AN EVALUATION
OF IMPLEMENTATION AND SUCCESS
OF THE
SEQUIM BAY WATERSHED MANAGEMENT PLAN

APPROVED BY:

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Committee Co-Chair:  
Dr. John Strand

Committee Member:  
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An Evaluation
of Implementation and Success
of the
Sequim Bay Watershed Management Plan

by

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Report

Presented to the Faculty of the Graduate School
of Washington State University
in Partial Fulfillment
of the Requirements
for the Degree of

Masters of Science
in the School of Environmental Sciences

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I would like to thank everyone who assisted me in my research of the Sequim Bay watershed. Your contributions made this research possible.

Special thanks go to all the individuals at Clallam County including Andy Brastad, Ann Soule, Cindy Swegle, Jim Podlesny, and Liz Maier; and everyone at the Jamestown S’Klallam Tribe including Ann Seiter, Hansi Hals, and Lori Delorm. Thank you Joe Holtrop at the Clallam Conservation District; everyone at Streamkeepers, especially Ed Chad for all your help! Dana Woodruff and John Cambalik, thank you for your support! Thank you Gary Gill and the rest at Battelle Marine Sciences Laboratory; thanks to David Freed and the Beachwatchers; the Port of Port Angeles, and Ron Amundson, and Jesse Waknitz for your tour of the marina! Thank you Julia Bos (Ecology), Lawrence Sullivan and Tim Determan (Department of Health), and Commissioner Steve Tharinger. Thank you Lyn Muench, and Katherine Baril, and all other Sequim Bay Watershed Management Committee Members for your input and support.

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An Evaluation of Implementation and Success
of the Sequim Bay Watershed Management Plan

by

Kristi L. Geris

Washington State University, 2010

Abstract

My research addressed implementation and success of the 1989 Sequim Bay Watershed Management Plan (SBWMP), a community-based watershed plan focusing on non-point source pollution entering Sequim Bay, Washington. The SBWMP was intended as a pioneering effort to safeguard water quality in Sequim Bay and its watershed in order to protect valued commercial and recreational shellfish beds, fish and wildlife habitats, and historically excellent water quality.

Based on interviews with key Sequim Bay community members, the SBWMP planning team, state and county officials, and members of the Jamestown S’Klallam Tribe, it was concluded that the SBWMP was only partially implemented and successful, due mainly to an evolving State of Washington watershed planning strategy; i.e., adoption of the WRIA planning concept, and the lack of ongoing funding. Review of water quality monitoring and research reports indicated that while water quality and wildlife habitat have improved in some areas of the watershed, there are still five beaches in Sequim Bay, those near major tributary outfalls, closed to the harvest of shellfish. Most interviewees praised the planning process as a model for how community participation can improve the effectiveness of fish and shellfish habitat protection.
EXECUTIVE SUMMARY

This report discusses the implementation and success of the Sequim Bay Watershed Management Plan (SBWMP), the culmination of a three-year planning effort adopted in 1991 by the Washington Department of Ecology to address nonpoint pollution in the Sequim Bay watershed. Sequim Bay is located in Clallam County on the Olympic Peninsula. It is an important shellfish growing area, and both salmon and steelhead trout pass through its waters to spawn in headwater streams. There previously was no formal assessment of whether or not the plan was fully implemented, or if water quality in the watershed improved following plan adoption.

This assessment is based on interviews with key Sequim Bay community members, the original planning team, state and county officials, and local Tribal members. A questionnaire was developed based on SBWMP evaluation criteria and sent to Sequim Bay community members, Sequim Bay Watershed Management Committee members, and was also used as a guide in scheduled interviews. Additionally, assessments of potential improvements in water quality were made based on a review of readily available water quality monitoring and research reports.

The Sequim Bay Watershed Management Committee recommended four Priority Management Policies to guide county implementation of the SBWMP: Priority 1 – Increase public education and involvement, Priority 2 – Keep things (bacteria, sediment, chemicals, plastics) out of the water, Priority 3 – Protect, maintain, and enhance habitat and biological diversity, and Priority 4 – Evaluate and adapt the plan as necessary and continue citizen oversight and participation.
Based on these priority management policies and SBWMP evaluation criteria, an Implementation Success table (Table-1) was developed. This tool was not used as an objective quantitative method of analysis, but rather a way to synthesize the large amounts of information provided by the interviewees.

<table>
<thead>
<tr>
<th>IMPLEMENTATION SUCCESS</th>
<th>Ratings and Scores:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Implementation success is measured on a four-point scale based on sound scientific judgment, cognizant interviews, and written hard evidence.</td>
<td>0 – Not successful</td>
</tr>
<tr>
<td></td>
<td>1 – Somewhat successful</td>
</tr>
<tr>
<td></td>
<td>2 – Substantially successful</td>
</tr>
<tr>
<td></td>
<td>3 – Very successful</td>
</tr>
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</table>

**Priority 1: Education and Public Participation**

<table>
<thead>
<tr>
<th>Question</th>
<th>Rating</th>
</tr>
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<tbody>
<tr>
<td>Has information generally been made widely available? Have brochures been distributed? Workshops held?</td>
<td>2</td>
</tr>
<tr>
<td>Is there an ongoing public education program such as BAY WATCHERS in the local schools?</td>
<td>3</td>
</tr>
<tr>
<td>Have water quality programs been implemented with community support? Is there general, broad-based community support for and involvement in water quality issues?</td>
<td>3</td>
</tr>
<tr>
<td>Have citizens been involved in collecting data and evaluating it where possible (WAC 400-12-510)?</td>
<td>3</td>
</tr>
</tbody>
</table>

**AVERAGE:** 2.75

**Priority 2: Keep Things Out of Water**

<table>
<thead>
<tr>
<th>Question</th>
<th>Rating</th>
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</thead>
<tbody>
<tr>
<td>Have there been reductions in levels of fecal coliform, sediment, chemicals and plastics in water?</td>
<td>1</td>
</tr>
<tr>
<td>Have BMPs been implemented by local landowners?</td>
<td>2</td>
</tr>
<tr>
<td>Were the failing culverts and slides repaired?</td>
<td>3</td>
</tr>
<tr>
<td>Is there effective streamside protection in the watershed?</td>
<td>2</td>
</tr>
<tr>
<td>Are water quality violations adequately enforced?</td>
<td>1</td>
</tr>
<tr>
<td>Have there been adjustments to the plan as necessary to achieve the goals?</td>
<td>0</td>
</tr>
<tr>
<td>Has there been a steady use of sewage pumpout and waste disposal facilities at marinas?</td>
<td>3</td>
</tr>
<tr>
<td>Have marina receipts provided to all users and overnighters included boater education information?</td>
<td>0</td>
</tr>
</tbody>
</table>

**AVERAGE:** 1.5
IMPLEMENTATION SUCCESS

*Implementation success is measured on a four-point scale based on sound scientific judgment, cognizant interviews, and written hard evidence.*

<table>
<thead>
<tr>
<th>Ratings and Scores:</th>
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<td>2</td>
<td>Substantially successful</td>
</tr>
<tr>
<td>3</td>
<td>Very successful</td>
</tr>
</tbody>
</table>

**Priority 3: Habitat Protection and Enhancement**

<table>
<thead>
<tr>
<th>Question</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have wetlands been protected?</td>
<td>3</td>
</tr>
<tr>
<td>Has stream habitat been improved or rehabilitated?</td>
<td>3</td>
</tr>
<tr>
<td>Are citizens involved in rehabilitation and enhancement projects for fish? Wildlife? Habitat and vegetation?</td>
<td>3</td>
</tr>
<tr>
<td>Is there a general stewardship ethic in the community?</td>
<td>3</td>
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</table>

**AVERAGE:** 3

**Priority 4: Implementation with ongoing coordinated funding, monitoring, and citizen oversight and participation**

<table>
<thead>
<tr>
<th>Question</th>
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</thead>
<tbody>
<tr>
<td>Is there continued assessment of water quality parameters and characteristics?</td>
<td>2</td>
</tr>
<tr>
<td>Have there been adjustments or revisions to the original recommendations?</td>
<td>0</td>
</tr>
<tr>
<td>Is the general objective of the plan being achieved?</td>
<td>1</td>
</tr>
<tr>
<td>Have there been regular reports and meetings with the public?</td>
<td>1</td>
</tr>
<tr>
<td>Have field data collection techniques emphasized visual evaluations of land use activities and physical conditions of water, stream banks, and habitats? (WAC 400-12-510)</td>
<td>2</td>
</tr>
<tr>
<td>Has the monitoring program been adequate, frequent and valid to accurately evaluate implementation of the program?</td>
<td>1</td>
</tr>
<tr>
<td>Does the monitoring program include quality assurance controls and scientific validity?</td>
<td>2</td>
</tr>
<tr>
<td>Has the overall trend in nonpoint pollution decreased?</td>
<td>1</td>
</tr>
<tr>
<td>Are there measurable improvements from BMPs?</td>
<td>1</td>
</tr>
<tr>
<td>Has the Watershed Committee continued to have a meaningful participation in all phases of plan implementation and evaluation?</td>
<td>0</td>
</tr>
<tr>
<td>Does the Watershed Committee continue to represent the broad and diverse interests in the Watershed and make their decisions by consensus?</td>
<td>0</td>
</tr>
</tbody>
</table>

