



COMPREHENSIVE WATER RESOURCE PLAN

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February 9, 1999

**WHATCOM COUNTY
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Pete Kremen
County Executive

February 9, 1999

Dear Whatcom County Citizens:

There is likely no greater challenge facing us than protecting our precious water resources for present and future generations. The intent of this plan is to provide a firm working foundation upon which this county and its citizens will be able to effectively preserve the most valuable of our natural resources – water.

This collective effort has enabled the development of a viable and realistic comprehensive water resource plan for Whatcom County. In addition to the work of the County's Water Team, this document was reviewed by a number of knowledgeable individuals, groups and local governmental entities. The hard work, constructive feedback and thoughtful suggestions of all involved have contributed substantially to this important planning effort.

While none of us who live in Washington's beautiful "fourth corner" are pleased with the prospect of spending substantial amounts of money on water resource issues, all of us have an important stake in the outcome of this work. If we fail to initiate and see these important projects through to successful completion, we will pay a much heavier price in the future. Without available and viable water resources, the beauty, strength and vitality that make Whatcom County a desirable place to live, raise our families and pursue our dreams will wither away.

This plan is being submitted to the County Council as a beginning "road map" that will help focus our efforts on the many projects that must be accomplished to protect our water and restore our endangered fisheries. The information contained in this document is intended to provide Council members with sufficient information to allocate the funds necessary to begin our work. I wholeheartedly encourage all citizens to become part of this crucial effort to protect the natural resource that is the lifeblood of our existence.

Sincerely,

A handwritten signature in black ink, appearing to read "Pete", written in a cursive style.

Pete Kremen
County Executive

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Whatcom County Comprehensive Water Resource Plan

INTRODUCTION

Purpose

The people of Whatcom County have historically benefited from the abundance and availability of water resources. This region is rich in natural beauty, renewable resources and plentiful fisheries. Our community has enjoyed abundant outdoor recreation as well as a vibrant economy. However, these resources and Whatcom County's economic future depend on adequate and dependable supplies of clean water for many uses.

The time has come when all government units, citizens and industry must work together to respond to critical and unavoidable water resource issues that will decide our future quality of life. While Whatcom County is currently involved in numerous on-going water issues, many new, expanded commitments and obligations have been placed upon the County. These include groundwater protection, Lake Whatcom management, salmon and shellfish recovery, and watershed planning under HB2514. It is essential that the County help to develop and implement plans and programs to protect and manage the water supply. All will have to work together, citizens, private businesses and organizations.

In October 1998, the County administration began the development of a Comprehensive Water Resource Plan intended to address the new and expanding obligations. The initial planning documentation provided a general overview of anticipated actions and funding requirements for the various water program elements.

In December 1998, the County Council took decisive action to provide funding in order that the necessary water resource programs could begin. At the same time, the Council also indicated the need for additional information and discussion as the process moves forward. The purpose of this document is to:

- Clearly identify our water resource management goals;
- Provide additional details on the new and expanding programs and actions intended to help meet those goals;
- Identify short and long term local responses and needed resources; and
- Respond to specific comments and recommendations received on the initial Water Resource Plan.

Water Resource Management Goals & Objectives

Development of an effective plan requires having a clear vision of the path to take. The County has adopted many goals and policies related to water resource management that provide further guidance in what we need to achieve. Among these are the County mission and vision statements (see Appendix G-1), comprehensive plan (see Appendix G-2), critical areas ordinance (see Appendix G-3), Lake Whatcom Watershed Interlocal Agreement (see Appendix 4-C), and Memorandums of Agreement pertaining to watershed planning (see Appendix 1-B) and salmon recovery (see Appendix 2-C). These were all used as a basis for the following goals:

- ◆ **WATER SUPPLY GOAL:** Whatcom County will have reliable and sustainable water supplies that support existing needs, as well as provide for reasonable growth and economic vitality.
- ◆ **FISH / SHELLFISH:** Whatcom County will have in place, local programs and actions that protect and contribute to the enhancement of fisheries, restore shellfish, and satisfy ESA requirements.
- ◆ **SURFACE WATER MANAGEMENT:** Whatcom County will have coordinated land use and habitat management that protects the drinking water supplies and provides recreational opportunities while restoring and sustaining natural systems.
- ◆ **GROUNDWATER MANAGEMENT:** Whatcom County will have in place programs designed to protect and promote safe and healthy drinking water supplies.
- ◆ **COORDINATED PLANNING & MANAGEMENT:** Whatcom County will have an effective water management structure that performs comprehensive planning and provides coordination of local, state, federal and tribal efforts that support diverse needs and users and promotes efficient use of available resources.

To achieve these goals, initial objectives have been targeted. It must be stressed that any quantifiable objectives are only achievable if sufficient funding is made available.

- ◆ **WATER SUPPLY:** Whatcom County will have a locally developed watershed plan and implementation strategy that provides for long-term, reliable and sustainable water supplies by 2003.
- ◆ **FISH / SHELLFISH:** Whatcom County will have all shellfish harvesting

areas re-opened by 2003. Whatcom County will implement programs and regulations for the protection of fish to fulfill the intent of the Endangered Species Act and state regulations.

- ◆ SURFACE WATER MANAGEMENT: Whatcom County will have a stormwater plan and implementation strategy in place by 2000.
- ◆ GROUNDWATER MANAGEMENT: Whatcom County will have a comprehensive groundwater plan and implementation strategy by 2001.
- ◆ COORDINATED PLANNING & MANAGEMENT: Whatcom County will have an effective administrative structure for water resource management by November 1999.

It is the intent of this plan to accomplish these goals and objectives through win-win solutions in partnership with all stakeholders. Specifically measurable objectives to attain these goals will be developed as part of the program elements specified in this plan. As much as possible, these goals should be achieved through non-regulatory approaches that allow the most practical and cost effective compliance with legal mandates.

These water resource issues are dynamic and must be addressed within a context of a volatile political, financial and regulatory environment. It is important to be mindful of this fact and expect changes. The issues ahead are large and complex. They will not be solved over the course of one year but must be approached as a long-term commitment. Substantial, cooperative, and coordinated efforts will be required between local jurisdictions and partners, including the tribes and state and federal government. Substantial financial commitments will need to be made locally. One of the benefits of this willingness to make the financial commitment locally is the opportunity to leverage greater financial resources from the state and federal governments. This opportunity also serves to assist in preserving local discretion and control to the maximum extent possible.

To achieve these goals, the County Council must commit the financial resources to implement the actions herein contained. The administration must then aggressively engage in a productive and effective long-term cooperative effort with other local entities to achieve these important goals. Together, all must recognize the crucial role that our finite water resources play in the life, health and success of our community. We must act responsibly to protect and preserve these essential resources for ourselves now and our children in the future.

Comprehensive Water Resource Plan Funding

Identifying and applying local resources to accomplish the identified goals is a critical issue that must be addressed. In addition to the previously established funding sources for existing water resource programs and activities, the Whatcom County Flood Control Zone District has agreed to provide short-term funding for the new and expanded water resource efforts described in this plan (\$1.7 million local funds for 1999). However, while this plan begins to outline the long-term resource needs, funding alternatives must be identified and selected as the variety of water resource work program details are finalized for 2000 and beyond.

Program Elements

Meeting the identified goals will require the continuation of existing programs¹ as well as the development and implementation of new and expanding programs. It is also critical that the County proactively participate in actions at the local, state, and federal level in order to respond to future needs and/or changes that may arise.

New and expanding programs are described in Elements that follow. Both short and long-term actions are described for each program to the extent they are known. In some cases, such as for Shellfish Protection and Lake Whatcom, various jurisdictions and partners have developed very specific actions. For other programs, such as Watershed Planning Under 2514 and Salmon Recovery, specific details are being developed through cooperative efforts with our resource management partners.

¹ Examples of existing programs include flood hazard management, stormwater management, Coordinated Water System Plan implementation, water/wastewater utility plan review, Lummi On-Reservation negotiations, education/outreach programs, land use/development regulations, on-site/solid waste programs, public water supply oversight, water availability evaluations, well site inspections, groundwater data management/risk assessment/outreach/monitoring, spill response, wellhead protection, well abandonment, etc.

***Element One: Watershed Planning Under the
Watershed Management Act
(RCW 90.82/ESHB2514)***

Background

The Watershed Management Act: The Opportunity and Need.

The 1998 Legislature passed Engrossed Substitute House Bill 2514, now known as the Watershed Management Act. This act provides a framework to collaboratively plan and implement solutions to water related issues. It is designed to allow local citizens and local governments to join together with tribes, state, and federal agencies to develop and implement a Watershed Management Plan that balances the competing resource demands. The goal is for current and future generations of people in the WRIA to have a sustainable environment and economy which make it possible to continue to harvest salmon and to have water of sufficient quality and quantity to meet our needs.

The framework is based on geographic areas known as Water Resource Inventory Areas (WRIAs). In Whatcom County, WRIA #1 includes the Nooksack river basin and several adjoining smaller watersheds, such as the coastal drainages of Dakota and California Creeks, as well as Lake Whatcom. Locally established "Planning Units" are to assess each WRIA's water supply and use, and recommend strategies for satisfying water supply needs. In addition, there is also the opportunity for local planning units to address the closely related issues of improving water quality, protecting and enhancing fish and wildlife habitat, and, in collaboration with the Department of Ecology, to determine instream flows.

Participation of any WRIA in the Watershed Management Act planning process is voluntary. It is an opportunity, not a mandate. This law provides that the locally generated watershed plan, if adopted by local governments, will also be adopted by state agencies. Federal agencies, which by invitation will be represented in the planning project, may also accept the applicable obligations included in the plan.

The fact that the state will endorse and adopt the local watershed plan creates an opportunity to solve some otherwise intractable water quantity, quality, and habitat problems. Failure to develop and adopt a local watershed plan would have severe negative consequences on the economic and environmental future of Whatcom County (discussed more fully below). Lacking adoption of a local watershed plan, there is no other practical means available to address water allocation issues at this time. The result would be uncoordinated actions by state and federal agencies, extensive litigation, and probable federal adjudication, a process that could take many years (e.g. 10 – 25 years). These judicial processes would be far more expensive than local watershed planning and would not create desirable solutions. It is therefore imperative

that Whatcom County, the other Initiating Governments,² the participating local governments, and the participating private interests fully commit to working cooperatively, and to provide the financial resources, technical expertise, and staff to enable success.

There have been other attempts in Whatcom County to do comprehensive watershed planning. These attempts have provided valuable experience and suggestions as well as a considerable body of technical information that needs to be considered in this planning process. Building on this past experience, and because the Watershed Management Act provides for state adoption of the plan and a specific framework for the process, the current effort has greater potential for success.

Four Components of a Watershed Plan

The four components of a Watershed Plan under the Watershed Management Act consist of one required component, water quantity, and three optional components, water quality, habitat, and instream flows (see Appendix 1-A).

The Initiating Governments for WRIA #1 have opted to do all four of the components. These are outlined in the original grant application to the Department of Ecology (DOE) and in the Memorandum of Agreement between the Lummi Nation, the City of Bellingham, Whatcom County, and Public Utility District #1 signed in October 1999. The optional components, water quality, habitat, and instream flows, are complementary to and will be closely coordinated with the other local efforts in salmon recovery and ESA response.

The mandatory **water quantity** element should consist of an assessment of water usage and availability and a plan strategy. The assessment should determine a water usage budget that quantifies the following:

- How much water is present and available;
- Existing water rights and how the water is actually being used;
- Future water needs;
- Aquifer recharge;
- What water may be available for appropriation.

The goal of the strategy is to ensure water supply needs and to meet minimum instream flows. The planning process cannot confer water rights.

The optional **water quality** component should begin with an examination of:

- Existing studies on water quality standards met, violated, causes, and pollution capacity,

² The Initiating Governments for WRIA #1 are Whatcom County, City of Bellingham, Public Utility District #1 and the Lummi Nation.

- Legal uses of fresh water;
- TMDLs established for the area;
- The impact of fresh water quality on the marine environment.

The plan should include recommendations for implementing TMDLs and monitoring for compliance.

The optional **habitat** component should rely on existing laws, the Growth Management Act, forest practices, and be integrated with other salmon recovery efforts. The Salmon Recovery Act (ESHB 2496), which provides for Limiting Factors Analysis and Critical Pathways methodology, and a prioritized list of projects and recovery actions, should serve as the primary non-regulatory part of the plan.

The optional **instream flows** component of the plan may be done by collaborating with the DOE, and consulting with the affected tribes.

Phases of the Watershed Management Project

The Watershed Management Act outlines three phases in the creation of a watershed plan, and the subsequent adoption/implementation of the plan.

Phase 1 is the formation of the Watershed Management Project organization, including the Planning Unit, and outlining a scope of work, budget, and planning procedures and protocols.

Phase 2 is the technical assessment phase, involving the evaluation of existing data and the identification and collection of new data.

Phase 3 is the production of a watershed plan designed to provide the best management strategy to balance the competing demands for water and ensure long-term sustainability of that balance.

When the County and the other local participating governments approve the final plan, the implementation phase begins, although ongoing and early action projects may be continued or initiated prior to completion of the full plan. Participating state and federal agencies, if they have participated in the creation of the plan, can adopt the applicable obligations and guidelines contained in the plan. The participating governments may adopt the planned rules and ordinances, thus enabling the locally based management plan to begin. The long-term management plan would probably include long-term data collection, monitoring, and adaptive management by designated organizations.

Major Issues in Nooksack Watershed - WRIA #1

The DOE is the state agency with statutory authority to administer water rights, permits, and claims, and to process applications. In the last 10 years, there have been

approximately 500 applications for new water rights and permits, and fewer than 10 have been granted. For a variety of reasons, the DOE is unable to process these applications. Without the kind of watershed assessment provided for in the Watershed Management Act, there can be no appreciable new water available to enable the economy to thrive and grow.

The problem is that the officially recorded quantities of water that are allocated for consumptive use in WRIA #1 may be very different from the actual valid allocation and consumptive use. The DOE has about 8,000 recorded water-right files (files in this context means recorded claims, rights, permits and applications) in WRIA #1. Most of these recorded files have never been reviewed, and their current validity and accuracy is not determined. Until each of these files is investigated, it must be officially assumed that all of these files are valid, and that the actual quantities of water consumed are consistent with the quantities granted in the file. Thus, the officially determined total quantities of water that are allocated and consumed in WRIA #1 are based on paperwork that may no longer be valid or accurate. The resultant official assertion is that WRIA #1 is over-allocated and that no new water is available. Additionally, there are a significant number of exempt wells that provide difficulties in estimating total water use.

The actual allocation and use of water in WRIA #1 is not known, and must be determined in order to enable a realistic water management plan to be created. A minor proportion of these DOE files have been investigated, and based on the findings in those cases, it is reasonable to project that the majority of the recorded water-right files are either no longer valid, and/or that the quantities listed do not agree with actual usage. When actual water allocation and use is determined, it may be that additional water will be available for allocation.

The DOE also has the responsibility to enforce water consumption based on this permitting process. It is estimated that up to 60% of the Whatcom County farms and a large number of non-agricultural users are consuming water without benefit of an adequate claim, permit, or certificate. Almost 400 users have pending water right applications with the state that have not been processed to date. These unpermitted water users are at high risk for enforcement action and loss of their water use, particularly in light of impending ESA listings and other increasing pressure to act against unpermitted water use. These unpermitted water users constitute a very large proportion of the economic base of Whatcom County. Enforcement action against these farms and businesses could be devastating to the families affected, and the negative impact on the economy of Whatcom County would affect everyone. It may also be in the best land use and environmental interests of the WRIA for the land with the farms at risk to remain in agricultural use vs. some other kind of use.

Pollution, especially by fecal coliforms, in the Nooksack River and some other watersheds in the WRIA is above federal and state clean water standards, and has resulted in marine environmental degradation. Designing a management response to this problem will involve cooperation between the Watershed Management Project and

other programs and organizations that address both salmon recovery and the effect of fresh water quality on the marine environment. The implementation of a long-range water quality management plan that includes monitoring and adaptive management may best be approached through the overall watershed management plan.

The proposed new County Water Resource Manager would fill a vital role in coordinating the Water Management Project planning effort with the efforts of Whatcom County's other water resource interests as well as coordinating the subsequent implementation of the long term monitoring and management plan.

