200		400
printing		200		200
copying		100		200
mailing		500		1,000
travel		500		1,000
computer supplies		-		-
communications		100		200
<u>Materials/Equipment:</u> (d)				
meters (e)		15,000		30,000
water saver kits (f)		2,500		5,000
educational materials		500		1,000
Total, Conservation program		\$28,240		\$56,285

- (a) The following salary assumptions were made: Water Resources Planner @ \$34,320/yr., Hydrogeologist @ \$34,320/yr., and Administrative Assistant @ \$23,400/yr. Benefits are also added @ 30% of salary.
- (b) Administrative overhead is assumed to be \$3,000/yr. per employee.
- (c) Professional services may take the place of some employee time, but to an undetermined extent.
- (d) Computer and supplies listed under "A. Purveyor Information Program" will be used for other program elements.
- (e) Based on distribution of 400 connection and source meters/yr. @ \$75 each - installation extra.
- (f) Based on 1,000 kits/yr. @ \$5 per kit. Does not include distribution costs, if any.

TABLE VI-9  
ESTIMATED BUDGET  
DATA COLLECTION AND MANAGEMENT PROGRAM

Program elements: Well inventory; water level, usage, and quality monitoring; weather monitoring	Initial Costs (first 6 mo.)	Ongoing annual costs (f)		
Personnel:	hrs/wk	total costs for 6mo.	hrs/wk	total annual costs
Data Manager (a)	20.0	\$8,580	20.0	\$17,160
Hydrogeologist (a)	20.0	8,580	20.0	17,160
Administrative Assistant (a)	5.0	1,460	5.0	2,925
<u>Operations/Administration:</u>				
administrative overhead (b)				
advertising	1,690	3,375		
printing	250	500		
copying	600	750		
mailing	250	500		
travel	5,000	7,500 (e)		
computer supplies	300	600		
communications	100	200		
professional services (c)	100	200		
-	-	14,200		
<u>Materials/Equipment:</u>	Quantity			
water quality sampler	1	500		
precip. event recorder	2	1,700		
pan evaporation stations	2	3,000		
water level indicators	2	520		
altimeter	1	250		
rain gauges	50	450		
miscellaneous		1,000		
Total, Data collection program		\$34,330		\$66,170

(a) The following salary and benefit assumptions were made: Data Manager @ \$34,320/yr., Hydrogeologist @ \$34,320/yr., Administrative Assistant @ \$23,400/yr. These are totals of salaries plus benefits at 30% of salary.

(b) Administrative overhead is assumed to be approximately \$3,000/yr. per employee.

(c) Includes lab costs for water quality sampling.

(d) Existing computer equipment will be used for the data collection program.

## SECTION VII

### EFFECTIVENESS MONITORING PLAN

#### A. INTRODUCTION

Implementation of the Island County Ground Water Management Program requires continued efforts by the GWMP lead agency and the Ground Water Advisory Committee. It is an action plan and the lead agency and the GWAC must work together to identify impediments, ensure progress, and monitor its effectiveness. Ongoing efforts to monitor the preferred program and to facilitate the adoption of one or more of the ongoing options are described below.

#### B. LEAD AGENCY RESPONSIBILITIES

The Island County Planning Department is the lead agency for implementation of the GWMP. The Planning Department is recognized for having multi-jurisdictional authority over local ground water issues and for maintaining an active role in state issues regarding ground water planning and management.

The GWMP lead agency responsibilities include:

- o Monitoring the effectiveness of the GWMP preferred program implementation and reporting to the GWAC;
- o Monitoring and evaluating the adequacy of GWMP funding and staffing;
- o Presenting updates to the GWAC regarding the status of ongoing options;
- o Providing necessary support to the GWAC for program implementation and review;
- o Enforcing local regulations under its jurisdiction which pertain to ground water protection;
- o Reporting annually to Ecology on progress and status of GWMP implementation. These reports will be distributed to the BICC and the GWAC.

#### C. GWAC RESPONSIBILITIES

Once the GWMP has been certified by Ecology, the GWAC will have responsibilities in both GWMP implementation and in evaluating ongoing options. The lead agency will coordinate

with the GWAC on GWMP implementation progress and review. The GWAC will have the following responsibilities:

- Evaluate the effectiveness of the GWMP and recommend necessary revisions;
- Assist in drafting specific recommendations to incorporate ongoing options into the GWMP preferred program.
- Assist in activities relating to GWMP program implementation, especially in the Data Collection and Management and Education Programs, including field visits and interviews.

#### **D. GWAC MEMBERSHIP AND ORGANIZATION**

The GWAC should continue to represent a broad spectrum of the public to ensure objectivity in ground water protection. At the first GWAC meeting following GWMP program certification, the GWAC should decide how preferred program monitoring is to be reviewed and evaluated and whether it be reviewed by an executive committee or by subcommittees. Ecology may appoint replacement members or alternates to the GWAC upon request of the appointee or the GWAC.

The decision of whether to maintain the existing Steering Sub-committee structure and function should be made at the first GWAC meeting following GWMP certification. Ecology clarification of the role of the GWAC in GWMP implementation would assist in making this decision. During the startup phase of GWMP implementation, it may be appropriate for the Steering Sub-Committee to meet on occasion to coordinate activities related to implementation startup. Once implementation is effectively underway, however, it may be appropriate for the Steering Sub-Committee to dissolve its functions and for reviews to be conducted by the full GWAC.