**AVERAGE:** 1.0
**IMPLEMENTATION SUCCESS**

*Implementation success is measured on a four-point scale based on sound scientific judgment, cognizant interviews, and written hard evidence.*

<table>
<thead>
<tr>
<th>Ratings and Scores:</th>
<th></th>
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<tbody>
<tr>
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<td>1</td>
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<tr>
<td>2</td>
<td>– Substantially successful</td>
</tr>
<tr>
<td>3</td>
<td>– Very successful</td>
</tr>
</tbody>
</table>

**Administration of Plan**

<table>
<thead>
<tr>
<th>Question</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Were the recommendations in the plan implemented?</td>
<td>2</td>
</tr>
<tr>
<td>Are local entities responsive to the plan recommendations?</td>
<td>2</td>
</tr>
<tr>
<td>Were adequate funds available to implement the plan?</td>
<td>1</td>
</tr>
<tr>
<td>Was there a positive relationship with implementing and cooperating agencies?</td>
<td>2</td>
</tr>
<tr>
<td>Has there been successful cooperation with State and local agencies including SCS, Agriculture, DNR, the Port Authority, and Tribes (WAC 400-12-10)?</td>
<td>2</td>
</tr>
<tr>
<td>Does the Watershed Committee continue to have effective advisory and oversight role?</td>
<td>0</td>
</tr>
</tbody>
</table>

**AVERAGE:** 1.5

**TOTAL PLAN IMPLEMENTATION RATING**: 1.95

Table-1 presents the total average score for SBWMP implementation and success at 1.95 of a possible 3.0, which indicates that the plan has only been partly implemented and successful. The score of 1.95 falls between the ratings of somewhat successful and substantially successful, but still allows me to generally accept the hypothesis that says that some of the priorities and recommendations of the SBWMP were implemented and successful. With respect to the water quality of the Sequim Bay watershed, I cannot be as unequivocal when accepting or rejecting the hypothesis. While there was measurable improvement in some metrics that resulted from SBWMP implementation, there also are some significant lingering water quality deficiencies.
In the year following adoption of the plan, 1992, local community enthusiasm for the work was high and supporting agency funding was adequate to support most recommended projects. Notable achievements included repair of the Johnson slide as a source of sediment to Sequim Bay, the comprehensive restoration of Bell Creek, and the adoption of best management practices (BMPs) throughout the watershed. Planning the restoration of Jimmycomelately Creek and removal of a log storage yard in south Sequim Bay was also initiated. These activities undoubtedly improved benthic conditions for shellfish in Sequim Bay and enhanced riparian habitat and passage for salmonids in the tributaries, respectively.

Unfortunately after 1992, evolving interests coupled with the new State of Washington watershed planning strategy; i.e., adoption of the Water Resource Inventory Area (WRIA) planning concept, resulted in a lack of continued cooperation and ongoing funding among the initially supporting state, county, and local agencies. As a consequence, many projects ended, others were never implemented, and follow-on projects were not undertaken.

It was concluded that while many recommended actions for each of the four management priorities were implemented and some live on today as priorities in different agencies, the SBWMP as originally drafted was only partially implemented and successful. While water quality has improved in some areas of the watershed, there are still five beaches in Sequim Bay, those near major tributary outfalls, closed to the harvest of shellfish.

The SBWMP was intended as a pioneering effort to safeguard valued resources from the impacts of nonpoint pollution, and in this regard the SBWMP has lived-up to its billing. Most interviewees praised the planning process as a model for how community participation can improve the effectiveness of fish and shellfish habitat protection.
Key recommendations developed as a result of this evaluation include developing better accountability within cognizant supporting agencies, opening lines of communication among local, county, state, and federal watershed planning efforts, adopting enhanced quality assurance procedures for water quality monitoring, re-establishing community ownership of the Sequim Bay watershed, and finding a continuing funding source.
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<thead>
<tr>
<th>ACRONYMS</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>BMPs</td>
<td>Best Management Practices</td>
</tr>
<tr>
<td>CD</td>
<td>Clallam County Conservation District</td>
</tr>
<tr>
<td>CES</td>
<td>Washington State University Cooperative Extension Services</td>
</tr>
<tr>
<td>DCD</td>
<td>Clallam County Department of Community Development</td>
</tr>
<tr>
<td>DOE</td>
<td>Washington State Department of Ecology</td>
</tr>
<tr>
<td>DNR</td>
<td>Washington State Department of Natural Resources</td>
</tr>
<tr>
<td>DOH</td>
<td>Washington State Department of Health</td>
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<tr>
<td>DRMT</td>
<td>Dungeness River Management Team</td>
</tr>
<tr>
<td>ENVH</td>
<td>Clallam County Department of Environmental Health</td>
</tr>
<tr>
<td>EPA</td>
<td>United States Environmental Protection Agency</td>
</tr>
<tr>
<td>FC</td>
<td>Fecal Coliform</td>
</tr>
<tr>
<td>GRS</td>
<td>Governor’s Salmon Recovery Office</td>
</tr>
<tr>
<td>JCCD</td>
<td>Jefferson County Conservation District</td>
</tr>
<tr>
<td>ML</td>
<td>Milliliters</td>
</tr>
<tr>
<td>MRSC</td>
<td>Municipal Research and Services Center of Washington</td>
</tr>
<tr>
<td>MSL</td>
<td>Marine Sciences Laboratory (Battelle)</td>
</tr>
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<td>PERS COMM</td>
<td>Personal Communication</td>
</tr>
<tr>
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<td>Clallam County Department of Planning</td>
</tr>
<tr>
<td>PORT</td>
<td>Port of Port Angeles</td>
</tr>
<tr>
<td>PSWQA</td>
<td>Puget Sound Water Quality Authority</td>
</tr>
<tr>
<td>OSWP</td>
<td>Washington State Department of Health Office of Shellfish and Water Protection</td>
</tr>
<tr>
<td>RCW</td>
<td>Revised Code of Washington</td>
</tr>
<tr>
<td>SEPA</td>
<td>State Environmental Policy Act</td>
</tr>
<tr>
<td>SRC</td>
<td>Sound Resolutions Cascadia Consulting Group Inc</td>
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<tr>
<td>SBWMP</td>
<td>1989 Sequim Bay Watershed Management Plan</td>
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<tr>
<td>TRIBE</td>
<td>Jamestown S’Klallam Tribe</td>
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<tr>
<td>USGS</td>
<td>United States Geological Survey</td>
</tr>
<tr>
<td>UG/L</td>
<td>Micrograms per liter</td>
</tr>
<tr>
<td>WDFW</td>
<td>Washington State Department of Fish and Wildlife</td>
</tr>
<tr>
<td>WMC</td>
<td>Sequim Bay Watershed Management Committee</td>
</tr>
<tr>
<td>WRIAs</td>
<td>Water Resource Inventory Areas</td>
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1.0 INTRODUCTION

1.1 Objective

Twenty years after approval of the Sequim Bay Watershed Management Plan (SBWMP) by the State of Washington Department of Ecology, there is still no readily available assessment of how much of the plan was implemented, and whether or not the plan was successful. My objective, then, will assess the completion of each of the SBWMP’s priorities, by evaluating successful implementation of specific recommended actions, in concert with compliance to overall SBWMP goals and objectives. Evaluation of plan success will address whether implemented plan recommendations and overarching priorities were sustained, and that the actions accomplished what was intended. Finally, analyses of past and present water quality data will demonstrate if the SBWMP served its purpose in protecting and enhancing water dependent resources in the Sequim Bay watershed.

This research is important for several reasons:

1) When the SBWMP was developed in 1988 and 1989, the Sequim Bay waters were classified as Class AA (Extraordinary quality) by Washington State’s Water Quality Standards (Chapter 173-201A WAC). Successful implementation of the SBWMP was intended to assure the continued high quality of the area’s waters and subsequent recreational, biological, and commercial benefits.