There are many other important issues facing WRIA #1 that will be addressed by this project. In light of the above and other considerations involving water quantity, quality, habitat and instream flows, a risk-benefit analysis that considers the potential effects on both the economy and the environment, would conclude that the benefits associated with a successful outcome to the Watershed Management Project are enormous. Conversely, the downside risks and losses associated with an unsuccessful attempt are very great.

Role of Whatcom County in the Watershed Management Project

Whatcom County's role in the project is three fold:

- 1) Whatcom County participates in the process as one of the five initiating governments.
- 2) As the Lead Agency, Whatcom County has accepted a fiduciary role, to receive and disburse funds for the execution of grants, contracts, and services.
- 3) As the only initiating government with Countywide fund raising ability, it is appropriate that Whatcom County provide the funding mechanisms for the local portion of the costs.

Response to Date

A grant of \$250,000 was awarded to WRIA #1 by the DOE in June 1998 for phase one and phase two of the Watershed Management Project. In accordance with the Watershed Management Act, the three non-tribal Initiating Governments, Whatcom County, the City of Bellingham, and PUD #1, invited the two affected tribes in the WRIA, the Lummi Nation and the Nooksack tribe, to become Initiating Governments.

Actual work on the Watershed Management Project in WRIA #1 was able to effectively begin after October 27, 1998, with the signing of the MOA that identified the Lummi Nation as a participating Initiating Government. This MOA was integrated into the contract for the DOE contract award. During November and December 1998, the Initiating Governments were able to draft a proposed organization for the project titled, *Watershed Management Project Structure and Function* (see Appendix 1-B). One public forum was held to solicit input and suggestions about the proposed structure, and

many responses were gathered. The Initiating Governments are reviewing these suggestions and incorporating the resultant changes in the final design of the Planning Unit and other organizational components. The Initiating Governments are designing ways to facilitate and support the formation of caucus organizations. It is expected that functional caucuses will be formed beginning in February, to represent local governments, state and federal agencies, and private sector water interests on the Planning Unit.

The budget and scope of work is to be determined and developed by consensus of the Initiating Governments in combination with the Planning Unit when it is formed. That budget should be provided to Whatcom County, the lead agency for the project, in February 1999. Funding for the project will come from three sources: the \$250,000 grant from DOE; federal, state and other outside funding sources; and from local sources. The Whatcom County Council has made local source funds available for 1999 for this project and the other elements of the Whatcom County Comprehensive Water Resource Plan. The means for raising local money to support the project beyond 1999 is yet to be determined. Because the technical elements of the project are being defined and developed, the amount of funding required to accomplish the entire project cannot yet be accurately defined, but the budget estimates provided with the original grant proposal are still reasonable estimates. The total long-term costs will be in the multi-millions of dollars, and significant federal and state funding is being sought.

A brief scope of work was provided in the 2514 grant application and in the MOA defining the Initiating Governments. A matrix of that scope of work is provided in Appendix 1-C.

The Initiating Governments, through Whatcom County, the lead agency, have selected and hired one staff person. This action provides the minimum essential support for the very early phases of the project. This staff position is to be funded by the 2514 grant, and is administered through the payroll of Whatcom County. A supplemental budget request is being submitted for this staff position. It is anticipated that additional staff and consultants will be soon be required as the caucuses and the Planning Unit begin to function and the technical teams for the assessment phase are formed and begin work.

All five of the Initiating Governments have worked together in a spirit of trust, commitment and cooperation, and have accomplished a great deal in a short time. The technical experience and expertise, the high level of resolve, and the commitment of time and resources by these five governments increase the likelihood of success. Fortunately, there has also been a high level of interest among private organizations and interests in participating in the project.

Short Term Local Response

Whatcom County should accomplish the following short-term actions in collaboration with the Initiating Governments and the Planning Unit.

- Organize the Planning Unit, Management Team/Decision Makers, and Technical Teams. Develop and agree upon a structured process that will govern each group's activities. Ensure that legitimate interests are adequately represented in the watershed planning process.
- Develop and begin implementation of scopes of work for the following areas:
 - public involvement and education;
 - water quantity assessment (see Appendix 1-C for additional details);
 - water quality assessment (see Appendix 1-C for additional details).
- Build upon work already done or in progress.
 - Determine how to best address habitat issues. Meet with the groups currently involved in fishery enhancement activities to determine how to best coordinate and support development and implementation of habitat needs (see Appendix 1-C for additional details).
 - Determine how to best address instream flows in the assessment phase. Develop detailed scope of work and budget as appropriate (see Appendix 1-C for additional details).
- Determine State and Federal participation in the Planning Unit.
 - Develop a recommendation for state agency representation on the Planning Unit and work with the Governor's Office to firmly establish state agency participation.
 - Identify needed federal agency participation and secure their participation and commitment in terms of staff, funding, and priority of the effort.
- Identify staffing and other resource needs to support the planning process. Include:
 - Support for the Planning Unit, Management Team, and Decision Makers
 - Support for the initiating governments as may be needed;
 - Support for the caucuses to ensure that they are able to effectively participate in the process.
- Pursue additional resources from state and federal agencies (e.g. grants) and other partners as possible.
- Identify and implement early action projects as possible.
- Perform ongoing efforts.

Long Term Local Response

- Per scopes of work developed in the Short Term Local Response, continue implementation of water quantity and quality assessment (and instream flow/habitat as appropriate).
- Continue to pursue additional resources from state and federal agencies and other partners.
- Watershed Plan Development: Evaluate alternatives and develop strategies to address water quality, habitat, instream flow, and other water quantity needs as identified through the assessment and short-term local response process. Consider for each area:
 - Water quality – implementing TMDLs and monitoring for compliance.
 - Water quantity – ensuring water supply needs are being met for both instream and out-of-stream needs. Develop strategies for increasing water supplies including water conservation, water reuse, use of reclaimed water, voluntary water transfers, aquifer recharge and recovery, additional water allocations, and additional water storage and storage enhancements. Incorporate work done through previous efforts as appropriate.
 - Habitat – integration with other salmon recovery efforts.
 - Instream flows – assurance that instream needs are being met and possible changes to existing instream flows as determined to be needed by Planning Unit.
- Review and adoption of Plan by local, state, and federal agencies as appropriate.
- Implement plan and monitor effectiveness.

Watershed Planning Under ESHB 2514 Funding

As previously noted, a State Grant was awarded to Whatcom County totaling \$250,000. It is expected that additional state grants will be available to assist in completing a local plan at approximately \$250,000 annually. While this will easily cover the general administrative expenses of the coordinated effort (\$71,408 for 1999 Watershed Program Analyst), it will not be adequate to cover the previous total program estimates (\$12,000,000 over 4 years).

A specific goal of the watershed planning process for completion during 1999 is the refinement of projected project costs and timelines. In order to ensure that early action elements can move ahead without delay, \$1,000,000 is recommended to be dedicated from the 1999 Flood Assessment increase in addition to the currently uncommitted portion of the State Grant.

The Whatcom County Council will be requested to dedicate at least a portion of the noted funds during early 1999, with the balance to be directed throughout the year as specific tasks are agreed to amongst the Initiating Governments.

Element Two: Salmon Recovery/Endangered Species Act

Background

Many stocks of wild salmon, steelhead and trout have declined along the West Coast of North America. These declines are the result of many factors. Some, such as poor ocean conditions, are natural and beyond our control. Other factors, however, have resulted directly from human activities, including water withdrawals, forestry, agriculture, urban development, dams, fishing and hatcheries. Economic development and rapid population growth have exacerbated conditions unfavorable to salmon production.

In Washington, many wild salmon, steelhead and bull trout stocks were listed or are under consideration for listing under the Endangered Species Act (ESA). Of particular significance to Whatcom County, within the Puget Sound Evolutionary Significant Units (ESU), chinook will be listed as “threatened” as early as 2/26/99 and bull trout will be listed as “threatened” as early as 6/12/99 (or, in both cases, shortly thereafter).

In the Nooksack watershed, two different *natural spawning* chinook populations exist: one in the North Fork Nooksack and the other in the South Fork Nooksack. Both are considered to be native chinook stocks, and are *genetically distinct* from each other and all other Washington chinook stocks. As adults these stocks enter the river in the spring and summer and spawn in the upper reaches of both river forks in late summer. In contrast the chinook stock, reared at the two Nooksack salmon hatcheries, enters the river in the late summer and spawns early fall. This fall chinook stock originated from the Green River near Seattle, is the predominate hatchery stock reared through out Puget Sound for the purpose of supporting commercial and sport fishing, and is *not native* to the Nooksack River.

Under the ESA, recovery of a listed species is proposed, acted on, monitored, and measured on an Evolutionary Significant Unit (ESU) basis. While it should be expected that there will be a policy and regulatory umbrella applicable for the entire Puget Sound ESU, unique policies and priorities must be established and acted on for Water Resource Inventory Area No. 1 (WRIA #1). The focus of specific local efforts will be based on WRIA #1 as the planning area. As long as locally driven WRIA #1 policies and priorities are proactive in the effort to recover the listed species, we can hope that the burden of meeting state and federal mandates beyond those local policies and priorities will be minimally burdensome. (See ESU map for reference – Appendix 2-A)

Specifically relating to a species listed as “threatened”, the regulatory framework under the federal ESA is based on what are referred to as Section 4(d) Rules, Section 7 Consultations, Section 9 prohibition, and Section 10 Habitat Conservation Plans. These terms are individually described hereafter. The combination of these regulatory elements is to more precisely define the permissible and prohibited activities within certain industries, geographical areas, etc.

Relative to the local “threatened” chinook species, Section 9 prohibits the “taking” of this soon to be declared endangered species. Section 4(d) Rules are “... such regulations as [the Secretary of Interior] deems necessary and advisable to provide for the conservation of such species.” The specific 4(d) rules affecting the local community, as well as the entire Puget Sound basin, will be finalized and issued by National Marine Fisheries Service (NMFS) three to four months following the expected March listing of the species. Establishment of the 4(d) rules can be a collaborative effort with NMFS, including clarity as to identifying certain exempt activities determined to not directly or indirectly be a “taking” of the species.

Section 7 consultation relates to dialogue between NMFS and any other federal agency involved in funding, permitting, or directly engaged in a local activity which is within the scope of ESA regulations. Consultation in such instances will at a minimum slow the process of performing the desired activity, and in some instances, may result in it not happening at all. For example, in those instances in which a permit must be obtained from the Army Corps of Engineers before proceeding, and in which the threatened species of salmonid is implicated, the Corps will have to consult with NMFS before such a permit is issued. The consultation may result in the denial of the permit. The potential scope of consultation requirements is very broad, given the numerous instances in which federal funding may be involved, directly or indirectly, in the proposed activity. Federal flood insurance, federal farm subsidies and price supports, NRCS cost-share arrangements, federal insurance for bank deposits, federal home loan programs—the list of circumstances in which federal funding may be involved in an activity with a potential impact on a threatened species is almost endless. Where the line will be drawn for requiring consultation remains to be seen.

Activities that have no such federal connection may be permitted under Section 10 of the ESA, through the issuance of an “incidental take permit”. The applicant for such a permit must prepare (typically negotiate with NMFS) a habitat conservation plan which reduces and mitigates the “taking” activity to the maximum extent practicable, and does not appreciably reduce the likelihood of survival and recovery of the “threatened” species. Large timber companies have availed themselves of this route in other areas where listings have occurred. How practical this route will be for smaller landholders, or groups of landowners, or local governments engaging in routine activities, remains to be seen, but it is an avenue that will need to be pursued initially by local governments.

Again, the reasonable hope is that current state and local regulatory regimes, with reasonable levels of enforcement, coupled with proactive efforts such as those contained in this plan, will achieve most, if not all, of the objectives contained in the federal approach to protection of species under ESA.

State of Washington Response Plan

The State of Washington recently released a complete draft of a statewide strategy to recover salmon entitled, "Extinction Is Not an Option." The stated primary goal and objective of this strategy is:

Restore salmon, steelhead and trout populations to healthy harvestable levels and improve those habitats on which the fish rely. Develop and implement a coordinated statewide strategy that moves us aggressively toward the goal while maintaining a healthy economy. The Statewide Salmon Recovery Strategy will take a balanced approach to addressing the factors of decline that are within human control, including habitat modification and destruction, harvest, hatcheries and hydropower.

A timeline is attached for reference in Appendix 2-B.

The statewide strategy also recognizes the importance of providing adequate, clean water and healthy watersheds for the citizens of the state. It stresses that the task at hand is about more than protecting and restoring fish. It's about people and the quality of life we have come to expect. To accomplish this end, parallel efforts are expected to occur at the state, regional, and local levels.

The Statewide Salmon Recovery Strategy emphasizes that all citizens and governments have a role to play in order to accomplish the goal of the Statewide Salmon Recovery Strategy:

- ***We need to determine our own future.*** If we do not act to save our salmon, we will be depending on the federal government and federal courts to decide the future -- not only of salmon but also of our watersheds and the communities therein.
- ***We must make tough choices.*** We are not going to save salmon by talking about it. We must make changes in the way we conduct our lives in our communities and our watersheds. These changes must result in improvement to salmon habitat, and include how we use our water, where we build our homes, how we harvest our timber and how we farm. We are also going to have to change how we manage harvests of salmon.
- ***We must undertake significant effort and provide adequate funding.*** It is going to take a lot of hard work to protect and restore our salmon. The kinds of change that are needed will not and cannot happen without extraordinary efforts. In addition, saving our salmon will not be free. Protecting and restoring salmon habitat will require substantial investments.
- ***We are all in this together.*** Saving our salmon is not about blaming anyone. We are all part of the problem and we must all be part of the solution. Each of us

must come to understand the impacts we have on our salmon and the opportunities we have to contribute to their protection and restoration.

Local Response to Date

In order to implement a meaningful local response program, Whatcom County must clearly plan and operate within the context of a general statewide recovery plan. The County is committed to an emphasis on non-regulatory approaches to these issues but it recognizes that regulatory options may be appropriate in certain circumstances.

Consistent with state policies, local policies and actions are to be carried out at the watershed level, reflecting local needs and issues that arise. During the 1998 legislative session, ESHB 2496 was adopted to provide a procedural framework for prioritizing salmon restoration projects locally as well as across the state. ESHB 2514 was adopted describing a planning framework for locally based watershed management. Our local watershed plan will provide an important connection between the variety of water resource issues and the specific salmon preservation and restoration activities.

Early in 1998, discussions began between Whatcom County, Lummi Nation, and the Nooksack Tribe regarding a joint response to the ESA listing of our local chinook stocks. The product of these discussions was a Memorandum of Agreement (MOA) between the parties acknowledging a mutual commitment to rebuild the salmonid stocks of the Nooksack basin and the independent drainages of Whatcom County which collectively comprise WRIA #1 (see Appendix 2-C). Since the signing of the MOA, a number of cooperative efforts are emerging which focus on watershed planning under 2514, salmon recovery planning under ESHB 2496, and local ESA response planning. The foundation of these joint efforts is built on trust, collaboration, data sharing, and the understanding that all these efforts are interrelated and bound by a sense of urgency to resolve long standing conflicts.

ESHB 2496, Salmon Recovery: A coordinated framework is needed to respond to the salmon crisis. Local leadership supported by extensive technical knowledge of local salmon issues is needed to identify, prioritize, sequence and direct funding to habitat restoration and protection projects which address effective and timely salmon recovery. Towards this end, ESHB 2496 establishes such a framework (see Appendix 2-D). It provides for a **Technical Advisory Group (TAG)** which brings together individuals with local expertise in the areas of fisheries, forestry, agriculture, river dynamics, and habitat restoration to identify habitat issues which currently limit successful salmonid recovery in WRIA #1, otherwise known as limiting factors. In addition, it requires all local jurisdictions in WRIA #1 (Whatcom & Skagit Counties, tribes, cities) to select a **Lead Entity** to oversee (administer) the salmon recovery grant process and appoint a **Citizen Committee**. The citizen committee is charged with the task of compiling a project list, ranking each project based on identified limiting factors, and insuring projects are sequenced properly and monitored to document success or failure.