Discussion at all meetings should be focused and structured with the subject matter limited to GWMP implementation efforts. Effective GWMP implementation will require that many activities be organized and carried out simultaneously, therefore, meetings should emphasize specific actions described in the certified plan.

#### **E. REVIEW METHODS**

A number of review methods will be used to monitor GWMP effectiveness and ongoing option developments. These may include progress and budget reports, field visits, and interviews. Both County staff and the GWAC will be involved

in evaluating GWMP effectiveness.

The program monitoring system is designed to evaluate the effectiveness of the GWMP preferred program. The GWMP program goals and objectives should be used as the long-term criteria for the determination of program progress and success. Each recommended management strategy should be reviewed independently in order to determine if the option objective has been met or if the desired implementation progress has been achieved in the desired time frame. Preferred program progress should be measured against the preferred program implementation schedule (See Table VI-4).

Specific and general questions which could be asked by staff and GWAC to assist in preferred program evaluation could include:

- Have recommended strategies been implemented?
- Have the stated objectives been met?
- Is implementation of each of the preferred program elements working successfully together towards ensuring comprehensive ground water management in Island County?
- Have any program gaps become apparent during GWMP implementation efforts?
- How are evaluations of ongoing options progressing toward their possible incorporation into the preferred program?

Annual field visits to specific sites associated with implementation should be conducted to monitor program effectiveness. For example, where implementation consists of volunteer participation in ground water data collection activities, the GWAC should be involved in communicating with volunteers to ensure implementation is being carried out in the proper manner. If problems related to program implementation arise, a site visit may ensure that problems are properly addressed and handled. A field inspection could also be conducted to check the operation and installation of the pan evaporation stations.

In addition to volunteers, County staff and affected agencies throughout the County which are directly or indirectly involved with ground water management should be interviewed when appropriate. As part of the review process, the Data Collection System in the ICHD should be reported on an annual basis. A GWAC member may interview ICHD staff to get an update of progress and any specific problems encountered.

#### F. REVIEW SCHEDULE

Table VII-1 represents the recommended schedule for GWAC

review meetings and annual reviews. Following GWMP certification, the GWAC will meet quarterly to review GWMP implementation progress. Not all program elements will be reviewed at every quarterly meeting. The GWAC should decide which program elements require review prior to each scheduled meeting. The rows to the right of each program element will be marked with a review symbol when it is determined a review is necessary.

During the annual review period, County staff will provide an annual written report on progress, results, effectiveness, problems, and new developments of GWMP implementation and ongoing options. A budget report will be provided as part of each annual report, including a list of expenditures, projected expenditures, and funding status. Reports will be sent to the BICC, GWAC, Ecology, and DOH. Interested citizens may obtain the progress report at their request.

#### **G. GWAC ANNUAL EVALUATION AND REPORT TO ECOLOGY**

Based on the information contained in the staff report, the GWAC will also conduct an annual evaluation of GWMP implementation progress and program effectiveness. The GWAC should meet to discuss the annual report provided by staff and if necessary supplement the report. Both staff and GWAC annual evaluations will be submitted to Ecology following the review period.

Following the second annual review period, the GWAC meeting schedule may require some changes. During this review period, the GWAC should evaluate their existing review schedule and make modifications as necessary. For example, semi-annual meetings of the GWAC may be more appropriate once GWMP implementation is effectively underway.

TABLE VII-1  
ISLAND COUNTY GROUND WATER MANAGEMENT PROGRAM  
PROPOSED REVIEW SCHEDULE

	Quarter following GWMP certification											
	1	2	3	4	5	6	7	8	9	10	11	12
GWAC review meetings	x	x	x	x	x	x	x	x	x	x	x	x
GWMP Annual Reviews				*				*				*
PREFERRED PROGRAM ELEMENTS	(a)	(a)	(a)		(a)	(a)	(a)		(a)	(a)	(a)	
1. <u>Education Program</u>				o				o				o
2. <u>Technical Assistance</u>				o				o				o
3. <u>Conservation Program</u>				o				o				o
4. <u>Data Collection Program</u>				o				o				o
5. <u>Ground Water Development Classification Matrix</u>				o				o				o
6. <u>Ground Water Availability Criteria</u>				o				o				o
7. <u>Land Development Standards Revisions</u>				o				o				o
8. <u>Environmentally Sensitive Area Designation</u>				o				o				o

TABLE VII-1 (continued)  
 ISLAND COUNTY GROUND WATER MANAGEMENT PROGRAM  
 PROPOSED REVIEW SCHEDULE

	Quarter following GWMP certification											
	1	2	3	4	5	6	7	8	9	10	11	12
GWAC review meetings	x	x	x	x	x	x	x	x	x	x	x	x
GWMP Annual Reviews				*			*					*
PREFERRED PROGRAM ELEMENTS	(a)	(a)	(a)		(a)	(a)	(a)		(a)	(a)	(a)	
9. <u>Critical Area Designation</u>					o			o				o
10. <u>Areas of Special Concern</u>					o			o				o
11. <u>Non-Regulatory Land Conservation</u>					o			o				o
12. <u>Pollution Source Controls</u>					o			o				o
13. <u>Coordination Program</u>					o			o				o
14. <u>Memorandum of Understanding</u>					o			o				o

x GWAC quarterly review of selected preferred program elements.

\* County staff and GWAC annual review of all preferred program elements.

o Preferred program element to be reviewed during this time period.

(a) The preferred program elements to be review at this GWAC meeting will be determined at a later date.