2) Sequim Bay is one of the largest commercial shellfish producing areas in the Puget Sound. It is of the greatest importance to the local economy that the shellfish beds remain healthy and certified by the State of Washington Department of Natural Resources.

3) Twenty-five people invested a significant amount of time and energy to develop the SBWMP and so far, there are no written results of their efforts, and
4) At the time of plan inception, the SBWMP was intended to be one of the pioneering models for nonpoint pollution management. The plan’s focus on nonpoint source pollution was especially unique because nonpoint source pollution tends to be much more difficult to trace to a specific source. Furthermore, addressing nonpoint source pollution requires significant changes in individual behavior and attitudes, and also requires an extensive process involving the cooperation of all interests in the watershed.

1.2 Scope of Present Study

My research focused on the efficacy of the SBWMP’s remedies for nonpoint source pollution entering Sequim Bay and its major tributaries. Major tributaries addressed in this study are tributaries directly mentioned in the original watershed plan including Bell Creek, Johnson Creek, Dean Creek, Jimmycomelately Creek, and Chicken Coop Creek.

Implementation criteria listed in the SBWMP (SBWMP 1989:3-41) were applied to evaluate its success. Review of the scientific literature for criteria used in the evaluation of other management plans was also undertaken. Watershed management plans succeeding the SBWMP, e.g. The Dungeness-Quilcene Water Resources Management Plan (2004), the Elwha-Dungeness Watershed Plan (2005), and the Clean Water Act 319 Plan – Dungeness Watershed (2007), were reviewed for specific references to or acknowledgement of the SBWMP provisions, thereby indicating impact of the earlier plan.

1.3 Hypothesis

“The Sequim Bay Watershed Management Plan was successful in implementing the proposed recommended actions and that water quality in Sequim Bay and its major tributaries have improved as a consequence of plan adoption.”
1.4 **Background**

This section describes the geographical setting of Sequim Bay and its watershed, and also the natural resources the area offers. Additionally, this section reviews the details of the SBWMP, including its purpose, goals, and objectives, the creation of the watershed committee, cognizant agencies involved in the planning and implementation process, the scope of responsibility of the plan, and brief review of the efficacy of the planning process.

1.4.1 **Sequim Bay and Its Watershed**

The Sequim Bay Watershed, located near the city of Sequim in Clallam County, Washington, is known for its excellent water quality and natural resources. Sequim Bay supports important habitat for juvenile salmon, shellfish and migratory birds. Salmon and crab are recreationally harvested, and oysters, little neck and manila clams are harvested commercially and recreationally. Fall coho, summer chum, winter steelhead, and cutthroat trout thrive in tributaries in the watershed (Clallam County 2009). This great salmon presence, along with several other finfish populations prompts visits by marine mammals such as otters, harbor seals, killer whales, and shark (WSP 2009). Pacific herring also spawn in the Bay and thousands of waterfowl winter there (SBWMP 1989). The watershed is also a source of timber and its estuary is home to a commercially successful shellfishery. A 22-acre marina\(^1\) supports a large boating community. The watershed not only supports valued fish and wildlife resources but also provides employment opportunities at local, regional, and state levels.

\(^1\) John Wayne Marina, featured in the June 2003 issue of *SEA Magazine* as “Best of the West” for small marinas, was constructed in 1985 on land donated by the John Wayne family (Port 2009).
1.4.2 The Sequim Bay Watershed Management Plan (SBWMP)

In early 1987, the Sequim Bay watershed was chosen by the Puget Sound Water Quality Authority (PSWQA) as one of 12 “early action” watersheds to develop a comprehensive plan on how to address worsening water quality. The abundant finfish and shellfisheries were at risk from increasing pollution from timbering and road building, a new marina, livestock using area streams, failing septic systems, and additional development (Pinkerton 1991). In October 1987,
The Washington State Department of Ecology’s Shellfish Protection Program awarded Clallam County a grant to develop a comprehensive plan to protect the Sequim Bay watershed.

The Clallam County Board of Commissioners in using grant funds adopted a strategy to develop a grassroots, citizen-based planning process and appointed twenty-five residents of the Sequim Bay watershed area to serve on a watershed committee. The ensuing two-year planning process focused on nonpoint sources of water pollution entering Sequim Bay and culminated in the publication of a comprehensive plan (Sequim Bay Watershed Management Plan) for protecting, maintaining, and enhancing habitat and fish and wildlife resources that was adopted by the Washington State Department of Ecology in 1991 (SBWMP 1989).

SBWMP Purpose, Goals, and Objectives

The residents of the Sequim Bay area have always enjoyed the excellent water quality and the subsequent ecological and commercial benefits the area offers. It was for this purpose, the overall goal of the SBWMP was to assure continued compliance with State water quality regulations and maintain a Class AA (Extraordinary quality) classification for the watershed’s waters, and also to maintain healthy shellfish beds in the Bay. The main objective set to reach this goal, was “to develop and implement a community-based, coordinated program to eliminate nonpoint source pollution and protect and enhance water quality and natural resources of the Sequim Bay Watershed” (SBWMP 1989).

Watershed Committee

Rather than rely on consultants or agency staff to prepare this plan, Clallam County adopted a specific strategy to develop a grassroots, citizen-based planning process. It was believed that only the local residents of the Sequim Bay area could develop the most realistic, cost-effective solutions, and work to assure full implementation. This planning strategy went
beyond meaningful public participation, and was developed by the public itself through the citizen-only committee. Members included representatives of business, sportsmen, Jamestown-S’Klallam Tribe, farmers, local media, environmental interests, real estate agents, shellfish interests, irrigators, and research scientists, among others.

Implementing Agencies

The Watershed Committee identified several state, county, Tribal, and local agencies to assist in successful implementation of the SBWMP. Each “implementing agency” was assigned a role as *Lead, Support, Cooperative, or Participatory*, and with each role the plan defined an associated scope of responsibility, or level of involvement. Agency concurrence was sought based upon the expected level of involvement for the action elements.

Key agencies included the Clallam County Department of Community Development, Washington State agencies including Fish and Wildlife\(^2\), Parks and Recreation, Department of Health, Department of Natural Resources, and the local Washington State University Cooperative Extension. A full list of the SBWMP’s Implementing Agencies is located in Appendix A.

Costs

Funding for plan development was provided through Centennial Clean Water Fund grants with a 25 percent match from Clallam County (DCD 1991). Clallam County officials no longer have records of costs for the two-year SBWMP planning process because the Local Government General Records Retention Schedule does not require records this old to be kept (C. Swegle,

\(^2\) At the time of SBWMP adoption, Washington Department of Fisheries and Washington Department of Wildlife operated as separate entities. This research, however, will address the then two individual agencies as one single entity presently known today as Washington Department of Fish & Wildlife.
pers. comm.). There are however, records of funding obtained for the implementation of the SBWMP which amount to almost $400,000.

Additionally, personnel costs for participation in the meetings must be considered, but are unavailable. The planning process for the SBWMP began in October of 1987, when the Washington State Department of Ecology awarded Clallam County the Shellfish Protection Program Grant. The Sequim Bay Watershed Management Committee officially convened in April of 1988, meeting almost weekly. It was not until August of 1989 that the plan was subjected to State Environmental Policy Act (SEPA) review, and not until November of 1991, was the plan adopted by the state.

1.4.3 Effectiveness of Planning Process

In a study of locally based water quality planning and contributions to fish habitat protection, Pinkerton (1991) identified the SBWMP as successful in its approach to watershed planning. She attributed success to a consultative process that relied on significant community education, consensus and constituency building. Local groups and agencies were motivated to preserve their “quality of life,” which was closely tied to the natural resources of the region. Through the planning process, the planning succeeded in laying out a set of priorities to preserve water quality and water related resources that ultimately won widespread support in the community as a whole.
2.0 METHODS FOR EVALUATION OF PLAN IMPLEMENTATION AND SUCCESS

My research approach involved a comprehensive review of Sequim Bay’s watershed management practices, goals and objectives, as well as the results of key informant interviews designed to determine which provisions of the plan were implemented, and which proved to be successful. Additionally, I reviewed relevant and readily available correspondence, recorded documentation and legislation, and water quality data.

2.1 SBWMP Priority Management Strategies

The Sequim Bay Watershed Management Committee developed four priority management policies or objectives to protect and enhance the resources of Sequim Bay. Analysis of these four priorities along with one additional evaluation category addressing administration of the plan, were used in evaluating the overall success of the SBWMP.