Lead Entity, Citizen Committee, TAG: Whatcom County, with the passage of resolutions by the Nooksack Tribe, Lummi Nation, Cities of Ferndale, Everson, Lynden, Sumas, Nooksack, Blaine, and Bellingham; and Skagit and Whatcom counties, has been selected to be the Lead Entity for the purpose of the 2496 process. As the designated lead entity, Whatcom County will complete the following tasks during the first quarter of 1999:

- Complete a grant application to the Interagency Review Team (IRT) for the purpose of securing administrative financial assistance to support the functions of the lead entity, TAG, and Citizen Committee.
- Appoint a Citizen Committee with representation from the forest and agriculture industries, fisheries, public utilities districts, business, Tribes, Cities, and County.
- Work with the Conservation Commission to form a Technical Advisory Group (TAG) with technical representation from tribes, WA Department of Fish & Wildlife (WDFW), Department of Natural Resources (DNR), National Marine Fisheries Service (NMFS), Whatcom Conservation District (WCD), County, Nooksack Recovery Team (NRT), Forest Industry, Department of Ecology (DOE), U.S. Forest Service (USFS), and U.S. Fish and Wildlife Service (USFW).

The TAG will be charged with completing the habitat limiting factors for WRIA #1 and to work closely with the Citizen Committee in project design, selection, and prioritization.

Appendix 2-D provides further detail regarding the structure of the various entities formed under ESHB 2496 and their respective roles and responsibilities.

Federal ESA Funding for Early Action: During the spring of 1998 Whatcom County was requested to submit a list of prioritized salmon recovery projects as part of a statewide funding request to the Federal government to address the proposed ESA listing of chinook. The Lummi Nation, Nooksack Tribe, and County collectively identified a list of projects, which addressed infrastructure, assessment, habitat restoration, and land acquisition needs directed at 1999 native chinook recovery efforts. Total grant request from the Tribal / County application totaled \$7.9 million dollars.

Late in 1998, it was confirmed that the State of Washington was successful in obtaining \$20 million in federal funding to initiate early action recovery efforts statewide. The allocation to WRIA #1 was \$1.4 million, less than the requested \$7.9 million, nonetheless a significant amount of funding to support early actions. With the benefit of additional time and better information, the tribes and County, with assistance from the City of Bellingham, the Whatcom Conservation District, Nooksack Salmon Enhancement Association, Washington State Department of Fish and Wildlife, US Forest Service, and the Whatcom Land Trust, collectively re-prioritized the original

project list to describe a short term response strategy. The primary goal of the short-term strategy is to gather and analyze sufficient data in order to select and prioritize long-term recovery efforts as well as to act on obvious existing opportunities.

Application for ten projects were prepared and submitted to the to the Governor's Salmon Office for the allotted funds (see Appendix 2-D). Following is a brief description of the projects ranked by priority.

Projects:

1. ESA / Salmon Recovery Infrastructure

This item provides funding for essential administrative, policy, and technical infrastructure to the tribes, County, and cities to develop and implement salmon recovery plans. This is in response to the ESA listing of Nooksack native chinook and the general decline of other Whatcom County salmonid stocks. These include providing for:

- Administrative and policy support to allow the above entities to actively participate in the review and implementation of the state-wide salmon recovery plan.
- Additional technical assistance to complete the Nooksack chinook recovery plan & develop habitat limiting factors for all other Whatcom County salmonids stocks.
- Technical assistance to review current County and Cities' comprehensive plans, CAO's, and other land use rules to ensure they are consistent with existing state and federal requirements in protecting salmon.
- Technical assistance and policy support which allows local jurisdictions to work with NMFS to develop habitat conservation plans (HCP) and strategies to comply with Section 4d rules which would then exempt certain public works projects (routine maintenance of road, flood protection, storm and waste water, and drainage projects) from ESA "taking" issues.
- Implementation of an effective public education and outreach program to keep the local citizenry informed about state and local issues, legislation, and opportunities concerned with salmon recovery.

Complete Chinook Recovery Plan. Completion of the chinook recovery plan for the two stocks of listed native chinook is a high priority. The plan will address and make recommendations to resolve all issues believed to be impacting the recovery of the native chinook stocks. These include ocean and terminal harvest, habitat degradation, hatchery production, species interactions, and predation. The completed plan will help

focus recovery efforts on the most critical elements of recovery and establish priorities for individual elements (assessment needs, habitat restoration, hatchery programs, land use rule changes, harvest modifications, etc.). The plan will establish benchmarks and monitoring protocols necessary to measure progress toward stock recovery. Completing the plan and obtaining NMFS review and final approval will require a concerted effort by WDFW, tribal technical staff, and the County, over the next 12 months.

Habitat Limiting Factors: The State Recovery Plan recognizes the need to identify those habitat elements that limit the success of salmonid species in local basins. Completing this task is a requirement for future 2496 funding which, when complete, will help focus local effort on the more critical problems and help speed recovery of salmonid stocks. Completing this task will require substantial technical assistance in the form of tribal fisheries staff and contracted services over the next 12 months.

Land Use: Protecting existing habitat is crucial if we expect to recover and preserve salmon stocks for future generations. Fish-friendly land use rules and regulations in the form of comprehensive plans, building codes, critical area ordinances, zoning, etc, becomes the vehicle to protect valuable habitat and its functions. It is crucial that the County and cities review existing land use plans to verify they meet the minimum standards prescribed in the Salmon Recovery and Puget Sound Water Quality Plans. The County and cities also need to review how existing plans are implemented on the ground and later enforced to determine effectiveness in providing real protection to sensitive fish habitats.

HCP / 4D Rule: In direct response to the anticipated ESA listing of chinook in March, the County and cities will be required to develop and/or adopt habitat conservation plans and develop strategies to comply with 4(d) rules for various routine public works projects such as road and drainage maintenance, flood protection, water diversions etc. (See previous section on ESA background)

Education: Having an informed citizenry will promote citizen involvement and political support for setting land use policy identified as critical to protect habitat for salmon recovery.

2. Nooksack Production & Habitat Assessment

This project provides funding to expand biological and habitat assessment work in the Nooksack basin necessary for the recovery of salmonid stocks. Elements of the work will focus on two general areas; production assessment and habitat assessment.

The proposed production work will assess natural stock productivity. It will investigate all life stages of the native chinook and attempt to identify what freshwater and estuary features currently limit successful recovery of the stocks. Additional spawning ground survey work will help enumerate the numbers of adults returning to the river, improve

information on run timing, time of spawning, and redd life. DNA analysis and otolith sampling will help determine the origin of each adult fish recovered from the spawning ground.

Smolt trapping, minnow trap baiting, beach seining, and redd capping work will investigate the early life history stages (eggs, alevins, fry, and smolt) of the young fish. This work will improve our understanding of where and when juvenile fish spend time in various types of habitat. This data will then be used to direct habitat recovery and protection efforts on the most critical habitat elements.

Both the Lummi Nation and the WDFW operate large salmon hatchery programs on the Nooksack River. Kendall Creek hatchery (WDFW) is on the North Fork of the Nooksack. The facility releases juvenile coho, chum, and fall chinook salmon. Since late 1980, the program has also been developing a native chinook program in efforts to recover the North Fork native stock. Skookum Creek hatchery (Lummi) is located on the South Fork of the Nooksack and produces large numbers of yearling coho for release from the facility as well as Lummi Bay.

The large numbers of hatchery fish being released into the basin raises a number of concerns. Question about straying, adult interbreeding, juvenile interactions, and genetic integrity will need to be answered and will be addressed by the production assessment work.

Widespread degradation of adult holding, adult spawning, and juvenile rearing habitats related to abnormal sediment dynamics and breakdown of riparian function are clearly dominant factors limiting recovery of chinook in the Nooksack.

The prime feature of the habitat assessment work will be to complete and document an inventory of critical salmonid habitats for the Nooksack river basin. The outcome of this task will be a Geographic Information System (GIS) data base pinpointing locations of both existing and newly sampled habitat, land use impacts, and habitat conditions to allow prioritization for protection and restoration consistent with ESU-wide descriptive needs.

3. Fisheries Enforcement Enhancements

The Nooksack Technical Advisory Group (NTAG) has identified illegal and or unreported harvest of native chinook in Bellingham Bay and the Nooksack River as an important limiting factor to the recovery of this stock.

Reports of illegal harvest activities, such as poaching, the use of illegal nets or fishing gear, are common throughout the upper basin, yet few of these reports are ever substantiated. Existing fisheries enforcement staff is unable to provide the necessary coverage to verify these reports much less apprehend and prosecute the violators. Hence, the Co-Managers (tribes and WDFW) have little hard data to evaluate the

impact of illegal harvest on the small numbers of native chinook spawners that return to the basin.

The objective of this project is to form an interagency enforcement team composed of officers from the Lummi Nation, Nooksack Tribe and WDFW for the sole purpose of patrolling the river and bay between March and October of 1999. Their primary role will be to document illegal harvest activities (illegal gill nets, sport fisheries) and investigate poaching reports. The officers will also respond to hydraulic code violations and fish harassment reports or observations. They will be expected to proactively interact with riverfront property owners and the recreating public on a daily basis providing considerable opportunities for outreach and education.

4. North Fork Native Chinook Acclimation Pond Operation

The scope of this project is to support the operation of three native chinook acclimation/imprinting ponds on tributaries to the North Fork of the Nooksack River above RM 55. This project provides benefits to the recovery of North Fork Nooksack native chinook by allowing hatchery produced native chinook fry to be imprinted to the upper North Fork. Imprinted juveniles return as adults to the reaches of the river near the acclimation pond sites and spawn naturally in the river rather than returning to the hatchery. This program has been in place for 12 years and is part of the recovery effort sponsored by the basin's co-managers.

Volunteers (supported by the efforts of the Nooksack Salmon Enhancement Association, the local regional enhancement program) man the three sites (24 per day) for approximately eight weeks. WDFW staff oversees and monitors the rearing programs.

All fry are otolith marked at the hatchery prior to transfer to the acclimation ponds. WDFW and tribal spawning ground survey crews recover otoliths from carcass that are then read to determine contribution to the spawning population of hatchery reared native chinook. CWT groups have been released to estimate overall survival and fishery contribution / interceptions.

5. South Fork Nooksack River Engineered Log Jam

The analysis of limiting factors performed by fisheries' co-managers has identified lack of adult holding pools, high levels of fines in spawning gravel, high stream temperature, and redd loss as factors limiting native chinook production in the South Fork Nooksack.

The Lummi Natural Resources Department has proposed to place up to ten-engineered logjams along 0.75 river miles (RM) of the South Fork Nooksack River. These logjams will accomplish three objectives. First, the jams will divert flow away from a 2500' long by 160' high cut bank/landslide complex that feeds approximately 90,000 yards of fine

grained glaciolacustrine and glacial outwash sediment directly into a river reach used for native chinook spawning.

Second, the jams will provide improved holding pool depth, complex woody cover, and stream temperature moderation essential for successful adult chinook holding prior to and during spawning.

Third, the jams will facilitate reconnection of mainstem habitats to floodplain off-channel habitats and to the lower reaches of Roaring (WRIA 0294) and Plumbago (WRIA 0292) Creeks that provide high flow and over winter habitats and spawning for coho and pink salmon and steelhead trout.

This particular reach was selected due to a recent (last 10 years) degradation in the quality and quantity of adult chinook holding habitats, lower utilization of the habitats available, and drastic increase in sediment production from the large left bank cut/landslide complex (South Fork Sediment Reduction Plan, 1996 - LNR and Crown Pacific in-house data). This landslide complex delivers fine grained sediment (fine sand to silt) directly into chinook spawning habitats. Riparian interplanting projects in this reach will provide for improved long-term large woody debris recruitment into this reach. The project will provide for immediate habitat needs and will form the nucleus for long-term stable log jams on the flood plain. Other funding acquired by Lummi has provided for site surveying, flow and temperature monitoring, preliminary design, and a start at materials acquisition. This funding will provide for final materials and construction funds.

6. North Fork Nooksack Forest Road Sediment Reduction

Sediment can cement and cover up spawning gravels. Sediment also reduces bedload movement and inhibits the ability of the stream to maintain adequate pool riffle ratios. Reduction of sediment is expected to improve habitat functions for several salmonid species, including native chinook spawning grounds.

This project intends to reduce road-related erosion and subsequent sediment delivered to Canyon Creek, Glacier Creek, Wells Creek and North Fork Nooksack River and to relocate and protect a portion of the Wells Creek road from further erosion.

The United States Forest Service inventory of roads applied the priority designation process to these projects and determined them to be high and medium priority. The criteria includes Desired Condition, Key/Priority Watershed, Partnership Potential, and Watershed Sensitivity. The USFS will monitor the project work as part of their ongoing road inventory process.

7. Off Channel Habitat - South Fork Nooksack Dike Removal

The main objective of this project is to reestablish the natural functions of a section of the historic floodplain along a short reach of the South Fork of the Nooksack River. The removal of the dike will provide for more frequent flooding of adjacent flood plain allowing for the creation of important off-channel rearing habitat for juvenile coho. Benefits will also accrue to other species of birds, reptile, fish, and mammals known to utilize riparian habitat in this area.

Up to five hundred feet of dike will be removed to allow floodwaters to fill existing low areas of historic wetlands. Approximately 30 acres will be re-planted with native woody vegetation, including conifers, to improve the habitat of the re-created forested wetland complex. The restored seasonally inundated wetland area is expected to be greater than ten acres in size.

The first phase of this project will be to determine the extent of possible flood event inundation and then to determine as accurately as possible the extent of land that will be affected. The next phase will set the limits of the dike removal based on the findings of Phase 1. The construction phase will include the removal of the dike; bank work to limit scour; and the completion of any additional work called for by the parties involved. Planting and maintaining the project is the final phase of work.

Monitoring will be shared jointly by many of the partners associated with the project including Whatcom County, Nooksack Tribe and NSEA. Project elements that will be evaluated are the wetland and riparian re-vegetation growth, the integrity and function of the lowered dike, the influence on the existing habitat features as well as the flood attenuation function.

8. Riparian Project Maintenance

The primary objective of this project is to provide for the maintenance of approximately 100 previously planted riparian restoration sites covering 20 miles of stream corridor to ensure plants reach free to grow stage: replace dead material as needed and mow; cut, thin, and spray competing non-native vegetation; monitor sites to track growth, predation, and disease; and document successful establishment, problems, and failures.

Lack of riparian cover and inadequate stream buffer widths is identified as a major limiting factor to salmon recovery in the State of Washington. Healthy riparian areas provide shade, stable stream banks, large woody debris, wildlife transportation corridors, and provide a major degree of water quality protection by filtering nutrients prior to entering the stream.

Most stream channels in lowland Whatcom County have been substantially altered from historical conditions. To accommodate agriculture, channels have been straightened,

diked, dredged, vegetation removed, and animals allowed access. Removing the canopy cover over these streams provided a rich environment for non-native species (reed canary grass, blackberries, and nightshade) to become established and out-compete less aggressive native plants. Reed canary grass grows in the low gradient stream channel, trapping sediment necessitating periodic stream channel dredging to maintain drainage on the adjacent agricultural land. This quickly establishes a cycle where the stream and its recovering habitat are continually being degraded.

Forest riparian recovery work presents a different set of problems and issues. Past harvest practices required minimal stream buffers and removed much of the softwoods that provide future durable large woody debris to the streams and river.

Over the past 7 years the Nooksack Salmon Enhancement Association (NSEA) and the Lummi Nation's Natural Resources (LNR) have planted over 170 sites. NSEA has focused efforts on the lowland systems, LNR on the upper forest.

Forest stream buffer re-vegetation work is an evolving science. LNR has focused efforts on replanting stream buffers with evergreen species to restore a healthy mixed stand of conifer and hardwood species to improve the durability of future large woody debris. Maintenance of these replanted sites includes replacing dead material, mechanical removal of competing salmonberry, maintaining browser protection (bud caps, repellent spray) and thinning dense stands of alder.

Lowland re-vegetation work, particularly converting reed canary grass systems to a healthy mix of native shrubs and trees, is new, and efforts have resulted in mixed success. It has become clear through NSEA's experience that a major key to success is site preparation and follow-up maintenance for a period of one to five years.

Three quarters of the recovering sites are located along the lowland streams of Whatcom County and involve converting reed canary grass sites to a mix of tree and woody shrub vegetation. Each year NSEA volunteers and staff undertake another 12-15 projects to accommodate an increasing interest from willing property owners to restore their section of stream. Projects with little maintenance have a high failure rate. Whatcom County Parks in cooperation with the County courts has developed a maintenance program which utilizes citizens with fines or community service to "work off" penalties by working on supervised park maintenance crews. Based on the results of these efforts, NSEA recommends funding two crews to perform maintenance of past Lummi and NSEA restoration sites. .