2.1.1 Priority 1: Education and Public Participation

The Watershed Management Committee believed that when individuals understand the need for action, they will be more willing to make an effort to protect the environment and use their natural resources wisely.

2.1.2 Priority 2: Keep Things Out of the Water (Contaminants)

Another important requirement was to eliminate contaminants from polluting the water including bacteria, sediment, toxins, chemicals, and plastics, and nutrients, which could result in aging or ‘eutrophication’ of the Bay. This involved the need to adopt BMPs by agricultural owners, marina operators, recreational boaters, and foresters.

2.1.3 Priority 3: Habitat Protection and Enhancement

The Watershed Management Committee agreed that it simply was not enough to preserve current habitat levels. Their vision not only involved maintaining the health and diversity of the
Watershed’s resources, but also included improvement of wildlife habitat and rehabilitated fish streams.

2.1.4 Priority 4: Implementation with Ongoing Coordination, Monitoring, and Citizen Oversight and Participation

The overall goal of the SBWMP was to implement a widespread, coordinated effort to reduce and eliminate the effects of nonpoint pollution sources in order to protect and enhance the resources of the watershed. To do this, all parties within the watershed agreed to respond to new data and water quality threats, and continue citizen oversight and public participation in the implementation of the plan. Resolution of potential disputes and interpretation of these recommendations also had to be reconciled through consensus.

2.2 Collection of Data

An eclectic collection of data was gathered to assess overall implementation of the SBWMP. Personal interviews were conducted, water data were collected, newspaper archives, official recorded documents, old videos and brochures were accessed and other data sources such as email correspondence and governmental databases were reviewed and utilized in evaluating this plan.

2.2.1 Key Informant Interviews

Interviewees included key community members, members of the Watershed Management Committee, state and county officials, and Tribal members. Interviews took the form of both qualitative and quantitative discussions regarding the implementation and success of the SBWMP. The questionnaire described below often guided these interviews. The interviews offered insight into plan implementation that data alone could not provide. A list of interviewees is provided in Appendix C, and interview datasheets are provided in Appendix D.
2.2.2 Questionnaire

A questionnaire based on evaluation criteria contained in the SBWMP was used in interviews. It was distributed via email, United States postal service mail, and fax. Respondents were informed of the questionnaire by telephone and thanked by email after returning their questionnaire. Those who did not complete the questionnaire received follow-up phone calls in an attempt to increase response rate.

This questionnaire contained 34 questions requesting general (and some specific) information regarding effectiveness, status, and success of the four priorities developed by the Watershed Management Committee. Also included were questions regarding administration of the SBWMP (a copy of the questionnaire is provided in Appendix B).

2.2.3 Water Quality Data

Various applicable water quality monitoring reports were collected and reviewed for the purpose of determining if water quality has improved throughout the watershed over the last 20 years. Due to limited access of raw data, my research based its conclusions regarding water quality improvements on the analyses produced by the agencies conducting the water sampling and the reports they have published, and not conducting statistical analyses of the data on my own.

Reports were collected from the federal, state and county agencies responsible for water quality. Additionally, non-governmental organizations, the Jamestown S’Klallam Tribe, and other private organizations in the Sequim Bay watershed area were polled to see if they had water quality study results to contribute.

Any trends (improving, deteriorating, etc.) in water quality were highlighted in terms of compliance with specific water quality parameters, such as those listed in the State of
Washington Water Quality Standards (Chapter 173-201A WAC) and those important to the survival of valued fish and wildlife resources. Targeted for collection were data on priority pollutants, fecal coliforms, temperature, dissolved oxygen, pH, nutrients, and sediment (from erosion).

The Watershed Management Committee agreed that fecal coliform contamination is one of the first indicators of a threat to the Watershed, for it suggests the potential presence of disease causing virus and bacteria (SBWMP 1989). Fecal coliform contamination also is a key determinant in decertifying shellfish beds. Based on this assumption, the Watershed Management Committee decided to focus on fecal coliform loading as a measurable gauge of plan success.

2.3 Summary Synthesis

In an attempt to evaluate how interviewees viewed success of the plan, I converted each interviewee’s response to the elements of the questionnaire to a numerical value based on a four-point scale where 0 – not successful, 1 – somewhat successful, 2 – substantially successful, 3 – very successful. This approach is modeled after methods used by Albert et al. (2003) and Harris and Pender (2010). Each priority and specific recommendation was assessed and assigned a numerical value based on my judgment of what the interviewee said regarding success. Additionally for water quality data, the assignment of a numerical value was based on documented evidence in agency and non-governmental organization reports and comparison of that data with the State’s Water Quality Standards. Please note that I am not representing this as an objective quantitative method of analysis but rather a way of synthesizing the voluminous data collected.
3.0 RESULTS AND DISCUSSION

Section 3.0 presents an in-depth analysis of the implementation and success of each of the four SBWMP priorities, and additionally, how well the plan was administered. In Table-3 (see Section 3.6), I include a Summary Synthesis of plan success which is based on the Watershed Management Committee’s Implementation Criteria (SBWMP 1989:3-41), and which I included in the questionnaire used to guide informant interviews.

3.1 Priority 1: Education and Public Participation

Recommended actions to enhance public education and public participation included among others: using local media and press, expanding volunteer programs, promoting public education projects, working with youngsters, expanding outreach to existing community organizations, holding an annual water quality conference, and posting signs designating water quality boundaries.

3.1.1 Publications

The SBWMP recommended a heightened awareness of water quality in the watershed, which subsequently resulted in the distribution of a number of educational publications. In addition to brochures, occasional pamphlets, and sign postings, these publications included: “Water Quality Tidings”, “Clean Water Herald”, “Salmon in your Front Yard”, “Shellfish in your Backyard”, and a “Clear Water Herald Septic Edition”. Although this educational information has been established, due to lack of funding, publication and distribution has been intermittent since about 1992.

3.1.2 Workgroups

Two key Clallam County workgroups operating within the Sequim Bay watershed are responsible for many of the educational brochures and newsletters distributed throughout
Clallam County: The Clean Water Workgroup and Septic Workgroup. These groups consist of a consortium of participating governments, shellfish growers, scientists, volunteer organizations, private citizens, and tideland owners. Along with distributing newsletters and other educational pamphlets, these work groups facilitate and coordinate training and outreach programs such as septic homeowner training and education on reducing bacterial waste. Unfortunately funding since 1992 has limited regular distribution of educational materials, and furthermore, I learned that the Clean Water Workgroup focuses largely on the Dungeness watershed (Anonymous\(^3\), pers. comm.).

3.1.3 Educational Signs

Over 100 signs identifying 29 important fish streams throughout Clallam and Jefferson County were posted in the summer of 1990. The blue and white signs have a salmon logo with the stream name in black lettering on them. Clallam County Public Works Division provided posts for Clallam County and the Department of Fisheries Volunteer Fisheries Program financed the sign production (JCCD 1990). It appears that Clallam County continues to post signage as necessary, e.g., repairing and replacing lost or destroyed signs.

3.1.4 WSU Cooperative Extension Services

The continuation of the Clallam County WSU Cooperative Extension Services Bay Watchers volunteer program was also recommended by the SBWMP, along with the program’s expansion county-wide (SBWMP 1989). Although the program ended around 1994, a similar program, also connected with WSU Cooperative Extension Services, surfaced around 2004.

\(^{3}\) Four personal communications requested to remain anonymous in my research.
called the Beachwatchers\textsuperscript{4}. The earlier Bay Watchers program and latter Beachwatchers program share the same vision of improving water quality throughout the watershed. The current Beachwatcher program aims to improve water quality mainly through volunteer projects such as preservation and restoration of shoreline habitats, whereas the earlier Bay Watchers program approached water quality issues using a curriculum-type training setting (D. Freed, pers. comm.).

3.1.5 Streamkeepers

The Clallam County Streamkeepers is another organization that focuses on volunteer and outreach opportunities in the Sequim Bay watershed. The Streamkeepers train volunteers to assess a variety of biological, physical, and chemical stream health indicators through a structured quarterly monitoring program conducted in the tributaries of the Sequim Bay watershed. *Streamwalk* is one of many programs Streamkeepers facilitate, where Streamkeepers staff and volunteers visit the streams in the watershed and conduct a visual evaluation of water and habitat quality. This is a great educational tool that makes the public aware of the current water quality conditions in the area.

3.1.6 Jamestown S’Klallam Tribe

The local Jamestown S’Klallam Tribe (Tribe) conducts much of its public education and outreach program through the Dungeness River Audubon River Center. The Tribe also maintains a number of natural resource education programs in the form of presentations, workshops, and field trips related to marine and fresh water quality and habitat.

\textsuperscript{4} The Bay Watchers evolved into the 8 Streams Project run by Clallam County Department of Community Development, and then into the Beachwatchers program based in a neighboring Washington county, Island County, before returning to Clallam County, WA.
3.1.7 Clallam Conservation District

The Clallam Conservation District provides public outreach relating to BMPs for forest, farm, and urban land owners. This includes presentations, tours, and publications on a wide array of water quality related topics such as pasture and manure management, and the use of native vegetation as stream buffers. The Conservation District also works closely with the local schools.

3.1.8 Summary Synthesis of Priority 1 Implementation and Success

It appears that following SBWMP implementation, there was fairly widespread public education and involvement to foster stewardship among the greater watershed community. Information was made available, and brochures were distributed, although intermittently. Workshops were held, although some did focus their attention to the Sequim Bay as the SBWMP intended. This scores numerically a ‘2’ out of the potential ‘3’ in the Summary Synthesis Table (Table-3). A program such as Bay Watchers did continue as Beachwatchers and Streamkeepers, so this element scores numerically as a ‘3’. The water quality programs that have been implemented were undertaken with wide-spread community support which rates this element a numerical score of ‘3’. Finally, although water quality surveys have been intermittent since plan inception, when funding has permitted sampling, citizen participation and support in water quality surveys has been consistent. This also scores a ‘3’, resulting in an overall average score of ‘2.75’ for Priority 1.

3.2 Priority 2: Keep Things Out of the Water (Contaminants)

The SBWMP addresses specific issues that contribute to bacterial, sediment, chemical and nutrient contamination of the Sequim Bay watershed. The Sequim Bay Watershed Management Committee adopted a performance-based goal of implementing voluntary BMPs throughout the watershed, keeping things out of the water, and also adopting legal compliance
with State Water Quality Standards (Chapter 173-201A WAC). My evaluation of this priority is based on determining which recommended actions of the SBWMP were implemented and also whether or not water quality in terms of bacteria (fecal coliforms), sediment from erosion, chemicals, and nutrients in Sequim Bay and its tributaries has improved as a result of SBWMP actions.

Watershed Management Committee recommended actions included among others: reducing of priority pollutants, chemicals, nutrients, and plastics in the watershed, rechanneling and restoring the lower two miles of Bell Creek, fixing failing septic systems, eliminating unsanitary discharge from boats and marina operation, fencing livestock out of tributary streams, and reducing sediment entering the watershed from forest and agricultural practices.

3.2.1 Bacteria

For fecal coliforms in the watershed, the SBWMP adopted the goal of legal compliance with State Marine and Fresh Water Quality Standards (Chapter 173-201A WAC). The Sequim Bay Watershed Management Committee did not favor setting an intermediary numerical goal to reduce fecal coliforms, e.g., a 10 percent reduction in each stream, but instead simply recommended a reduction of all pollutants entering the waters.

Washington State Water Quality Standards Table-1 shows the maximum fecal coliform levels allowable in order to maintain Class AA (Extraordinary quality) in marine waters and to protect shellfish harvesting. These standards require that mean fecal coliform concentrations are not to exceed a geometric mean value of 14 bacterial colonies per 100 mL. Additionally, the estimated 90th percentile of all water samples (or any single sample when less than ten sample points exist) cannot exceed 43 organisms per 100 mL for marine waters, and 100 organisms per 100 mL for freshwaters in areas potentially impacted by nonpoint pollution (WSL 2010).
Table-1: Washington State Water Quality Standards (FC/100 mL)

<table>
<thead>
<tr>
<th>Class</th>
<th>Marine WAC 173-201A-210 (3)(b)</th>
<th>Fresh WAC 173-201A-200 (2)(b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class AA (Extraordinary quality)</td>
<td>14 FC</td>
<td>50 FC</td>
</tr>
<tr>
<td>Class A (excellent)</td>
<td>14 FC</td>
<td>100 FC</td>
</tr>
<tr>
<td>Class B (good)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class C (fair)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lake Class</td>
<td></td>
<td>50 FC</td>
</tr>
</tbody>
</table>

**Marine Waters**

Around the time of the SBWMP inception, a study was conducted on sources of water quality problems in the Sequim Bay watershed (Determan 1986). This study collected samples at several locations within Sequim Bay and reported that the shoreline between the Bay entrance and Pitship Point, and the Middle Ground were presently closed to commercial harvest due to the risk of waste dumping from boats (Determan 1986) (see Figure-2). Additionally, Determan (1986) found relatively high bacteriological concentrations in shellfish near the mouth of Sequim Bay near Washington Harbor.
Figure-2: The Sequim Bay Watershed Showing Beaches Closed to the Harvest of Shellfish
In August of 2008, the Washington State Department of Health Office of Shellfish and Water Protection conducted a Sanitary Survey of the Sequim Bay Growing Area. The survey sampled water quality at 28 monitoring stations throughout Sequim Bay (see Appendix E for geographic locations). The water samples were collected under a systematic random sampling method in accordance with Chapter IV of the National Shellfish Sanitation Program Model Ordinance (DOH 2008). The sample schedule was spread throughout the year to allow seasonal variations to be examined. A variety of tidal conditions were also sampled.

The majority of the area surveyed was classified as Approved and compliant with Class AA (Extraordinary quality) State classification standards (Chapter 173-201A WAC) (DOH 2008). This study also found, however, fecal coliform levels around Washington Harbor at 240 fecal colonies per 100 mL, which far exceeded the 14 colonies per 100 mL standard, and prompted these waters to be classified as Prohibited. Washington State Department of Health speculated these elevated levels of fecal contamination were due to various actual and potential pollution sources including Bell Creek, and the potential impacts from on-site sewage disposal systems in the area (DOH 2008). A Prohibited area was also established around the John Wayne Marina, a 300-slip marina located along the western shore of the Bay. This Prohibited area included a closed area from intermittent pollution from Johnson Creek.

Based on 2010 data provided by the Washington State Department of Health Shellfish Safety Information website (DOH 2010), exceedences of the State Water Quality Standards are still ongoing at five beaches located within Sequim Bay. They are Pitship Point, South Pitship Point, North Sequim Bay State Park, Sequim Bay State Park, and DNR-411A (west of the

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5 The Growing Area Classification program evaluates all commercially harvested shellfish growing areas in Washington State to determine their suitability for harvest (OSWP 2010).
southern point of Gibson Spit) (Figure-2). Each is located near the outfall of a tributary in which are found fecal coliforms levels exceeding the standard, or marine biotoxins have been found to concentrate in shellfish at these locations, or both conditions exist.

**Freshwater Tributaries**

Tributary data analyses are based mainly on studies and reports collected by Determan (1986), the Clallam County Streamkeepers and the local Jamestown S’Klallam Tribe (Tribe). The Streamkeepers and the Tribe share many sites used for sampling and monitoring in their reports. Monitoring site maps generated by the Tribe are included in Appendices F and G. Fecal coliform loading will first be analyzed in each tributary to assess water quality, and analyses of nutrient, temperature, pH, dissolved oxygen, and turbidity data will then follow.

**Jimmycomelately Creek**

Jimmycomelately Creek covers 19 square miles and is approximately 20 miles long (Tribe 2010). Since the early 1990s it has been perhaps the most heavily monitored tributary in the Sequim Bay watershed. Efforts to address declining fish populations and increased flooding in Jimmycomelately Creek has led to extensive study, mainly by the Clallam County Streamkeepers and the Jamestown S’Klallam Tribe. Sequim Bay’s primary subbasin Jimmycomelately Creek is also the natural home to a run of the Endangered Species Act listed summer chum salmon *(Oncorhynchus keta)* and supports steelhead *(Oncorhynchus mykiss)*, cutthroat trout *(Oncorhynchus clarkii)* and coho salmon *(Oncorhynchus kisutch)* (Tribe 2003, 2009, and 2010).

In Determan’s (1986) study on sources of water quality problems in the Sequim Bay watershed, fecal coliform samples collected from Jimmycomelately Creek reported 610 fecal colonies per 100 mL. This exceeded the targeted 50 fecal colonies per 100 mL to comply with
State Class AA (Extraordinary quality) water quality standards. In this report, Determan (1986) sampled what he identified as three major streams (including Bell, Johnson and Jimmycomelately Creeks), and six minor streams (all unnamed except Dean Creek). Of these streams, Jimmycomelately Creek was among the top contributors of fecal coliform to Sequim Bay (Determan 1986).