Both NSEA and Lummi currently monitor their respective riparian restoration project sites to determine plant survival and growth. Both organizations recognize that this information is essential to the overall success of restoration work. Monitoring protocols are available upon request from Lummi and NSEA.

9. Riparian Interplanting

The primary objective of this project is to provide support for three forest riparian restoration projects:

Site 1. The Kenny Creek acquisition of 20 acres of riparian forest is deficient in well-established conifers. The release of existing conifers from hardwood competition and the interplanting of shade tolerant cedar, spruce and grand fir into the stand will provide shade, large woody debris contribution to the river and diverse wildlife habitat.

On the 180 foot riparian buffer (6.5 acres), we propose to raise the conifer stocking level to 200 trees per acre and release existing established trees from brush and hardwood competition. Restoration workers will prepare planting sites by cutting brush and grubbing out the roots of competing vegetation from a 48" square spot. Shade tolerant conifer seedlings such as cedar, spruce and grand fir will be planted into the prepared sites and protected from the re-growth of competing vegetation within 2' of the stem with fabric mulch. The remaining 13.5 acres will be treated with a light thinning to accelerate tree growth, and established conifers will be manually released from brush and hardwood competition.

Blackberry and other invasive weeds have colonized recently cleared areas within the riparian stand. This project would treat these plants twice with herbicides and replant the clearing with native grasses to provide deer and elk forage.

In July, following planting and in the following year as well, restoration workers will apply herbicide to competing shrub vegetation and install paper bud caps protection from deer and elk browsing.

Site 2. The Rutsatz Road acquisition of 30 acres of riparian forest was recently clear cut and not restocked with conifers. A full hardwood canopy has not been re-established either, leaving much of the stand to be dominated by brush, including high densities of invasive Himalayan blackberry. What few conifers exist are direly in need of release from brush competition. The establishment of shade tolerant cedar, spruce and grand fir into the buffer will provide shade, large woody debris contribution to the river and diverse wildlife habitat. On the 180 foot riparian buffer (9 acres) we propose to plant conifers to raise their stocking level to 200 trees per acre and release established trees from brush and hardwood competition. Restoration workers will prepare planting sites by cutting brush and grubbing out the roots of competing vegetation from a 48" square spot. Seedlings will be planted into the prepared sites and protected from the re-growth of competing vegetation within 2' of the stem with fabric mulch.

The 21 acres of riparian stand beyond the 180 foot buffer needs significant silvicultural restoration, being deficient in both conifers and hardwoods and heavily covered with brush species, including Himalayan blackberry. We propose to restore this area in stages, creating a mosaic of forested habitats. The first stage treatment will be to

establish 20-1/8th acre patches of Douglas fir, distributed evenly over the 21 acres. We will re-open previously established skid roads, as needed, to provide access to the patches for a small excavator which will clear them of brush and scarify the ground. The patches will then be planted with Douglas fir on a 7'x 7' grid and the individual seedlings treated with fabric mulch. The areas between the patches will be planted on 15' x 15' spacing with shade tolerant conifers employing the techniques described in Site 1.

In July, following planting and in the following year as well, restoration workers will apply herbicide to competing shrub vegetation and install paper bud caps for protection from deer and elk browsing.

Site 3. Interplant 20 acres of riparian buffer (ranging in width from 150 to 200 feet from the ordinary high water mark on the banks of the South Fork Nooksack below Larson's Bridge on the left and right banks. Reach to be treated has had 13 acres previously treated and will be the site of an extensive engineered logjam project in the year 2000.

A tribal subcontractor will release existing conifers from brush and hardwood competition and thin conifers, as required. This will be followed by extensive site preparation, planting cedar seedlings to a 200 tree per acre density and installing fabric mulch and "bud cap" seedling protection. Seedlings will be provided by Crown Pacific as part of a project match.

In July, following planting and in the following year as well, restoration workers will apply herbicide to competing shrub vegetation and install paper bud caps for protection from deer and elk browsing.

10. Land Acquisition North Fork Nursery

The primary objective of this project is to provide funding to purchase two parcels of land which the Whatcom Land Trust has identified to be adjacent to critical spawning habitat for native chinook.

Site 1. The project seeks to acquire fee simple interest in 56 acres of upland, wetland, riparian habitat, and mid-channel island and gravel bars along the North Fork Nooksack in an area of existing salmon spawning and rearing habitat. This acquisition will protect large riparian forest areas, wetlands, and off-channel habitat. Acquisition and protection of this habitat will prevent future residential development, flood control activity (i.e. bank hardening, riprap, and channel constriction) and gravel mining along this section of the river. The Whatcom Land Trust currently owns two parcels in the immediate vicinity of the acquisition site. Acquisition of these target parcels would facilitate protection and restoration of 3/4 mile of the North Fork Nooksack, along both sides of the river. Currently the acquisition sites are open to vehicular traffic, promiscuous garbage dumping and poaching of spawning salmon. In addition, historic

land use practices in the North Fork basin have reduced spawning and holding habitats that are important to native chinook salmon. Restoration of the acquired properties could significantly increase the productivity of this reach of the Nooksack and provide for perpetual protection of restored habitat.

The North Fork Nursery Project was selected because it is one of the best of the relatively undisturbed spawning and rearing sites in the North Fork Nooksack basin. Unfortunately, increasing recreational activity, unregulated public access and growing residential development in the watershed threaten the long-term viability of the acquisition site. Acquisitions in the project site will complement existing riparian areas owned and protected by the Whatcom Land Trust on the right hand bank of the river, increasing the overall benefits of this project.

Site 2. Acquire fee interest in 75+ acres of upland, wetland and riparian habitat along the South Fork Nooksack in an area of historic native chinook holding habitat. Protect through this acquisition large riparian forest areas, wetlands, and off-channel habitat. Acquisition and protection of this habitat will prevent future residential development and flood control activity (i.e. bank hardening, riprap, and channel constriction) along this section of the river. Currently conservation easements and public ownership on the right-hand bank protect this reach of the river for 4 miles. The left-hand bank along this reach is private. It has been manipulated by landowners' attempts to control over-bank flooding. This activity has started to degrade the natural pool and channel of the river. Due to historic land use practices in the South Fork basin, holding habitat is very limited for native chinook. Protection (and possible restoration) of this site will assure the maintenance of some of the best existing holding habitat on the South Fork. This project will complement the protected properties on the right-hand bank and provide increased protection for native chinook during the critical holding period.

The South Fork Riparian Project was selected because of its location in the basin provides for the best native chinook holding habitat directly downstream of higher velocity spawning areas and upstream of intense agricultural and residential land uses. In addition, the project area contains some of the best remaining holding habitat in the South Fork basin. Finally, acquisitions in the project site will complement existing publicly owned and protected riparian areas on the right hand bank of the river, increasing the overall benefits of this project.

Short Term Local Response

- ***Ongoing Efforts:*** Continue cooperative local efforts. Ensure there is coordinated and balanced technical and policy elements consistent with the County/Tribal MOA.
- ***Education and Outreach:*** Work with County Cooperative Extension Service to develop an effective public education process to insure ongoing public

access and involvement in the review of existing rules and development of new policies relative to the ESA listing.

- ***Fishery and Habitat Data:*** Continue both political and financial support of the interagency biological assessment team composed of technical staff from the Lummi Nation, Nooksack Tribe, and the WDFW. Ensure that outcomes from production and habitat assessment work effectively address data gaps that limit the ability to select and prioritize recovery efforts for Whatcom County's salmonids.
- ***Chinook Recovery Plan:*** Work with WRIA #1 fisheries Co- Managers (tribes, WDFW) to review completed Nooksack Chinook Recovery Plan and identify local actions which need to be implemented (and funding to implement actions) to recover native chinook.
- ***Habitat Conservation Plans & Section 4(d) Rules:*** Review those routine public works projects or actions such as road and drainage maintenance, flood hazard mitigation work, storm and waste water discharge, etc. which have potential to impact salmon or their habitats. Develop operational plans or strategies (BMP's, HCP's) which comply with NMFS Section 4 (d) rules and provide adequate protection to listed species.
- ***ESHB 2496:*** As the designated Lead Entity under the 2496 framework, convene the Technical Advisory Group and Citizen Committee to refine 1999 salmon recovery work plans. Using habitat limiting factors develop, rank, and sequence habitat restoration and protection projects for efforts in the year 2000.
- ***ESA Federal Project List:*** Whatcom County and the tribes collaborated to identify and rank 10 salmon recovery projects for 1999 implementation. Total estimated cost to complete the 10 projects is \$2.023 million. \$1.4 million will be available from the 1999 federal ESA funding allotment covering the cost of projects 1 through 5 (see Appendix 2-E). The remaining prioritized projects address salmon limiting factors and should be considered for local financial support.
- ***Review Local Land Use Policies and Regulations:*** Protecting existing habitat is crucial if we expect to recover and preserve salmon stocks for future generations. Fish friendly land use rules and regulations in the form of existing comprehensive plans, building codes, critical area ordinances, zoning, etc, becomes the vehicle to protect valuable habitat and its functions. It is crucial that the County and cities also review existing land use rules to verify they meet the minimum standards prescribed in the Salmon Recovery and Puget Sound Water Quality Plans as well as Section 4(d) ESA rules promulgated by the NMFS. Where found deficient, develop a strategy to bring the plan / rules into compliance. The County and cities also need to

review how existing plans are implemented on the ground and later enforced to determine effectiveness in providing real protection to sensitive fish habitat.

- ***Flood Hazard Management and Salmon Recovery:*** The listing of chinook and the desire to recover salmon stocks will require a proactive approach to flood hazard mitigation which integrates fish habitat protection and enhancement into river and flood plain plans. The short-term response to this goal is to review the lower Nooksack CMFP with an eye toward fish habitat protection / enhancement. On a reach by reach basis identify recent (last 50 years) meander limits which have been constricted by bank protection, roadway construction, etc. Identify areas of the reach where proactive land acquisition, dike / levee removal, re-vegetation, etc., would be a cost effective approach to reducing flood hazard mitigation and provide substantial fish habitat value.
- ***Fish Passage:*** Providing unobstructed access for juvenile and adult salmonids to rearing and spawning habitat remains one of the higher priority items for salmon recovery. A recent inventory estimated that there are over 3,000 culverts under Whatcom County roadways and rights-of-way. This does not include culverts under private roads, driveways, or city maintained roads. Most of these culverts have not been formally evaluated for fish passage. The Nooksack Salmon Enhancement Association and the Lummi Nation have recently initiated a culvert inventory program and to date have evaluated approximately 200 drainage structures for fish passage. It is proposed that County funds be earmarked to match Department of Transportation fish passage program funds to expand the survey / inventory effort as well as replace high priority culverts.

Long Term Local Response

- Maintain contact and coordinate with statewide salmon recovery efforts. Ensure local salmon recovery response plan for WRIA #1 is consistent with the statewide plan and the Puget Sound ESU plan.
- Coordinate policies and resource allocation between the WRIA #1 salmon recovery response plan with 2496 habitat initiatives and 2514 watershed planning. Maintain contact and coordinate with statewide salmon recovery efforts. Ensure local salmon recovery response plan for WRIA #1 is consistent with the statewide plan and the Puget Sound ESU plan.
- Amend local land use regulations, CAO's, ordinances as necessary to implement local response plan. Establish benchmarks to monitor implementation schedules and effectiveness; establish consequences for not achieving goals.

- Ensure local resources are available to maximize recovery efforts through utilization of local funds to match or otherwise leverage state and federal funding programs. Utilize dedicated local resources to accomplish local project priorities even when state or federal funds may not be available.
- Incorporate Adaptive Management Protocols in implementing Salmon Recovery Response Plans. Monitor results and adjust policies and plans accordingly.

Salmon Recovery/ESA Funding

As previously noted, a number of response actions are currently planned for 1999. As summarized in Appendix 2-D, the estimated cost to complete these projects is approximately \$2,000,000. This is in addition to the various efforts being accomplished by the participating entities outside of this water plan.

The County has received assurance that approximately \$1,400,000 of federal money can be applied to the listed projects. Whether this federal money will be applied to entirely cover selected projects or is otherwise distributed general amongst the projects, a \$600,000 shortage exists. A portion of this shortage will most likely be covered through additional grant programs. It is recommended that the majority of the shortfall be covered from a portion of the Flood District set-aside.

Since this is a dynamic funding situation, specific discussion with the County Council will occur in the near future to confirm financing plans and coordination.

With the level of local/regional/state/federal coordination needed to successfully accomplish salmonid recovery as well as grant writing and administration, an additional FTE (ESA Coordinator) is also proposed to be hired during 1999. As an ongoing position, an annual expense is estimated at \$65,000. Finalization of the skills and scope of duties will be completed in the near future.

Element Three: Shellfish Protection

Background

As a result of bacterial surface water contamination, the State Department of Health (DOH) has either closed or restricted shellfish harvesting in both Drayton Harbor and Portage Bay. It is essential that the County take action to restore impacted shellfish beds in Portage Bay and Drayton Harbor in order to ensure a productive resource base for long-term use.

DOH classifies shellfish growing areas on the basis of comprehensive sanitary surveys. Each survey includes assessments of water quality and pollution sources, and also takes into account meteorological and hydrographic factors that may affect the presence and distribution of contaminants.

The presence of certain levels of fecal coliform bacteria is used as the primary indicator of water quality. In classifying each shellfish growing area, DOH relies on the 30 most recent samples taken from each sampling station located in and around the shellfish harvest area. Using the Adverse Pollution Condition protocol (APC), the samples at each station must meet a two-part standard for water quality. For example, the geometric mean of the samples cannot exceed 14 fecal coliform colonies per 100 milliliters of water (fc/100ml), and no more than 10 percent of the samples can exceed 43 fc/100ml.

Under the National Shellfish Sanitation Program, DOH is required to sample approved commercial shellfish areas six times each year. Sampling stations in both Drayton Harbor and Portage Bay have failed to meet these criteria and this failure has resulted in downgrades from the approved status to either a restricted or prohibited status.

Specific local closure response plans have been developed for Drayton Harbor and Portage Bay to address these issues. These closure response plans specify the actions that must be taken in order to protect and restore these resources. The actions interrelate with many existing water resource problems including stormwater discharge, agricultural runoff, municipal and on-site sewage treatment, industrial discharge and marina issues. The problems that we are experiencing with shellfish quality are symptoms of a very large problem. Water quality in the County must be comprehensively addressed to ensure that the quality of our streams and rivers are such that our shellfish resources are no longer impacted. The actions specified in the closure response plans must be completed as part of a comprehensive plan to improve surface water quality problems throughout the County. All of the water quality problems must be addressed if we are to have a viable shellfish resource in Whatcom County in the future.

DRAYTON HARBOR

Response to Date

In January 1995, the Washington State Department of Health (DOH) downgraded the classification of commercial shellfish growing areas in Drayton Harbor. The reclassification was based on water quality data and a Sanitary Survey of known and potential pollution sources in the watershed. In response to the downgrade, state and local agencies joined with other affected interests to develop the *Drayton Harbor Closure Response Strategy*, a targeted, short-term action plan aimed at controlling the pollution sources and restoring the water quality of the harbor. The strategy was also designed to complement the more comprehensive recommendations of the *Drayton Harbor Watershed Management Plan*.

Problems with water quality in Drayton Harbor have been noted in the bimonthly DOH sampling for some time. In the mid-1990's, DOH started sampling Drayton Harbor on a monthly basis and added several sampling stations in an effort to identify pollution sources. In 1995, the State DOH downgraded a portion of Drayton Harbor because the classification standards were exceeded. In September 1996, the department switched back to bimonthly sampling. This decision to reduce frequency of sampling was based upon lack of evidence of improving water quality in the Harbor, no significant improvements on the ground, and limited resources within Department of Health to maintain this expanded program in Drayton Harbor.

Overall, samples collected since the downgrade in 1995 indicate that water quality in Drayton Harbor is not improving. In fact, the data suggests that conditions in the harbor are actually worsening. From October 1996 through April 1997, the remaining commercially grown oyster shell stock was relayed from the *restricted* area to the *approved* area, enabling re-harvest and sale of oysters. This relay operation was completed and currently there is no active oyster growing operation in Drayton Harbor due to the fecal coliform pollution problem.