Since the time of Determan’s (1986) study, Jimmycomelately Creek has been remeandered, revegetated and has undergone other significant restoration efforts which will be discussed in greater detail in sections to follow. More recent studies on Jimmycomelately Creek show reductions in fecal coliform loading. The Clallam County Streamkeepers released a county water quality index in March 2004 reporting fecal coliform results for county streams including results for one site along Jimmycomelately Creek. The reported geometric mean of 14 fecal colonies per 100 mL for this site was compliant to State standards for Class AA (Extraordinary quality) water quality of below 50 fecal colonies per 100 mL (Streamkeepers 2004).

Another county water quality index released in October 2007 reported similar findings for the same site along Jimmycomelately Creek, showing a geometric mean of 27 fecal colonies per 100 mL (Streamkeepers 2007). Although slightly elevated from the 2004 findings, the 27 fecal colonies per 100 mL was still compliant to State water quality standards of 50 fecal colonies per 100 mL. One other site along Jimmycomelately Creek was monitored in the 2007 study and reported fecal concentrations of 21 fecal colonies per 100 mL, and was also in compliance with State standards (Streamkeepers 2007).

The Jamestown S’Klallam Tribe reported fecal coliform results for Jimmycomelately Creek for two time periods, one from November 2004 to February 2006, and the other was from May 2007 to August 2008. Both time periods show Jimmycomelately Creek well below the State
water quality standard for Class AA (Extraordinary quality) water quality (Tribe 2009). Samples from 2004 to 2006 showed fecal concentrations of 10 fecal colonies per 100 mL, and samples collected from 2007 to 2008 reported 18 fecal colonies per 100 mL. The Tribal study (2009) noted, however, that some sections of Jimmycomelately Creek are still listed on Washington State’s 303d list under the Clean Water Act\(^6\) for fecal coliform violations.

**Bell Creek**

Bell Creek, the westernmost drainage into Sequim Bay, is 3.8 miles in length. Coho have been observed spawning in the lower one mile of the creek, and steelhead and cutthroat trout smolts have been collected there (Tribe 2010). Restoration efforts undertaken on Bell Creek have attempted to improve the creek’s history of elevated levels of fecal coliform concentrations; however, poor water quality conditions over the years have placed Bell Creek on the State’s 303d list for fecal coliform bacteria since the State’s 1996 assessment.

Elevated fecal coliform concentrations in Bell Creek were noted as early as 1986 in a study on sources of water quality problems in the Sequim Bay watershed (Determan 1986). Bell Creek, Determan reported (1986), was by far the greatest contributor (out of the streams studied) of fecal coliform to Sequim Bay. Geometric means for fecal coliform concentrations found in Bell Creek were upwards of 84 to 6800 fecal colonies per 100 mL (Determan 1986).

In order for the Washington State Department of Ecology (DOE) to assess water quality in Bell Creek, the Clallam County Streamkeepers and Jamestown’s S’Klallam Tribe (Tribe) provided fecal coliform data for Bell Creek to DOE, providing the basis for assignment of the creek to the State’s 303d list (DOE 2010). Data provided by the Streamkeepers to DOE in 1992

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\(^6\) Washington’s Water Quality Assessment lists the status of water quality for a particular location in one of 5 categories recommended by EPA. This Assessment represents the Integrated Report for Sections 303(d) and 305(b) of the Clean Water Act (DOE 2010).
Reported a geometric mean of 2070 fecal colonies per 100 mL at monitoring site Bell 0.1, located at river mile 0.1 at Schmuck Road (DOE 2010). In 1998, the Tribe reported a geometric mean of 70 fecal colonies per 100 mL at a monitoring site referred to as ‘Bell 05’ (DOE 2010). In 2000, the Tribe reported geometric means ranging from 102 to 430 fecal colonies per 100 mL at four separate monitoring sites along Bell Creek (DOE 2010). Again in 2002, the Tribe reported geometric means of 99 to 140 fecal colonies per 100 mL at four separate monitoring sites (DOE 2010). These data consistently fail to meet the 50 fecal colonies per 100 mL as required by the State to be classified Class AA (Extraordinary quality) waters.

Trends of ongoing water quality violations in Bell Creek may be in part due to lack of BMPs employed along the stream corridor. The Clallam County Streamkeepers issued a Streamwalk report in 2002 documenting bank erosion on both sides of the Creek (Streamkeepers 2002). Vegetation was observed to be heavily denuded due to the extensive fenceless residential area through which Bell Creek meanders. Numerous stream crossings also contribute to the continued elimination of vegetative cover and cause silt build-up in the water, decreasing preferred habitat for fish (Streamkeepers 2002).

Although Bell Creek has historically reported elevated fecal concentrations, more recent data show decreasing levels of fecal coliforms throughout the creek. Woodruff et al. (2009) monitored fecal coliforms in Bell Creek from 1998 through 2008. Samples were taken at eleven stations along the creek and compiled into three reaches. Woodruff et al. (2009) reported geometric means of 14 fecal colonies per 100 mL for the upper reach, 52 fecal colonies per 100 mL in the middle reach, and 36 fecal colonies per 100 mL at the mouth. These results indicated two of the three reaches in Bell Creek were in compliance with State water quality standards of 50 fecal colonies per 100 mL, while the third reach was just slightly out of compliance.
Close to the mouth of Bell Creek is a large farm located adjacent to the creek which maintains over 200 livestock. Although the livestock are fenced approximately five feet from the creek and do not have direct access to the water, the pasture areas lack vegetative cover to reduce storm runoff of manure into the creek (DOH 2008). This could be another potential source of increased levels of fecal coliform entering Sequim Bay.

The Jamestown S’Klallam Tribe (Tribe) collected samples from February 2006 through September 2007 from Bell Creek at two monitoring sites located nearby the livestock operation; at river mile 0.8, upstream of the farm, and at river mile 0.16, located downstream of the farm (DOH 2008). The 2008 survey reported the geometric mean of fecal coliform samples taken at river mile 0.8 upstream of the livestock operation, at 14.6 fecal colonies per 100 mL, while the geometric mean of the samples taken at river mile 0.16 was 28.6 fecal colonies per 100 mL (DOH 2008), indicating some contribution from the livestock operation. The samples were compliant with State water quality standards of 50 fecal colonies per 100 mL, nonetheless Bell Creek still discharges through a Washington State Department of Health classified Prohibited area of Sequim Bay.

*Johnson Creek*

Johnson Creek is the third largest stream within the Sequim Bay watershed (Streamkeepers 2004). The creek flows from the northeast into the west side of Sequim Bay at Pitship Point near the John Wayne Marina. Johnson Creek has been listed on Washington State’s 303d list as category 5 for fecal coliform pollution for the years 1996, 1998, 2004, and 2008.

Reports of elevated fecal concentrations in Johnson Creek were also noted in Determan’s 1986 study of water quality in the Bay area (Determan 1986). Determan (1986) reported fecal
coliorm levels in Johnson Creek as high as 210 fecal colonies per 100 mL which exceeds the State water quality standards of a geometric mean of 50 fecal colonies per 100 mL. Determan (1986) identified Johnson Creek in this report among the top three contributors of fecal coliform to Sequim Bay.

The Clallam County Streamkeepers released a county water quality index in March 2004 where mean fecal concentrations for Johnson Creek were reported for two sampling sites along the creek (Streamkeepers 2004). One sampling site reported a mean fecal load of 150 colonies per 100 mL, exceeding State standards of 50 colonies per 100 mL to comply with Class AA (Extraordinary quality) water standards. However, the other site reported much lower concentrations of 29 fecal colonies per 100 mL, which did comply with the State standards (Streamkeepers 2004).

A 2008 Sanitary Survey conducted by Washington State Department of Health noted bacterial contamination in Johnson Creek was still ongoing and shellfish harvest in the Johnson Creek tidelands where the creek empties into Sequim Bay had been prohibited (DOH 2008).

**Chicken Coop Creek**

Chicken Coop Creek is approximately 3.1 miles long and has multiple road crossings and barriers, and the habitat is severely fragmented (Streamkeepers 2004). The floodplain habitat below East Sequim Bay Road is described as a forested wetland/wet meadow complex that provides some good habitat for fish. Chicken Coop Creek has been known to support steelhead, cutthroat trout, and coho salmon.