The most recent sampling conducted by the DOH in December 1998 showed exceedingly high levels of fecal coliform contamination at all sampling stations in the harbor. The apparent cause of these high levels was an overflow of untreated sewage into the harbor caused by storm water overloading the City of Blaine sewer system. This event resulted in the State DOH closing Drayton Harbor to shellfish harvesting indefinitely. DOH is considering what permanent action will be necessary as a result of this incident. This may result in permanent closure of the harbor to shellfish harvesting. DOH may discontinue sampling until major issues with sewage discharge and other pollution sources are resolved.

State DOH identified six pollution sources as a result of the Sanitary Survey that they conducted. These pollution sources are:

1. *Failing on-site septic systems on or near the harbor shoreline and creeks*
2. *City of Blaine sewage treatment facilities and bypasses*
3. *Storm water runoff*
4. *Blaine and Semiahmoo marinas*
5. *Agricultural practices in California and Dakota Creek watersheds*
6. *Fish processing wastewater*

Each of these point and non-point sources is recognized as significant, or potentially significant.

Short Term Local Response

Many of the strategies in the Closure Response Plan related to these pollution sources have been completed or are underway. However, there are still some recommendations that need to be completed. In September 1998, a status report on the implementation of the Drayton Harbor Closure Response Strategy was prepared by the Drayton Harbor Shellfish Protection District Advisory Committee. See Appendix 3-A for the projected costs and specific actions that still need to be completed. The actions are summarized below:

1. On-site Sewage Systems

Many of the existing on-site sewage systems (OSS) on or near the Drayton Harbor shoreline and along California Creek and Dakota Creek predate design and installation requirements. Fifty-four percent (54%) of the residences are more than 20 years old. Previous survey work in this area has revealed that 38% of the systems evaluated did not meet current design standards. A recent, intensive survey revealed a failure rate of 21%.

Local Response

- Designate Drayton Harbor as an Area of Special Concern through the public process. Additional requirements to reduce failure rates or minimize impacts of OSS on shellfish resources are detailed in WCC 24.05.23, Areas of Special Concern.
- Establish a countywide operation and maintenance program for all OSS by the year 2000. Sensitive areas, such as the Drayton Harbor Watershed, will be the primary focus of the initial phase of program implementation.
- Establish a permanent program for financial assistance for OSS repairs.
- Strictly enforce existing OSS regulations.

- Require proof that a residence, served by an OSS, has a functioning OSS for all real estate transactions.

2. Blaine Sewage Treatment Plant

Since the 1995 shellfish downgrade, Blaine has experienced numerous combined storm water/sewer overflows along Marine Drive. Storm water entering the sewer system overloads the Blaine Sewage Treatment Plant (STP), resulting in design capacity being exceeded. There is concern about the performance of the facilities and possible impacts to the harbor during these high flow events. The December 1998 event resulted in an indefinite closure of the harbor to all commercial shellfish harvesting. The level of concern about these discharges is high.

These overflows, caused by excessive inflow and infiltration (I&I) of storm water into the sanitary sewer system, overwhelmed the system resulting in the discharge of untreated sewage into Semiahmoo Bay. Commercial shellfish harvesting north of Semiahmoo Spit in Semiahmoo Bay is prohibited due to the current location of the sewage treatment plant outfall pipe. Along with the closure of the commercial shellfish beds within Drayton Harbor, the DOH has recommended to the Whatcom County Parks Department closure of recreational shellfish harvesting in this recreational area.

Local Response

- The City of Blaine, DOE, and Whatcom County Health Department continue identifying pollution impacting priority drainage's and report findings to the Shellfish Protection District Advisory Committee.
- The City of Blaine should establish and conduct water quality monitoring of Cain Creek and the Storm water outfall pipe to the northeast of Cain Creek. Outfalls and upstream locations should be monitored to determine if the collection system improvements are effective in source control.
- The Blaine Sewage Treatment Plant upgrade. Convene DOH, DOE, City of Blaine and the DHSPDAC to investigate the need for potential redesign or relocation of the STP outfall.
- The cause of the continued bypasses and overflows during high rainfall events must be determined and corrected.

3. Boats and Marinas

Two marinas operate at the entrance of Drayton Harbor. The State Health Department's ambient water quality data, Western Washington University's oyster tissue sampling, and current water quality monitoring conducted by the Port of Bellingham all show higher fecal coliform levels recorded in the commercial section of Blaine Harbor. This indicates that there are significant sources in Blaine Harbor. Washington State ambient sampling from March 1995 through September 1997 (43 samples) show repeated

violations of fecal coliform. Seventy-five per cent of the samples taken exceeded the standard. Although high fecal coliform levels have been recorded in Blaine Harbor no known point sources have been recorded.

Local Response

- Port of Bellingham – As the Port continues to monitor water quality they should record commercial activities to help delineate probable sources and develop a plan to deal with the sources as they are discovered. All findings should be distributed to the Advisory Committee and other interested parties on a monthly basis.
- Blaine Harbor - Report on the number and type of Marine Sanitation Devices (MSD's) in Blaine Harbor. Port Staff have requested that each vessel owner respond to a survey declaring the type of MSD that they have. The Port has received only a handful of responses. Drayton Harbor Shellfish Protection District Advisory Committee should be provided a status report.
- The Port of Bellingham and Blaine Seafood Processors (BSP) should exchange water quality data in order to locate and control fecal sources. The Port of Bellingham requires all processors be in total compliance with all federal, state, county, and city health codes as a condition of their lease.
- The Department of Ecology, who has National Pollution Discharge Elimination System permit enforcement responsibilities should insure that each processor is meeting the requirements of the NPDES permit issued to Blaine Seafood Processors.
- Coordinate water quality sampling with the State Department of Health.

4. Agriculture

The Drayton Harbor Watershed Report (1991) by the Puget Sound Cooperative River Basin Team cited poor agricultural practices as a source of bacterial contamination of water resources. Some of their conclusions are listed below:

Most commercial dairies have conservation plans; however most plans need to be updated and fully implemented. Pasture management on many smaller farms with cattle or horses is inadequate to control runoff and filter contaminants. Many dairies and other livestock farms have animals in proximity to unfenced streams or drainage ditches. Non-dairy livestock operations often have animal densities or stocking rates that exceed the vegetation's capacity to utilize the nutrients in animal waste.

Local Response

- Whatcom County should support education and technical assistance to small farms. Federal and state programs are in place for commercial farms.

Funding should also be sought for a cost-share program for small farms. Provide incentives to adopt BMPs as well as to offset the costs associated with compliance with the Critical Areas Ordinance.

- Commit to provide an effective enforcement program. Such a program includes the continued presence of the EPA and the DOE with Whatcom County assuming a higher profile. The County should take three steps in this regard:
 - Actively enforce the Critical Areas Ordinance by providing funding to support an inspector in the field dedicated to that purpose.
 - Prohibit by ordinance the spreading of liquid manure at certain times of the year (e.g. to corn stubble post-harvest through the following February) and prohibit manure application in proximity to a stream, creek or a public right-of-way.
 - Enter into a Memorandum of Understanding (MOU) with EPA and DOE. Through this MOU, the agencies would clarify their respective jurisdictions, coordinate efforts and make referrals from one another. This would avoid duplication or omission in inspection activities.
- The County should continue to provide funding to assist farmers in developing conservation plans consistent with CAO requirements.
- Efforts need to continue to better understand and then develop locally tested best management practices for on-farm nutrient management. On-farm research needs to expand looking at our unique soils, climate, crops, and other farm management systems in order to provide practical management approaches to utilizing manure in a manner that provides the necessary crop nutrients without contributing to groundwater contamination. Some farms are increasing herd sizes based on economic necessities, which creates excess nutrients for the land base. Recent work on developing both the production system and market for compost from dairy manure has great potential for this region and needs to continue. Compost has the capability of taking a surplus of nutrients on a farm and turning it into a value added product to supplement farm income and provide a valuable commodity to other farmers and home gardeners.
- Research and then education needs to address the logical progression of nutrient inputs on a farm – animal feed and fertilizer as a point for better management directed to reducing the nutrient output from dairy and other animal operations. Research needs to continue evaluating alternative crop systems, particularly on dairy farms to identify improved methods for capturing and utilizing nitrogen more effectively.

Long Term Local Response

An on-going long-term monitoring program for Drayton Harbor must also be established so that the County can continue to evaluate the effectiveness of the protection programs that have been established. Many of the water quality studies that have been conducted in this watershed lack the coordination needed to see effective results. Monitoring continues in the watershed with very little communication between projects.

A comprehensive monitoring program for the Drayton Harbor watershed should be developed. The program should provide the means for reaching agreement on an overall monitoring scheme, for guiding pollution control projects and activities, and for assessing progress towards meeting water quality standards.

PORTAGE BAY

Response to Date

In August of 1997, the State Department of Health (DOH) downgraded a portion of the Bay from *approved* to *prohibited*. This action was necessary to protect public health. Previous sampling of marine water showed concentrations of fecal coliform bacteria above what was safe according to the state water quality standards and National Shellfish Sanitation Program. Recent sampling has shown that the water quality has not improved and the state DOH has notified the County that they are planning to downgrade additional shellfish growing areas in Portage Bay. The formal downgrade of these areas will likely occur in early 1999.

Water quality is the most significant factor in determining whether clams, oysters, mussels and other shellfish are safe to eat. In polluted water, shellfish accumulate bacteria, viruses, or toxic substances. While the shellfish themselves appear to be unaffected, those who eat them can become ill. One of these common pollutants, fecal coliform, is the cause of the current restrictions on Portage Bay shellfish harvesting. Evidence has shown that the pollution in the Bay is a result of heavy bacterial loading from the Nooksack River Watershed.

The principal source of freshwater into the bay is the discharge of the Nooksack River. Sampling of the Nooksack River below the bridge at Mount Baker Highway as well as several of its tributaries intersecting below that point, are impaired by excess levels of fecal coliform. Nearly 40% of the monthly samples collected by the state Department of Ecology in the lower Nooksack River between 1993 to 1996 exceeded the established water quality standards for a Class A stream (100 fecal coliform colonies/100ml). Other studies show similar results.

The State Department of Health identified six potential sources of fecal coliform pollution in its August 1997 Sanitary Survey of Portage Bay. Four of these sources of pollution were considered key sources which must be addressed in order to restore the

shellfish resource. These are:

1. Agriculture;
2. On-site septic system;
3. Sewage treatment plants; and
4. Storm water runoff.

Each of these point and non-point sources is recognized as significant, or potentially significant. As a result of the shellfish downgrade by DOH, a local closure response strategy for Portage Bay was established to address the areas of key pollution sources. See Appendix 3-A for the projected costs and specific actions that still need to be completed. The actions are summarized below.

Short Term Local Response

1. Agriculture

The DOH and the Team identify improper dairy waste management as the largest potential contributor of fecal coliform pollution in the Nooksack watershed. About 69,000 cows on 241 dairy farms within the basin produce more than one-half million gallons per day of manure. This number does not include young stock. The amount of dairy waste produced each day in the Nooksack watershed on a bacterial loading basis is equivalent to 1.3 million people.

Local Response

- Actively enforce the Critical Areas Ordinance by providing funding to support an inspector in the field dedicated to that purpose.
- Prohibit by ordinance the spreading of liquid manure at the wrong time (e.g. to corn stubble post-harvest through the following February) and in a sloppy manner (e.g. to a stream, creek, river or a public right-of-way).
- Enter into a Memorandum of Understanding (MOU) with the Environmental Protection Agency (EPA) and State Department of Ecology (DOE). Through this MOU the agencies would clarify their respective jurisdictions, coordinate efforts and make referrals from one another. This would avoid duplication or omissions in inspection activities.
- Detailed technical studies on the effects of Best Management Practices (BMPs) on fecal coliform levels and/or research into alternative dairy waste management techniques should continue and be enhanced. WSU Cooperative Extension has been and should continue to be active in conducting such research and demonstration projects. The Whatcom

Conservation District and the Northwest Indian College have expressed interest in developing specific projects and seeking grant funding for them as well.

2. Failing On-site Septic Systems

Failing on-site septic systems ("OSS's) especially in the Marietta area are an additional potential source of fecal coliform contamination to Portage Bay.

Local Response

- Whatcom County Health and Human Services Department should conduct a survey of OSS in the Marietta area and require repair of failures.

3. Sewage Treatment Plants

Sewage treatment plants (STP) operated by the cities of Everson, Lynden and Ferndale are known sources of fecal coliform. In monthly averages, the daily discharged wastewater from these facilities must not exceed 200 fecal coliform colonies/100 ml. Sampling by Department of Ecology for the "total maximum daily load" (TMDL) study indicates that permitted average amounts are exceeded on individual days.

Local Response

- Review of discharge (NPDES) permits with a recommendation for tighter changes in upcoming permits under renewal.

4. Storm Water Runoff

Storm water runoff is a source of fecal coliform pollution in the Nooksack River drainage. In urban areas, pet waste and other non-agricultural sources are the primary sources. In rural areas, storm water can carry bacteria from agricultural operations, non-commercial farms or on-site septic systems. Affected municipalities, including the County, are required to develop storm water management plans.

Local Response

- In advance of implementation of the storm water plans, there is a need for mapping of known storm water outfalls to aid the response strategy. Prompt completion of outfall mapping is necessary.

Long Term Local Response

As a requirement of the federal Clean Water Act, the DOE is conducting a Total Maximum Daily Load (TMDL) study. This will help the DOE and the Whatcom County community determine how best to reduce pollution (of all types) in the Nooksack River and tributaries. Monthly sampling at 20 sites along the Nooksack River, from Nugent's Corner to Portage Bay, began in March 1997 as part of this TMDL study. When sampling is concluded in March 1998, the data will be thoroughly analyzed. It will identify the fecal coliform bacteria reductions needed to meet Class A water standards at all points of the Nooksack River. The TMDL study will help better quantify the relative contributions of fecal coliform from the potential sources identified in the DOH Report.

A monitoring program is necessary to measure two things. First, it must measure the effectiveness of the Portage Bay Closure Response Strategy. Second, it must measure the effectiveness of pollution limits set by the year 2000 under the TMDL process. A monitoring plan should include indicators of water quality, shellfish health, land use, education effectiveness, and regulatory actions. It is expected that the Portage Bay strategy will be constantly evaluated and adjusted according to information yielded from an ongoing monitoring program. Without monitoring, there will be no way to measure the effectiveness of resources spent on implementation. The committee established to implement the closure response strategy should coordinate monitoring of the Portage Bay Closure Response Strategy. The committee should also be responsible for maintaining a database, interpreting and summarizing data of monitoring reports, and evaluating trends.

Ensure that resource protection programs such as the newly adopted manure ordinance are in place in Whatcom County. It is essential that sufficient staff resources are allocated in the future to enforce elements of the protection programs and to provide the community with educational information related to resource protection. An on-going long-term monitoring program must also be established so that the County can continue to evaluate the effectiveness of the protection programs that have been established.

Shellfish Protection Funding Summary

The cost projections for completing the closure response strategies for Drayton Harbor and Portage Bay are projected to be in excess of \$12,000,000. At this point, each item in the closure strategy has a funding source identified and, in many cases, secured. During 1999 and 2000 approximately \$20,000 in County match will be required to contract for a coordinator to ensure implementation of the closure response strategies. \$10,000 in matching funds has been allocated by the County in 1999. An additional \$10,000 will be needed in 2000. Specific cost estimates for each of the response strategies can be found in Appendix 3-A and 3-B. Beyond these amounts, no additional funding is contemplated at this time as a part of this water plan.

Most of the revenue for completing the projects specified in the closure response strategies is currently available through state and federal grants. Local in-kind matching funds are also generally available in the community, for example producer matching funds for manure management plan implementation. It may be expected that the level of financial assistance from the federal government (NRCS) to local farmers to implement structural Best Management Practices will be restricted in the future by Section 7 ESA consultation requirements. If this becomes the case, alternative approaches to provide support or incentive to implement structural BMPs in the future will need to be evaluated.

As a result of the recent additional downgrades in both Portage Bay and Drayton Harbor, the response strategies will need to be reexamined in the future and additional efforts may be necessary to further address the deteriorating water quality. These additional efforts will increase funding and resources needed to effect an upgrade of the shellfish classification.