Minimal fecal coliform monitoring has been conducted in Chicken Coop Creek over the years. This may be due in part to Chicken Coop Creek’s perceived small impact of fecal coliform contributions to Sequim Bay in comparison to other Sequim Bay subdrainages. Clallam County
released a report in 1991 stating that Chicken Coop Creek contributed only 1.72 percent of total fecal coliform loading to Sequim Bay from September 1986 to May 1988 (DCD 1991). This was compared to Jimmycomelately Creek’s 2.84 percent contribution, Johnson Creek’s 4.5 percent contribution, and Bell Creek’s 90.6 percent contribution of fecal loading to the Bay (DCD 1991).

In 2009, Tribal survey results for the time period of December 2004 to August 2008, showed Chicken Coop Creek compliant to State water quality standards for the geometric mean of 50 fecal colonies per 100 mL. Samples collected from 2004 to 2006 reported concentrations of 11 fecal colonies per 100 mL, and samples collected from 2007 to 2008 reported concentrations of 25 fecal colonies per 100 mL (Tribe 2009). Chicken Coop Creek did, however, fail to meet the 90th percentile criteria of 100 fecal colonies per 100 mL for both time periods (Tribe 2009). No other studies were found for Chicken Coop Creek for further interpretation.

*Dean Creek*

Dean Creek is one of the smaller drainages to Sequim Bay, only approximately four miles in length. Juvenile coho and steelhead have been observed in the creek, and the local Jamestown S’Klallam Tribe (Tribe) conducts yearly commercial and subsistence clam harvests on the tidelands adjacent to the mouth of the creek (Tribe 2010).

Dean Creek was defined as a minor stream in Determan’s (1986) study on sources of water quality problems in the Sequim Bay watershed. While minimal fecal coliform data were collected for Dean Creek in this study, the data that were collected did not reveal any exceedences of State water quality standards (Determan 1986). In the Clallam County Streamkeepers’ 2004 watershed summary, the Streamkeepers reported *ample data do not exist* for Dean Creek to assess bacterial loading in the creek (Streamkeepers 2004). The Tribe sampled Dean Creek for fecal coliforms more recently, from November 2007 to June 2008 (Tribe 2009),
and reported fecal coliform levels of 4 fecal colonies per 100 mL, complying with the State standard for Class AA (Extraordinary quality) water quality, based on the geometric mean of 50 fecal colonies per 100 mL threshold (Tribe 2009). Monitoring of Dean Creek in the Sequim Bay watershed has been intermittent and the sampling locations have changed three times in the last three years (DOH 2008).

**Other Sources of Bacteria**

*Septic Systems*

The SBWMP recognized the potential risk that failing on-site septic systems presented for Sequim Bay due to the watershed’s high risk (course) soils and aging household septic systems (SBWMP 1989). However, plan recommendations addressing septic systems were only partially fulfilled.

In efforts to more actively isolate and remediate failing on-site septic systems, the SBWMP recommended support of State legislation to provide the public health office access to private property to test and inspect on-site septic systems in response to complaints or known public health risks (SBWMP 1989). Failing septic systems have been a controversial topic since the mid-1980s. This was in part due to the County not wanting to appear “heavy-handed” in dealing with the public and enforcing regulatory compliance (A. Brastad, pers. comm.).

The Sequim Bay Watershed Management Committee recommended that Clallam County inform and better educate the public and land developers that septic systems should be considered only interim disposal devices, and also provide information on alternatives for installation of community water and septic systems (SBWMP 1989). Soon after, the Growth Management Act was enacted in 1990 in response to rapid population growth and concerns with
suburban sprawl, environmental protection, quality of life, and related issues\(^7\) (MRSC 2010). Provisions in the Growth Management Act disallowed sewage systems outside urban growth areas, which includes much of Clallam County, subsequently nullifying SBWMP recommendations.

Sequim Bay State Park, however, has been connected to the City of Sequim’s sewer system (during the winter of 2007). At the time of plan inception, the park was on a septic system and incurred beach closures from land application of treated wastewater from the park’s sewage lagoons. After hook-up to the City sewage system, land application of wastewater was no longer needed at the park.

In light of the new legislation, Clallam County set its focus more on proper maintenance of the areas’ aging on-site septic systems (A. Brastad, pers. comm.). When funding has been available, brochures, flyers, and newsletters on appropriate design, installation and homeowner septic maintenance were published. Clallam County Department of Environmental Health is currently making a video for homeowners on septic system maintenance. In addition to the existing permitting database (database for all permitting since 1987), a new software system has recently been developed to map septic systems in Clallam County and to provide baseline data as well as better predict high risk areas.

Additional legislation, Chapter 246-272A WAC\(^8\) and RCW 70.118A\(^9\), was enacted in 2005 and 2006, and aimed at mitigating potential pollution caused by on-site septic systems. To

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\(^7\) The Growth Management Act has been amended several times, and is codified in many chapters but primarily in Chapter 36.70A RCW (MRSC 2010).

\(^8\) In July 2005, the Washington State Board of Health adopted Chapter 246-272A WAC, which requires local health departments to develop plans for the management of on-site septic systems within their jurisdictions (SRC 2007).
fulfill the requirements of this new legislation, Clallam County Department of Environmental Health elected to form an On-site Septic Systems Workgroup composed of people who live and work in Clallam County, and ex-officio members from outside the county. This On-site Septic Systems Workgroup began meeting in October 2006, and provided recommendations to the County on inspection requirements, creation of a Marine Recovery Area, funding options, and compliance activities (SRC 2007) The On-site Septic Systems Workgroup continues to meet quarterly.

In 2008, a study conducted by Washington State Department of Health evaluated the risk to Sequim Bay’s shellfish growing area, and included a detailed survey of on-site septic system practices. The Department defined 48 of 124 on-site septic systems as potential sources of pollution to the Bay. These sites were defined as potential sources due to the age, location, or type of on-site septic systems (DOH 2008). Soils in the area vary greatly along with their ability to support on-site septic systems with limited pre-treatment. Table-2 below reports Washington State Department of Health staff’s age estimations for on-site septic systems serving the local area.

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9 In 2006, the Legislature enacted RCW 70.118A, which requires local health jurisdictions that border Puget Sound to identify Marine Recovery Areas where on-site septic systems contribute to marine water quality problems, and to develop management strategies to find and repair all failing on-site septic systems within the Marine Recovery Areas (SRC 2007).
Table-2: Washington State Department of Health
Estimated On-Site Septic Systems Age for 118 Sites

<table>
<thead>
<tr>
<th>Estimated OSS Age</th>
<th>Quantity (Percentage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range</td>
<td></td>
</tr>
<tr>
<td>1 – 9 years</td>
<td>27 (23%)</td>
</tr>
<tr>
<td>10 – 19 years</td>
<td>23 (20%)</td>
</tr>
<tr>
<td>20 – 29 years</td>
<td>17 (14%)</td>
</tr>
<tr>
<td>30+ years</td>
<td>51 (43%)</td>
</tr>
</tbody>
</table>

*Data Source:* (DOH 2008)

As Table-2 shows, the majority of septic systems in the area are 30+ years old which increase the potential for leaks, emitting bacterial and viral contaminants into surface and groundwater bodies, which eventually lead to the Bay.

Based on the above findings and the new 2008 Washington State rule requirements (Chapter 246-272A WAC), Clallam County revised their code to require that all systems within the Sequim Bay watershed will be inspected on a stringent schedule based on system type and location, and will require certification by a professional because the entire watershed is designated part of the Marine Recovery Area (SRC 2007).

*John Wayne Marina*

Boating and marina activities present potential bacterial pollution primarily from direct discharge of boat and galley wastes. The SBWMP developed recommended actions specific to John Wayne Marina because the Sequim Bay Watershed Management Committee realized impacts may be particularly important around the marina where these wastes could be discharged and then settle directly on nearby shellfish beds (SBWMP 1989).
The John Wayne Marina was constructed in 1985 on 22 acres of land originally owned by the John Wayne family (Tribe 2009). The land was donated to the Port of Port Angeles (Port) which maintains the Marina for moorage and vessel storage. It includes a boat launch, fuel dock, moorage slips, a pumpout/dump station, and two portable toilets for moorage tenants, and transient vessel owners (Tribe 2009).

Several of the SBWMP recommended actions have been carried out related to permitted activities for sewage discharge, garbage and oil disposal, and fueling for John Wayne Marina. Many of these recommendations are explicitly outlined in the current rules and regulations for John Wayne Marina users, and can also be found in the Washington State Parks “Adventures in Boating Washington Handbook (2009)”. The Sequim Bay Watershed Management Committee recommended installing an informational kiosk in the Harbormaster Office parking lot, posting “No Discharge” signs on every dock, establishing an oil recycling center, a spill response shed, and posting of county health signs (e.g. beach closure for shellfish harvest due to fecal coliforms from Johnson Creek), where appropriate, all of which are now in place.