Element Four: Lake Whatcom Management

Background

Lake Whatcom is a large multipurpose lake located in the southwestern portion of Whatcom County. The lake is the source of drinking water for the City of Bellingham, Whatcom County Water District 10 customers, and about 250 residents, which draw water directly from the lake. Approximately 65,000 people, nearly half the County population, rely on Lake Whatcom as a drinking water source. The lake may become an increasingly important source of water to other areas of the County given the current legal, environmental, economic, and political impediments.

The Lake Whatcom Watershed is located directly east of Bellingham. The watershed comprises about 37,000 acres with a lake surface area of 5,000 acres. Total lake volume is about 3.2×10^{10} cubic feet. The lake is 10 miles long with a maximum width of about one mile.³

The lake itself is comprised of three sub-basins partially separated by subsurface sills. Sub-basin 1 is the northernmost basin with a maximum depth of 95 feet, mean depth of 30 feet, and contains about 2% of the total volume of water in the lake. Geneva sill, which has a maximum depth of 10 feet, separates sub-basin 1 from sub-basin 2. Sub-basin 2 has a maximum depth of 69 feet, and contains about 2% of the total volume of water in the lake. This sub-basin contains the Water Treatment Plant intake for the City of Bellingham. Strawberry sill, which has a maximum depth of 45 feet, partially separates sub-basin 2 from sub-basin 3. Sub-basin 3 contains about 96% of the lake volume and has a maximum depth of 328 feet. Water District 10's intake is located in basin 3. A number of continuously flowing streams and numerous seasonal drainages discharge into the lake. Whatcom Creek, located at the north end of the lake, is the only natural outlet. Groundwater also contributes recharge to an unknown extent. The City of Bellingham uses a constructed diversion from the Nooksack River to supplement flows into the lake.

Lake Whatcom is a multiple use lake and watershed. In addition to providing drinking water, the lake is used for boating, swimming, fishing and other activities. About 70% of the watershed is comprised of forestlands, largely surrounding sub-basin 3. There are approximately 5,000 homes currently in the watershed. High-density development and development potential exists around sub-basins 1 and 2. The major residential development around sub-basin 3 is Sudden Valley, a private community that has about 1,700 homes with the potential for more.

³ Many of the reports written on Lake Whatcom contain different information on some of the physical characteristics of the lake such as length. Much of the information about these features was gathered in the early 1970s and needs to be updated. It is planned that this update will occur this year.

Water quality in the lake varies with sub-basin 3 containing the highest quality water and sub-basin 1 the lowest. Although there is agreement that development adversely impacts water quality, professional opinions vary regarding the ability to define trends, extent of degradation, and specific cause of the degradation.

Numerous studies, reports, and plans have been developed over many decades regarding the lake and how it should be managed. Until the early 1990's there has been no lasting strategy developed and agreed to by the local jurisdictions such as the City of Bellingham, the County and Water District 10.

Response to Date

In 1990, Whatcom County, the City of Bellingham, and Water District 10 began meeting to determine how to best manage the lake. Fundamental to the early discussions was a clear recognition of the long-term importance of protecting, preserving, and enhancing water quality in the lake. Key events that have occurred since then include:

- 1992 – The Lake Whatcom Management Committee, composed of the County Executive, Bellingham Mayor, and Water District 10 Manager, developed a draft set of goals and policies to guide management actions in the watershed. Six general goal statements along with 21 specific goals related to quality, quantity, distribution, and fish/wildlife were included. The goals focused on taking a conservative protection-oriented approach to water quality management. Reasons for this approach included:
 - Lake Whatcom may become an increasingly important source of water to help serve other areas of the County in which supplies are limited;
 - Growth and development in the County depends on predictable, affordable supplies of clean water;
 - It is increasingly difficult to find new sources of water due to economic, legal, political, and environmental issues;
 - Surveys have shown that clean, safe drinking water is highly valued by the community;
 - Protection is generally considered more cost effective in the long run;
 - There is uncertainty about the long-term effects on water quality if changes were needed in the operation of the diversion which supplies water from the Nooksack River;
 - There is uncertainty about the implications of the Endangered Species Act, and the potential 303d listing of the lake as an “impaired water body”; and
 - Watershed control/source protection is now required as part of water system plans under Chapter 246-290 WAC

The draft goals were presented to the legislative bodies of each jurisdiction. Modifications were made to the goals based on public and legislative input. The legislative bodies jointly adopted the goals in November 1992 (see

Appendix 4-A – Joint Resolution Whatcom County 92-73, Bellingham No. 92-68, District 10 No. 560).

- 1993 – The Management Committee developed a strategy to develop plans to implement the goals and policies. The strategy was endorsed by the Legislative bodies on April 28. Eight specific goals were targeted for immediate action: land use, forest practices, spill response, conservation, public education/involvement, data/information management, stormwater, and septic systems. The intent was to eventually develop plans and implement actions to address all of the adopted goals. It was also recognized that many plans would need to be updated on a regular basis. A land use plan was adopted in 1993 and largely deferred to the Growth Management Act (GMA) planning process as the method to address land use issues.
- 1994 – Plans were completed and adopted for 5 of the remaining 7 high priority areas (see Appendix 4-B Joint Resolution Whatcom County 96-005, Bellingham No. 65-94, District 10 No. 591). The adopted plans targeted data/information management, spill response, conservation, public education/involvement, and forest practices.⁴ Successful implementation of the plans was dependent upon using existing staff/other resources and obtaining an additional \$136,000.
- 1995 to 1997 – Work began to implement the adopted plans; however, due to staff reductions and limited resources (\$60,000 was allocated to the program), full implementation was not possible. Completion of the stormwater plan was placed on hold until greater assurance of funding was obtained. Septic system actions were undertaken as part of a contract between the City and County. Through the GMA comprehensive planning process additional goals and policies were adopted by the city and County regarding the lake (see County goals, policies, and action items included within the comprehensive listing in Appendix 4-D).
- 1998 – The County, City, and District 10 allocated \$375,000 toward protection and management efforts in the watershed. Actions targeted stormwater management, land use/development, septic systems, continued implementation of the adopted public education/involvement, spill response, data/information, and conservation plans, and adoption of an interlocal agreement.

Of the \$375,000 allocated, most (\$300,000) was directed to hire professional services to assist with developing a stormwater program. Considerable background work was done by the jurisdictions prior to selecting a consultant

⁴ Due to length of some of these plans they are not included in this document but are available upon request.

in late 1998. The County Council approved the contract with the consultant in January 1999.

In May 1998, the jurisdictions formalized their joint commitment to protect and manage the lake through adoption of an “Interlocal Agreement Between City of Bellingham, Whatcom County, and Water District 10 Concerning Joint Management of Lake Whatcom” (see Appendix 4-C). The interlocal agreement formalized the working relationship between the jurisdictions by:

- defining the approach for on-going planning;
- clarifying the role of the legislative bodies, administration, and the public; and
- identifying interim funding commitments for each jurisdiction (\$375,000 total/year with \$175,000 from the City and County, and \$25,000 from District 10).

State Department of Ecology’s final proposal to the Environmental Protection Agency includes a recommendation that Lake Whatcom be included on the 303(d) list for dissolved oxygen.

Short Term Local Response

Consistent with the adopted interlocal agreement, the City, County, and District 10 have developed a 1999 Management Program for the watershed. The program identifies actions for each of the 1992 adopted goals and policies. Comments and suggestions from the public, administration, legislative bodies and subsequently adopted goals and policies were used to develop the original draft of the program. Some of the actions help complete implementation of the previously adopted high priority plans.

The draft program was presented to the legislative bodies at a Special Joint Meeting on September 23, 1998. Individual meetings with each of the Councils and Commissioners followed, at which time additional recommendations were received. The recommendations were incorporated into the final plan which was adopted by Water District 10 Commissioners, City Council, and the County Council on January 13, 25, and 26, 1999 respectively. A specific priority has been placed on actions related to land use, stormwater management, and watershed ownership. Other actions in the Plan include:

- Assessing potential water quality impacts associated with the abandoned “Y” road landfill;
- Working with DNR to ensure forest practices that minimize impacts on water quality;
- Enhancing and testing spill response capabilities;

- Providing education and tools to help watershed residents, developers, and others minimize their impacts on water quality;
- Evaluating City and County road programs for concurrency with a particular emphasis placed on the Connector;
- Providing/enhancing mechanisms for public and legislative education and involvement;
- Developing criteria and identify possible geographic areas as priorities for public purchase of property (building on existing work that has been done by other groups);
- Updating data base and ensure public access to information;
- City to reevaluate use of meters on residences to reflect current costs and conditions (previous mid-1990s estimate approximately \$5.5 million);
- District 10 to continue efforts to limit overflows of sewage.

The complete program is included in Appendix 4-D.

Long Term Local Response

The Lake Whatcom Management Program is an adaptive management program with annual review and update. The current approach has been to identify actions that can be accomplished in the following year. The 1999 program includes a recommendation that, as appropriate, multiyear program planning occur.

Lake Whatcom Management Funding Summary

As previously noted, a combined annual financial commitment of \$375,000 between the County, City of Bellingham, and Water District #10, with the County's committed annual share being \$175,000. This is in addition to the County's 1998 commitment of \$300,000.

During 1998, approximately \$21,000 was expended, with an additional \$33,000 of committed contractual expenditures carried over into 1999. From the balance of the unexpended portion of the \$300,000, plus the new \$175,000 commitment, 1999 County expenditures are estimated to be \$417,461. This proposal includes an additional 1 FTE (Watershed Planner) and at least \$305,000 in contracted services.

It needs to be noted that the annual financial commitments of the city of Bellingham and Water District #10 will be expended separately by those entities in accomplishing the joint work programs, and are in addition to the above numbers.

As noted above, the County has previously committed to an annual \$175,000 for agreed to program activities. As the planning and program details progress, expanded program activities will be discussed with our watershed partners, including new and/or alternative funding sources.

Element Five: Groundwater Protection & Management

Background

Uses/Importance

Groundwater is water contained in aquifers, which are subterranean layers of porous rock or soil. Whatcom County residents rely heavily on groundwater for drinking water, agriculture, and commercial/industrial needs. Groundwater also plays an important role in maintaining stream flows, although much remains to be learned about the relationship between groundwater and stream flows. The majority of the County's drinking water supply is surface water from Lake Whatcom or the Nooksack River; however many County residents use groundwater as a source of drinking water. Over 95% of 347 public water systems located in the County rely on groundwater. In addition, approximately 20,000 homes obtain water from exempt wells (not from "public systems"). Exempt wells pose difficulties for effective water resource management. The agricultural community also relies heavily upon groundwater for crop irrigation and use in the dairy industry.

Protection and management of the County's groundwater resource is critical. As reflected in the adopted County Comprehensive Plan and other documents, an effective strategy will require:

- Assessment – Work should continue to evaluate effectiveness of actions taken, conduct health surveillance/assessments, identify areas requiring special protection, and identify nature and extent of problems.
- Planning – Build upon existing work by the County and others to develop the best strategy to protect and manage the resource. Work should include source protection, education, technical assistance, and intervention.
- Implementation – Continue implementation of actions related to on-going programs and implement new actions as determined necessary in the planning/strategy development phase. A particular emphasis should be placed on implementing actions that have been adopted under existing programs (e.g. wellhead programs and County Comprehensive Plan goals).

Problem Identification

1. Studies

A number of studies have been conducted over the years to help characterize the quality and quantity of groundwater in Whatcom County. These include:

- LENS Study– This \$500,000 study was initiated in the early 1990s through the cooperative efforts of Whatcom County, Lynden, Everson, Sumas, United States Geological Survey (USGS), and the Department of Ecology (DOE). Whatcom County received a grant from DOE to:
 - Work with the USGS to investigate groundwater quality (and to a lesser degree quantity) in the northern portion of the County. Numerous tests were conducted on hundreds of wells, with approximately 20 selected for frequent testing to evaluate seasonal changes;
 - Provide education to area residents by sending information to over 8,000 homes offering free nitrate testing and educational materials; and
 - Develop a working relationship with agencies/partners in Canada because groundwater from Canada flows southward into the U.S. requiring international coordination in order to protect the resource. The Abbotsford/Sumas International Task Force was formed as a result of this study and continues to meet today.

Due to the extensive peer review required by the USGS, the final technical report has not been submitted to the County however it is expected soon (it is being printed). A draft report, executive summary, and numerous maps have been available for several years.

- Lummi Island Study – In the early 1990s, Whatcom County, in cooperation with Island residents, received an Ecology grant to provide education and investigate saltwater intrusion and naturally occurring arsenic on Lummi Island.
- 1997 DOE Nitrate Study - The results of the LENS study were re confirmed. DOE sampled 248 wells in the Sumas Blaine Surficial Aquifer for nitrate and found that 21% of the wells tested had levels of nitrate above the Maximum Contaminant Level (MCL) of 10 ppm. Additionally, 39% of the wells tested had levels of nitrate which exceeded half of the MCL.
- The presence of soil fumigants (EDB, 1,2-DCP and DBCP) in groundwater has been well documented since the mid-1980's. Numerous studies to determine the level and distribution of groundwater contamination have been conducted by various agencies. In 1998 coordinated studies conducted by federal and state agencies reconfirmed the extent of contamination in the County.
- Agency for Toxic Substances and Disease Registry (ASTDR) completed a Health Consultation related to the health risk of dermal and inhalation exposure to soil fumigants (Appendix 5-A).

- DOH recently completed a Health Assessment of drinking water contaminants in Whatcom County (Appendix 5-B). The assessment examined the potential for health effects at the levels of contamination found in groundwater in Whatcom County. The assessment also included recommendations for protective measures resident could use to reduce their risk of exposure.
- State Department of Health (DOH) in cooperation with WCHHS conducted a childhood leukemia study. This was in response to concerns that an increased incidence of leukemia might be related to groundwater contamination. The report detailing the study is nearing completion.

2. Results

Through these and other studies much has been learned about groundwater quality particularly in the northern portion of the County. Many still remains to be learned, particularly about water quantity. Key information includes:

- In general, groundwater in Whatcom County is very vulnerable to contamination because much of the County's groundwater lies within a shallow unconfined aquifer. Activities that occur on the surface of the ground directly affect groundwater quality. Shallow wells that draw water from unconfined water table aquifers are at highest risk.
- Nitrate contamination is the major concern for groundwater in the County.
- The Blaine Sumas Aquifer has been impacted by agricultural and other activities causing both nitrate and pesticide contamination problems in drinking water supplies. Though there is some variation in study results, approximately 20% of wells have levels of nitrate above the MCL of 10 ppm, with 40 – 50% of wells with levels that exceed half the MCL.
- Nitrate concentrations in some (particularly shallow) wells can vary significantly throughout the year. Concentrations can range from less than the MCL to well over the MCL depending on when the sample is taken.
- The main sources for excess nitrate in drinking water have been determined to include improper application of commercial fertilizers, improper animal manure applications, and improperly designed, installed or maintained septic systems.
- The presence of pesticides, such as the soil fumigants Ethylene Dibromide (EDB) and 1,2 –Dichloropropane (1,2-DCP), and Dibromochloropropane (DBCP) have been well documented since the mid-1980s.
- Limited data for wells sampled in 1991 and 1998 suggests that levels of the soil fumigants in well water may be decreasing. However results from

sampling conducted in 1998 revealed that soil fumigant levels above the MCL still exist in at least 12 private wells.

- Sources of soil fumigants appear to be associated with historic commercial applications of EDB, 1,2 – DCP and DBCP to fields prior to growing potatoes or berries. These fumigants were used to control worms in the soil that attack the roots. EDB and DBCP were banned from use in the 1980's and production of 1,2-DCP was discontinued in 1991.
- Bacterial contamination is also a concern. Many shallow private wells test positive for the presence of coliform bacteria. This indicates improper well construction or sealing.
- Lummi Island groundwater has naturally occurring arsenic levels that in some instances exceeds drinking water standards.
- Certain areas within the Lummi Reservation have problems with saltwater intrusion

3. Health Concerns

Nitrate:

The State Department of Health (DOH) recently completed Health Assessment considers nitrate the primary contaminant of concern based on concentrations observed, frequency of detection and potential health impacts.

Ingestion of nitrate can cause anemia. If this condition is not treated, serious health consequences can occur especially in very young children and other at-risk populations. The MCL for nitrate is 10 ppm. Unlike most drinking water MCLs, the nitrate MCL is based upon an observed human effect in highly sensitive individuals. There is no safety factor incorporated into the standard. In fact, symptoms have been observed in infants exposed to nitrate concentrations slightly above the MCL.

Soil Fumigants:

Ingestion, inhalation, and dermal exposure to the soil fumigants are all considered significant routes of exposure. EDB and DBCP are known to cause cancer in laboratory animals and can impact human health. 1,2-DCP does cause health effects in both people and laboratory animals but available data was not sufficient for either EPA or DOH to classify the carcinogenic potential. Exposure to levels of the soil fumigants above the MCL over a long time period is considered to be a health risk. The MCL's for the fumigants (EDB 0.5 ppb, 1,2-DCP 5 ppb and DBCP 0.2 ppb) are considered to be protective of public health.

Response to Date

In addition to the studies and assessments noted in the previous sections, a variety of actions have been undertaken to address the concerns identified. Such actions include:

- *Data/Information Management:*
 - A drinking water database has been developed at WCHHSD to consolidate the results of past groundwater studies. In addition, information on more than 2000 private wells have been added to the database. Public water supply data is now also available in the database. The database also contains all known and available fumigant data that has been collected to date. Drinking water data has been mapped using the GIS system to show the distribution and level of contamination found to date (see Appendix 5-C for an example of the mapping capabilities). This information will be used to identify those individuals at risk so that educational materials can be provided, and other actions taken as possible.
 - Maps of existing wellhead protection areas are available through the County GIS system.
 - A comprehensive inventory of existing groundwater studies and information was compiled through the efforts of the Nooksack Water Users Steering Committee. The information is available on hard copy and through electronic media. The documents will be located at a central location.
- *Research:*
 - Cooperative Extension and WSU have been conducting on-farm research and demonstrations to investigate the flow of nutrients through the farm from feed to cow to field to crop. Research and demonstrations have looked at providing guidance on how to measure existing nutrient levels in manure, soils and crops and how to calculate the current application rates based on this farm data. This work has been grant funded for the past five years and the grants have just ended.
 - Three federal agencies, the US Department of Agriculture, the Food and Drug Administration, and the EPA have jointly decreed that the most effective way to protect the environment from pesticides is through the adoption of integrated pest management (IPM). IPM does not mean no pesticide usage, but rather provides a systematic decision-making process that looks at all pest management options.

Cooperative Extension has been implementing IPM research and education through the Nooksack IPM project for the past three years here in Whatcom County. The effort has been funded by a federal Clean Water

(319) grant but is scheduled to end June 1999. The goal of the project is to reduce the reliance on pesticides as the first choice response to the presence of key pests in the production system. The IPM Project is designed to increase the knowledge, skills, and adoption of practical IPM practices by growers. This project enhance the adaptation of IPM by increasing the capacity of the industry to identify, plan, conduct, and evaluate IPM research in an on-farm production setting. Refer to <http://whatcom.wsu.edu/ag/comhort/nooksack/nook1.htm> for more information about the project.

- *Technical Assistance*
 - The Whatcom County Conservation District and the USDA Natural Resource Conservation Service provide technical assistance in the development of farm plans for County dairy farms. These plans require manure, soil, and crop analysis to ensure avoiding the over-application of nutrients which then would add nitrate to groundwater. The recommendation in these farm plans are based on NRCS technical standards and supported by local field research conducted by Washington State University and Cooperative Extension.
 - Refer to IPM program previously mentioned.
- *Education*
 - Whatcom County Health and Human Services has provided educational information related to groundwater contamination and drinking water safety by direct mail to resident of the affected areas.
 - Whatcom Watershed Information Network: This inter-jurisdictional/citizen group has been meeting since the early 1990s. They have provided education to the community on a wide variety of topics including groundwater. Some of the methods used include the quarterly "Water Whys" newsletter, information at the Northwest Washington Fair, and (in the past) a weekly half-hour radio program.
 - Refer to IPM program noted previously.
- *Regulations/Enforcement:*
 - Manure Ordinance: This past year, Whatcom County passed a manure ordinance that prohibits the application of liquid manure to bare ground or corn stubble in the fall and winter which is during a period of high rainfall and not utilization by a growing crop.
 - Public Water System Requirements: State Health regulations include monitoring requirements for nitrate and soil fumigants. Public water systems are required to monitor for nitrate concentrations on a periodic basis (every one to three years). If nitrate concentrations above one-half

of the MCL are detected, the water system is required to monitor the source on a quarterly basis. If a concentration above the MCL occurs, the water system must notify all customers so sensitive individuals can be protected. Public systems are also required to evaluate the development of alternate drinking water sources and treatment/blending options when technologically and economically feasible to reduce the nitrate concentration. There are a number of public water systems in Whatcom County that exceed these regulatory limits.

Existing Group "A" Community Public Water systems serving residential populations are required to monitor for soil fumigants. If contaminants in the water are identified above an action level (set by state law) further monitoring or treatment may be required. Small Group "B" systems serving 15 or fewer residential connections or transient non-community water systems (restaurants, grocery stores, migrant labor camps, and similar facilities) are not required to monitor for soil fumigants. New public systems are required to test for soil fumigants prior to obtaining source approval. If contaminants are found above the action level further testing may be required.

- Water Availability Evaluation: As part of the Growth Management Act, it is now required that applicants for building permits provide evidence that they have a safe, reliable water supply prior to issuance of a building permit. Testing for nitrate is required at this time. Testing for fumigants may also be required by WCHHS. If unsafe levels are found a treatment systems and/or other options are required. The water availability requirement is one of the most effective measures to ensure safe water supplies for new homes.
- Critical Area Ordinance: Protection of critical aquifer recharge areas is required as part of the Whatcom County Critical Area ordinance. The ordinance relies upon the SEPA process and may need to be reevaluated as part of the larger groundwater protection and management strategy.
- *Other*
 - Wellhead Protection Programs: A number of public water systems in the County have developed wellhead protection programs (Blaine, Sumas, Everson, Deer Creek, Pole Road). Wellhead protection programs are a required part of a comprehensive water plan (State Health regulations) for public water systems that rely upon groundwater. The program requires the purveyor to identify areas requiring special protection, identify potential contaminants within the areas, and develop/implement strategies to address potential concerns. One of the limitations of this program is that often the purveyors do not have jurisdictional control over the issue(s) of concern. For that reason, the strategies should be done in coordination with jurisdictions, such as the County, that have authority over the issue of

concern. In the early 1990s, the County applied for and received a grant to work with purveyors to develop a countywide program but was unable to meet the match requirements.

- **Abbotsford/Sumas Aquifer International Task Force:** The Task Force was formed through efforts in the LENS study. The purpose of the Task Force is to collaboratively work to protect and manage groundwater supplies. Numerous recommendations have been developed. One example is the extensive agriculture strategy that was developed by the Task Force. Whatcom County participation in recent years has been limited in part due to time constraints.
- **Coordinated Water System Plan:** The CWSP contains a number of recommendations related to groundwater management and protection. The Plan is being updated at this time.
- **Bottled Water:** DOE has been providing bottled water to those residences known to have wells contaminated with fumigants. WCHHS is coordinating efforts to provide a long term permanent solution. This may include an alternative water source or treatment options.

Short Term Local Response

Development of a Groundwater Protection Plan

Groundwater in Whatcom County is another important water resource that deserves a comprehensive strategy to ensure its protection for current uses and future generations. Now is the appropriate time to complete a comprehensive groundwater protection plan. This plan development would follow the same processes as the development of the Lake Whatcom Management Plan and the Shellfish Response Strategies for Portage Bay and Drayton Harbor.

This plan must also integrate existing planning and management efforts, such as the wellhead protection plans and programs referenced above and local watershed planning efforts, which will address water quantity issues under 2514. In order to be prepared for emergency actions and to prevent contamination, the plan must also include an inventory of potential sources of groundwater contamination. The inventory should identify, map and prioritize potential sources, such as on-site septic systems, underground storage tanks, industrial chemical inventories, including potential locations of spills. Emphasis of this effort will be on sensitive areas such as Sumas Aquifer.

There are a number of regulatory vehicles that could be integrated where appropriate into a comprehensive groundwater protection strategy for Whatcom County. Some of these vehicles could emanate from Whatcom County land use regulations, including the

Critical Areas Ordinance. Each and all of these have policy implications and deserve critical analysis and discussion during the plan development process.

Included below are a number of existing local, state, and federal level approaches that could be a part of developing and/or implementing a comprehensive groundwater protection strategy for Whatcom County. These are among the many options that should be explored to determine what would be appropriate for the County.

- Development of a comprehensive wellhead protection program for all public groundwater supplies. This was proposed in the early 1990's and was not pursued. Some public water supplies have developed these already, but Whatcom County should take the lead in coordinating a master wellhead protection program for all drinking water sources that utilize groundwater. This effort would establish wellhead protection zones based on contribution areas over time, inventory potential sources of contamination, and develop management strategies to address those sources. The Washington Department of Health has staff and protocols to assist this effort if desired. Wellhead protection has also been used in relation to larger surface mining activities in the County and could be expanded to include smaller mining operations as well.
- Re-examination of the Critical Aquifer Recharge Areas (CARA) section of the Whatcom County Critical Areas Ordinance. Current or new future land use actions could trigger additional administrative requirements. Only those activities where the County is the lead SEPA agency are evaluated for CARA. This leaves many development activities within a CARA that do not get adequate review. The non-conforming laws regarding existing land use and development should also be examined. Current non-conforming laws permit non-conforming use to continue within designated wellhead protection areas and CARAs. Sunset provisions may be beneficial in providing additional aquifer protection. These changes could be used to affect land use decisions over the aquifer. This review process could also be used to drive a public education effort to inform the public of the vulnerability of the aquifer and the potential for groundwater contamination.
- The County administrative process of recording, routing and tracking permits that may impact our groundwater resource should be examined. The County could benefit from a consolidated system that includes all County permit actions and links to state permitting data as well.
- Whatcom County could encourage the US Environmental Protection Agency to designate the Sumas Aquifer as a Sole Source Aquifer. This designation would affect federal agency efforts in the aquifer and could also be used to drive a public education effort to inform the public of the vulnerability of the aquifer and the potential for groundwater contamination.

- Whatcom County could petition the Washington Department of Ecology to designate the Sumas aquifer a Special Protection Area (SPA) under WAC 173-200-090 section of the Groundwater Protection Standards. The main effect of a SPA designation will be to affect DOE's permitting activities and probably increase the likelihood of obtaining DOE administered grant funding.
- Whatcom County could petition the Washington Department of Agriculture to designate the Sumas aquifer a Special Use Area (SUA) for pesticide applications. This would allow the WSDA to establish specific restrictions or modifications on pesticide application and use for a specific pesticide(s) if appropriate. WSDA could also designate a pesticide a restricted use pesticide with its inherit additional regulations based on perceived threats to groundwater.

Other options to provide groundwater protection will be identified and evaluated during the development of the plan.

Farm Management Plans

Efforts need to continue to provide practical farm management plans that will comply with the requirements of SB6161 and local needs for Whatcom County farmers. The Whatcom Conservation District will continue to take the lead in providing these plans. It is expected though that the demand for farm plans will outstrip the resources of professional staff to provide. Another approach that will complement the work by WCD staff, is to develop and implement a coached planning effort that combines education on plan components and requirements with support for farm families to develop their own plans. This approach has been used for some time with non-industrial private forest landowners successfully. It has been found that using coached planning to develop the forest stewardship plans have resulted in close involvement and dedication to the implementation of these plans by the landowners.

It may be expected that the level of financial assistance from the federal government (NRCS) to local farmers to implement structural Best Management Practices will be restricted in the future by Section 7 ESA consultation requirements. If this becomes the case, alternative approaches to provide support or incentive to implement structural BMPs in the future will need to be evaluated.

Farm Nutrient Flow Analysis & Management

Efforts need to continue to better understand and then develop locally tested best management practices for on-farm nutrient management. On-farm research needs to expand looking at our unique soils, climate, crops, and other farm management systems in order to provide practical management approaches to utilizing manure in a manner that provides the necessary crop nutrients without contributing to groundwater contamination. Some farms are increasing herd sizes based on economic necessities, which creates excess nutrients for the land base. Recent work on developing both the

production system and market for compost from dairy manure has great potential for this region and needs to continue. Compost has the capability of taking a surplus of nutrients on a farm and turning it into a value added product to supplement farm income and provide a valuable commodity to other farmers and home gardeners.

Research and then education needs to address the logical progression of nutrient inputs on a farm – animal feed and fertilizer as a point for better management directed to reducing the nutrient output from dairy and other animal operations. Research needs to continue evaluating alternative crop systems, particularly on dairy farms to identify improved methods for capturing and utilizing nitrogen more effectively.

Integrated Pest Management

The Abbotsford Sumas Aquifer International Task Force Agriculture Plan identifies IPM technical assistance as the primary method to protect groundwater from pesticides. This supports the federal policy determination that IPM is the preferred method to protect the environment from pesticides.

Research and education needs to continue to identify and evaluate alternative pest management approaches. A new local source of funds is needed to continue the Nooksack IPM project efforts being conducted in collaboration with the raspberry industry. There is also the need to expand this work to the other major crops being grown in the County. The work will lead to a better understanding of pest and climate interaction so to provide accurate prediction models. This will then be disseminated to growers in a timely manner. More work needs to be done to understand the interaction between naturally and augmented biological controls with the key pest complex we have here in the Nooksack watershed. This information will lead to the development of locally adapted pest management practices that reduce reliance of pesticides.

New Source Approvals

One of the most effective preventive measures is to reduce or eliminate the use of contaminated water.

- WCHHS should continue to evaluate new water sources proposed as part of the building permit process for compliance with acceptable drinking water standards.

New Public Water Systems

- If the concentration of nitrate, fumigants or other contaminants equals or exceeds the MCL (10 mg/l), public water systems will be required to install and operate a water treatment system, or take other mitigation measures that will reduce any of the contaminants to concentrations below the MCL.

- When a contaminant is detected at concentrations below the MCL but exceeding a trigger level, public water systems are required to monitor more frequently for the contaminant. This monitoring will better characterize changes over time. During this time the water system operator can evaluate potential sources of contamination, and identify available resources for installing, operating, and maintaining a water treatment process or other mitigation measures if levels continue to increase.
- Public water systems will also be required to show the capability to maintain the water treatment process (or other mitigation measures) over an extended period of time prior to receiving approval or a finding of adequacy.

New Individual Water Supplies

- The County should consider requiring new private water supplies that exceed 5 mg/l of nitrate be connected to existing or future public water systems. State guidelines already recommend water treatment systems be installed if nitrate concentrations exceed the MCL of 10 mg/l.
- The County must continue to require treatment of any new water source that is contaminated with fumigants above the MCL before issuance of a building permit. Treatment will only be allowed when a public or alternative supply is not available for use.
- On-going fumigant monitoring for new water sources that exceed the action level for any of the soil fumigants or connection to a public supply when available will provide further assurance that residents are not at risk.
- Owners or developers of private domestic water supplies with contaminant levels at or above the MCL are required to treat water prior to approval of the water source by the County. These owners or developers also must be required to inform future owners or consumers of the potential hazards associated with the contaminants (disclosure on the property title plus other mechanisms).

Personal Health Surveillance and Assessments

- Ongoing efforts must be enhanced to identify and educate vulnerable persons and health care providers about the potential dangers of drinking contaminated water.
- In addition with the assistance of DOH an epidemiological surveillance program to detect any new cases of methemoglobinemia for investigation and intervention will be developed.
- Ongoing efforts must be enhanced to identify those individuals at risk and to investigate health concerns of people living in those areas.

Educational Outreach

- Health care professionals and the public must be made aware of the potential hazards and clinical manifestations associated with elevated nitrate levels in drinking water, especially methemoglobinemia. Development and distribution of appropriate educational materials is a joint responsibility of the state and local health jurisdictions. WCHHS will continue to distribute these materials in the community.
- In areas where evidence suggests there may be nitrate contamination of groundwater used for drinking, educational materials must be distributed to private well owners. These materials will explain why it is important to monitor drinking water quality, ways to minimize current and future risks of contamination, and how people can get their well water tested. It is important that these educational materials be used in conjunction with efforts to implement long-term solutions to reduce nitrate.
- Encourage private well owners to test their wells.
- Development and distribution of appropriate educational materials to individuals living in areas that are at risk of fumigant contamination.

Long Term Local Response

- The County will continue to coordinate assessment of water supplies to determine the extent and degree of fumigant and nitrate contamination, incidence of health effects, and the characteristics of the affected persons.
- When wells are contaminated with fumigants or nitrate, an area-specific evaluation will be made to identify the source of the fumigant and corrective measures to lower fumigant concentrations.
- Efforts to better coordinate water quality data collection and management are needed to summarize and analyze existing information, and identify data gaps and problem areas.
- Alternative water supply options should be examined for north County residents whose drinking water supply has been impacted by contaminants. When considering available options for providing public water supply, the procedures specified in the County Coordinated Water System Plan will be followed. Once an option is selected, the option should be made available to those residences that have drinking water supplies that have been impacted by contamination.
- Implementation of the Groundwater Protection Plan developed as a result of these recommendations.

Groundwater Protection & Management Funding Summary

No additional funding needs are identified for 1999 other than what has already been budgeted for ongoing program activities. It is recommended that additional County staff be added beginning in January of 2000 in order to effectively address the groundwater protection issues in the County. Much of the problem related to our groundwater contamination issues relates to agricultural practices. We must be proactive in working with the agricultural community to find ways to lessen the impact of agriculture on our groundwater resource. We must also have staff available to understand the regional geohydrologic issues associated with the aquifers in our County. Public education related to private drinking water supplies and well testing must also be enhanced to effectively communicate the real health risks to the community. The integrated pest management programs and projects specified in the Agricultural Land Use Action Plan developed by the International Task Force on the Abbotsford/Sumas Aquifer must also be implemented. The County's GIS capabilities must be expanded to provide sufficient capacity to map groundwater data related to contamination. Request for PDS GIS mapping services already exceed the capacity to provide timely response. The estimated costs of such enhancements to the County's program are as follows:

	On-Going	One-Time
1 Geohydrologist	\$60,000	\$ 4,000
1 Environmental Health Specialist	\$60,000	\$ 3,000
1 Agricultural Research Specialist.	\$60,000	\$ 3,000
Implementation of IPM programs	\$70,000	\$ 4,000
Arc Info Software License/Training		\$ 20,000
Total	\$250,000	\$ 34,000

Funding should also be anticipated for costs associated with alternative water supply to residences that have been impacted by fumigant contamination. An estimate of cost cannot be made until the various options for providing an alternative supply are examined. A preliminary estimate of extending public water supply lines from the City of Lynden to the area most impacted by fumigant contamination has been made. The project total is currently estimated at \$7,200,000. This includes a projected local 25% match of \$1,800,000. It is hoped that with implementation of the source protection recommendations included in this plan, costs such as this can be avoided. At this time less costly point of use treatment alternatives may still be feasible. Without timely implementation of a groundwater protection program, our groundwater resource will continue to deteriorate and it will no longer be available for use as a drinking water source.

Element Six: Coordinated Planning & Management

Background

Several Whatcom County departments are directly or indirectly involved in water resource programs. Key among these are Health and Human Services, Planning and Development Services, Public Works, and Cooperative Extension. While it is expected that each of these departments will continue to play important roles in implementing water programs, it has become increasingly clear that the current structure does not provide the most efficient response to water resource issues. Circumstances that are problematic include:

- ensure adequate coordination or efficient use of staff and resources between departments;
- provide an effective mechanism for annual/long-term program planning to achieve the water resource goals identified; or
- provide for adequate coordination with other jurisdictions and partners outside County government.

Through this coordinated planning and management function there are also opportunities to achieve important supportive activities. These functions include:

Data Management

Whatcom County will build, with input from others, and manage a comprehensive water data management system. This system will provide a common format for existing (where feasible) data and collaboratively develop standards for newly developed data sets. Effort will be made to ensure that this water data is readily accessible to the various groups and agencies involved in water planning and management. Emphasis will be placed on utilizing geographical information systems (GIS) as appropriate to help depict and understand complex interrelated water issues. It is expected that this will provide the opportunity to evaluate the use of models that utilize this data to provide insight to management alternatives.

Financial Management

This management function will provide leadership and oversight of a coordinated financial management system for water efforts within County government. Efforts will be directed to create, in concert with other departments, manage and distribute timely and comprehensive financial management reports and records.

Project/Program Evaluation

Whatcom County will provide leadership and direction for the development of an integrated system of performance objectives and evaluative reporting, including quantitative and qualitative measures, for all water programs within the County. This system will be used to develop comprehensive reports to decision-makers and the public on progress towards water goals and objectives.

Inter-jurisdictional Coordination

It will be a priority to establish a focused point of contact and communication, in coordination with other departments, with a wide array of other groups, agencies, tribes, and other governments, including local, state, federal, and British Columbia concerning mutual areas of interest in water management.

Sustained Funding

This function will direct the identification, analysis, and evaluation of all potential appropriate sources of sustained funding for water efforts within County government. It is the intent of this activity to provide options with trade-offs to decision-makers.

Leverage

It is crucial that a commitment of internal resources be directed to help facilitate securing additional outside financial resources to leverage County funds. We need to create and foster partnerships to maximize outside resource contributions that will help achieve County water strategic goals. This will also help ensure that County efforts are not duplicative, but rather, complimentary of other existing efforts elsewhere.

The County's Operational Role

County government takes seriously its role in responsibly addressing the important water resource issues that now so clearly confront all who live in Whatcom County. It is essential that our individual and collective responses are not only timely, but are ultimately effective in saving and preserving our precious natural resources. Not only does our current way of life, our communities and our economic viability depend on it, but future generations are counting on us to do the right thing now. County government is preparing and is willing do its part in this important process.

As these vital water resource planning and program projects begin to move forward, it is important that the County's operational role be clearly stated. The County is willing to accept the administrative role as the lead agency of the Initiating Governments. The County accepts the administrative duties of the lead agency with full recognition that such a designation does not give it the authority to impose direction or control on either

the other Initiating Governments or the coordinated responses to water resource issues resulting from the collective decisions of the Initiating Government body. To this end, County Government will not assume a directive role in this process, but rather a cooperative “team player” role engaged with other involved governments, entities, citizens and other stakeholders to facilitate and complete the many successful projects that will be required to protect our essential water resources. The County’s role in this process will be to:

- Provide an administrative conduit through which local, state and federal funds may flow to provide funding for the various water resource projects;
- Provide an administrative “home” to provide payroll, benefits and limited supervision of many of the local government personnel resources that will be tasked with doing the actual work of the water resource projects;
- Provide office facilities, technological resources and administrative support to local government personnel engaged in the water resource program activities;
- Provide the active administrative, legislative and operational participation necessary to engage the issues, initiate the programs and complete projects necessary to successfully achieve established and future water resource related goals.

Short Term Response

Hire division coordinator whose initial role will include the following tasks:

- Work with departments to review existing roles related to water resource management and make recommendations for any organizational changes that may be needed to ensure coordination and efficiency.
- Work with departments in developing annual program plans ensuring that water resource goals are being met.
- Lead administrative representative to 2514 Management Committee with Water Resource Planner to act as alternate and support for technical committees.

Coordinated Planning & Management Funding

The funding needs for Coordinated Planning & Management relate specifically to the hiring and ongoing support for 2 FTE’s (Water Resource Manager and a Division Secretary) and the associated office expenses. For 1999, this expense is estimated to be approximately \$130,000. This will be an ongoing expense into future years, with inflationary factors the primary consideration for changing resource needs.

Element Seven: Education and Public Involvement

Background

Water issues affect everyone. The water issues here in Whatcom County are exceedingly diverse and complex. It is clear that in order to successfully address these issues, the community will need to take action. At the very beginning of this document was the statement:

“It is the intent of this plan to accomplish these goals through win-win solutions in partnership with all stakeholders. As much as possible, these goals need to be achieved through non-regulatory approaches that allow us to find practical and cost effective compliance with legal mandates.”

Non-regulatory approaches will require that the community know what actions to take. Those actions will be taken when they are understood and supported. The actions will be understood through education; they will be supported through involvement and participation. Many of the decisions ahead will require some sacrifice, or at least doing things differently than the past. Identification of many of the approaches for the future will require the aggregate wisdom and involvement of the community. A fundamental premise for many of the strategies being contemplated to address these water resource goals is the use of a locally based planning effort. For these efforts to be productive and successful, the participants, as well as the rest of the community, need to be educated and involved.

One of the lessons from the early action watershed efforts here, and across the state, was that the participants contributed their best when they first spent some time learning about and understanding the issues in an organized fashion. We need to be prepared to do the same as we proceed in addressing these important matters ahead of us. The decision-making process will be enhanced and supported when the contributors of ideas are well informed. The community will be more accepting and supportive of difficult decisions about water resource management when they feel that they have had an opportunity to contribute to the public policy deliberations.

For the community to take the appropriate, non-regulatory approaches requires that they be informed. Informed not only about the specific actions expected of them, but also informed as to the rationale for those actions. When people understand the reasons they have the best chance of complying with the requested actions.

For these reasons, there needs to be a comprehensive education and public involvement program that supports each component of the Whatcom County Comprehensive Water Resource Plan. There is sound reason why the words “education and public involvement” are used together. The community needs to feel a part of the process in order to successfully work together to achieve the goals. The

community will contribute the most when they do so from an educated and informed position. “Educated and informed” does not imply providing one point of view when differences exist. It does mean providing the knowledge of the science where science is appropriate. It does mean providing a diversity of opinions and ideas in order to foster productive contemplation of options. As an example, as the community develops strategies for the restoration of salmon they will be faced with questions about the respective contributions of habitat, harvest, and hatcheries to the decline of salmon stocks. These need to be discussed openly from an informed perspective in order to arrive at the best possible alternative approaches to a “win-win solution”.

The educational efforts need to be developed in a systematic manner, with specific goals and measurable objectives. In some cases it may be appropriate to design an educational project with a particular audience in mind, in other cases, not. A wide array of educational methods and products should be utilized, as some people and some issues are best approached from one set of choices, while with a different need, another approach may be more successful. Education is most effective when the information is provided repeatedly, in a number of formats.

Given the inter-relatedness of the water resource programs (watershed planning, salmon recovery, shellfish protection, etc.) it makes sense to have a coordinated education and public involvement process that looks for commonalities in educational needs and opportunities. This will provide for efficiencies in education development and delivery.

This educational effort should be developed collaboratively with the other County departments, other educators, and frequently with representatives of the intended audiences. The lead responsibility for Whatcom County’s efforts should be the responsibility of Cooperative Extension, the County’s education department. Cooperative Extension has a long history of providing water resource education in this community. Cooperative Extension – Whatcom County can draw upon the expertise and resources of its primary partner, Washington State University and the other land grant universities across the County. Cooperative Extension has demonstrated successful experience working with a wide diversity of audiences, including youth, adults, agencies, community organizations, decision makers, and others in a number of program areas, including natural resource management.

For water resource issues, educational efforts will need to focus on a number of areas. These include:

- Water law, historical and current directions;
- Hydrology – concepts, science, and local conditions;
- Consumptive and other beneficial uses of water;
- Public policy concerns and trends regarding water resources;
- Water body impairment – current conditions, trends, and sources of contributions;
- Pathways and fates of water contaminants;

- Health regulations and concerns for water contaminants;
- International issues for water resources in Whatcom County;
- Best management practices and appropriate individual actions to protect water quality (much of this will be audience specific);
- Finding new water – water storage, water conservation, and reuse;
- Land use effects on water resources – issues and options;
- Water quality monitoring – design and implementation options;
- Salmon – (an additional subset of issues) species, life cycle, significance, needs, recovery options;
- Endangered Species Act - reasons, history, actions;
- Watersheds and biological communities; and
- Local & other groups working on these issues – who, how, why, where.

It is important that evaluation of the education be built into the development of the educational plans. Each level of evaluative data depth will require more intensive efforts and resources to achieve.

In the past, virtually all of County's efforts directed to water resource education have been short-term, grant funded. Experience tells us that the educational needs for water resource management and protection are basically continuous and are best served by some sustained base level of internal funding. It is expected that there will be some one-term episodic educational needs that are best funded on a one-time, probably grant funded approach, but by now, we have seen that there is a consistent base line level of support needed as well.

Short Term Response

- Implement the 1998-99 Lake Whatcom Management education plan.
- Develop, in conjunction with others, an education and public involvement program to address salmon and ESA. Design and implement Salmon Volunteer Educator program.
- Participate in the development, in collaboration with initiating governments, management team, special and governmental interest caucuses, and others in an educational plan to support water resource management including local planning under 2514.
- In collaboration with others, survey and analyze educational needs for water resource education, develop appropriate objectives, methods and evaluative measures, and implement with consideration given to responding to complementary needs of diverse groups in an efficient manner.

- Develop diverse educational materials including an Internet web site to provide local data and educational information on water resource management for Whatcom County.
- Under the direction of the appropriate decision-making bodies, support the development of a successful public involvement program to ensure active and productive community participation in the various water resource policy deliberations.

Education and Public Involvement Funding

Clearly the efforts described within this element are critical if we are to expect successful accomplishment of the general goals and specific tasks. While Public Education and Involvement is specifically identified in certain elements of this plan, this activity has always been assumed to be critical and to be included in every element. Creation of this separate element of the Water Plan is intended to reinforce the need to coordinate and, when appropriate, consolidate these outreach efforts.

Funding of a coordinated and/or consolidated effort for 1999 should occur through reallocation of funds included within the other elements of this plan. Early in 1999 discussion with the County Council as to program scope and alternatives, including reconsideration of the rejected 1999 budget Cooperative Extension education related FTE, will occur.

Appendix - General

- G-1. Whatcom County Vision & Mission Statements.**
- G-2. Whatcom County Comprehensive Plan, Goals, Policies, and Action Items Related to Water Resources. 1997.**
- G-3. Critical Areas Ordinance Summary.**

**Appendix Element One
Watershed Planning Under ESHB 2514**

- 1-A. “Four Elements of Watershed Planning Under ESHB 2514”**
- 1-B. Memo re Watershed Management Project Structure and Function dated December 29, 1998. Organization Chart.**
- 1-C. Watershed Management Project (2514) - Preliminary Scope of Work**
- 1-D. Map of WRIA #1**

Appendix Element Two Salmon Recovery/ESA

- 2-A. “Saving Salmon & Protecting Our Water.” Map Included. Published by State Office of Financial Management.**
- 2-B. Timeline - “Key Near-Term Milestones for Washington State Salmon Recovery Strategy”**
- 2-C. Memorandum of Agreement between Lummi Nation, Nooksack Tribe and Whatcom County.**
- 2-D. Summary of Implementation of ESHB 2496. Published by State of Washington, Governor’s Salmon Recovery Office.**
- 2-E. Table of Salmon Recovery Project List for Period January 1, 1999 to December 31, 1999. Puget Sound North, WRIA 01.**
- 2-F. List of Acronyms**

**Appendix Element Three
Shellfish Protection Plans
(Drayton Harbor, Portage Bay)**

- 3-A. “Drayton Harbor Shellfish Protection District Status Report.” Published by Drayton Harbor Shellfish Protection District Advisory Committee.**
- 3-B. “Portage Bay Initial Closure Response Strategy.” Published by Portage Bay Closure Response Team.**

**Appendix Element Four
Lake Whatcom Management Program**

- 4-A. Joint Resolution of Whatcom County Council, Bellingham City Council and Water District No. 10 Adopting Goals for the Lake Whatcom Watershed. 1992.**
- 4-B. Joint Resolution of Whatcom County, City of Bellingham, and Water District 10 Adopting Specific lake Whatcom Watershed Action Team Plans. 1994.**
- 4-C. Interlocal Agreement Between City of Bellingham, Whatcom County, and Water District 10 Concerning Joint Management of Lake Whatcom. 1998.**
- 4-D. Lake Whatcom Management 1999 Program Plan.**

**Appendix Element Five
Groundwater Protection & Management**

- 5-A. “Chemical Specific Consultation for Ethylene Dibromide and Dichloropropane.” Prepared by Mike Allred, Ph.D., Emergency Response and Scientific Assessment Branch, Division of Toxicology, Agency for Toxic Substances and Disease Registry. July 31, 1998.**
- 5-B. “Health Assessment of Well Water Contaminants in Whatcom County, Washington.” November 1998.**
- 5-C. GIS Map. Nitrate Concentrations in Groundwater.**