The SBWMP also recommended the installation of a meter at the pumpout station which would allow officials to estimate how many boats used the station per hour. The hourly meter was installed and the Port submits a Boat Sewage Pumpout Annual Update Report to the Washington State Parks & Recreation Commission. On this report the Port submits hours the pumpout station was in operation for the previous year. The State Parks & Recreation Commission keeps records of this information. Also as recommended by the plan, oil spill response kits are located on each dock.

Despite this compliance with SBWMP recommended actions, Washington State Department of Health currently still maintains a Prohibited zone around the Marina. This closure
zone however, is more likely caused by fecal coliform loading from Johnson Creek and not marina activities.

*Individual Property Owner Conservation Plans*

Recommending that individual property owners prepare conservation plans was also intended to address bacterial pollution in both surface and groundwater resources. Conservation plans were to address adequate water protection, the reduction of direct animal access to waterways, and the better management of animal waste and pastures (SBWMP 1989). The failure to complete the recommended action, I think, was due mainly to increased public controversy over its implementation. Unfortunately, property owners viewed conservation plans as an intrusion of their property rights, and as the County did not want to appear “heavy handed” with the local citizenry, filing a conservation plan became voluntary (J. Holtrop, pers. comm.).

The Clallam Conservation District did, however, partner with Clallam County during the period of March to September 2006, to perform an inventory of farms to rate livestock-keeping operations in terms of potential impacts to water quality (Clallam County 2010). This information has not been acted upon but is available to local authorities in prioritizing which properties need conservation plans the most.

3.2.2 Sediment from Erosion

Sedimentation negatively affects marine and freshwater habitats and their ability to support shellfish and anadromous fish. Silt deposition in stream beds lowers dissolved oxygen levels, creates barriers to fish passage, raises water temperatures, affects spawning and egg development, and interferes with fish survival rates (Larkin et al. 1998). For these reasons, the SBWMP developed recommendations to address sedimentation in its major tributaries and Sequim Bay.
Johnson Creek Slide

Prior to plan inception, just south of Happy Valley Road, where the Highland Irrigation Ditch joined Johnson Creek, there existed a sizeable slope failure and mass wasting causing a landslide and continued erosion and sediment delivery into Sequim Bay (SBWMP 1989). Recommendations by the SBWMP focused on finalizing engineering options and funding for repair of the slide. An interdisciplinary team consisting of representatives from Washington State Department of Fish and Wildlife (WDFW), Point No Point Treaty Council, Clallam Conservation District, Clallam County Water Quality Office, and Highland Irrigation District visited the slide site in the early 1990s, subsequently preparing engineering alternatives to eliminate the contribution of the irrigation outfall to the mass movement of sediment into the Bay. Project approval was requested from the Soil Conservation Service\textsuperscript{10}, WDFW, and Washington State Department of Ecology. The plans were approved and installation of culverts, diversion of flow, and restabilization of vegetation were completed by the end of 1992 (J. Holtrop, pers. comm.).

Sediment from Forest Practices

Improperly maintained roads and poor logging practices in the forested watershed can be a significant source of sediment delivery to Sequim Bay. The SBWMP recommended that an analysis of sedimentation and impacts of roads to aquatic resources and water quality be conducted in order to develop and implement a better sediment management program for logging activities in the watershed.

The Jamestown S’Klallam Tribe, in compiling information for a 2009 Draft Watershed-Based Plan, has not found that any analyses of sedimentation and impacts of roads have been

\textsuperscript{10} The Soil Conservation Service is now presently known as the Natural Resource Conservation Service.
conducted for the Sequim Bay watershed forests, either under private, state, or federal management (Tribe 2009).

Log Yard and Sorting Operations Impacts

At the south end of Sequim Bay, a log sorting and transportation business had been operating since 1892. Sediment and chemical leachates from logs held in water storage contributed to oxygen depletion in the nearby shellfish beds (SBWMP 1989).

The Sequim Bay Watershed Management Committee expressed interest in working with Washington Department of Natural Resources and County planners to remedy the situation, initially developing a sediment management plan for the log yard. As a permanent solution to the problem, the Jamestown S’Klallam Tribe, in concert with 21 other local, state, federal, and private partners acquired the property and began restoration of the log yard in 2003. The log yard pier, along with 30,000 cubic yards of contaminated sediment from beneath the pier and nearby beach were removed, restoring nearly 20 acres of salt marsh (Tribe 2003, 2010). Additionally in 2003, native wetland plants were introduced. The removal of log yard pilings and rafts, dikes, fill and wood debris increased the amount of healthy subtidal and intertidal areas, eelgrass beds and beach habitat, which are important to the many species of birds, mammals, and shellfish inhabiting the estuary and Bay (Tribe 2003).

3.2.3 Toxins, Chemicals, and Plastics

A study of Puget Sound Bays entitled Reconnaissance Survey of Eight Bays in Puget Sound conducted by Battelle Northwest and the United States Environmental Protection Agency in 1986, found that of eight embayments studied, Sequim Bay was identified as the least impacted by metals and organic materials from human activities. However, the Sequim Bay
Watershed Management Committee still felt that prevention of future chemical and plastics pollution was key to keeping Sequim Bay’s water clean.

**Hazardous Waste Roundup**

The Sequim Bay Watershed Management Committee recommended developing a more accessible hazardous waste disposal facility in order to encourage proper disposal of hazardous wastes. Annual Hazardous waste disposal roundups were proposed to enable resident, businesses and agricultural operations to safely dispose of hazardous materials. These roundups were coordinated every year until the county was able to open a fixed facility for hazardous waste disposal (A. Brastad, pers. comm.). Opening the fixed facility made disposal of hazardous wastes even more accessible and replaced the need for the annual roundups.

**Promote Recycling Efforts**

County-wide recycling efforts were encouraged by the SBWMP in order to reduce improper disposal of metals that could leach into water sources in the watershed. Active recycling efforts in the watershed have occurred and include periodic community “No Waste” and “Low Waste” events, and also the WSU Cooperative Extension Service conducts community workshops to promote recycling in the area (D. Freed, pers. comm.). The City of Port Angeles has even adopted its own recycling coordinator to assist in the ongoing leadership and coordination of recycling in the watershed (A. Brastad, pers. comm.).

**Boater Education**

The SBWMP was also concerned that metals may actually increase in Sequim Bay as boat traffic increased (SBWMP 1989). The plan recommended the Port of Port Angeles (Port) support continued boater education and preventative measures in controlling improper disposal and leakage of marina-related pollutants into Sequim Bay. During a visit to the Harbor Master
Office at John Wayne Marina in June 2010 (R. Amundson and J. Waknitz, pers. comm.), I learned that over the years, boater education pamphlets and flyers addressing proper disposal of boater-related wastes have been routinely provided to marina users.

Another SBWMP recommendation suggested developing a small oil spill cleanup contingency program at the Marina. In coordination with the Port and the Jamestown S’Klallam Tribe, John Wayne Marina now has several oil spill cleanup kits on-site, plus one shed, and a trailer all equipped with oil spill cleanup materials.

3.2.4 Nutrients

Nutrients are another useful tool in analyzing water quality. Nonpoint source pollution can be detected in the form of elevated nitrates, phosphates, and ammonia, which are often indicative of agricultural or sewage runoff. Excess nitrogen and phosphorus can lead to significant water quality problems including harmful algal blooms, hypoxia and declines in wildlife and wildlife habitat (USGS 2010). The Washington State Department of Ecology has not established numerical nutrient criteria for streams or rivers.

Recent studies conducted in the tributaries of Jimmycomelately, Dean and Chicken Coop Creeks in 2009 (Tribe 2009) showed that nutrient concentrations varied substantially by creek. Concentrations for total phosphates, total nitrates and ammonia, for the most part, tended to be highest in Chicken Coop Creek and lowest in Jimmycomelately Creek. As an example, mean total phosphates, total nitrates and ammonia values for Chicken Coop Creek were 222.8 ug/L, 3249.1 ug/L, and 10.5 ug/L, respectively, while in Jimmycomelately Creek, these same metrics were reported at 66.98 ug/L, 1292.9 ug/L, and 15.92 ug/L, respectively (Tribe 2009).

While the State of Washington does not have numerical standards for nutrients in lotic waters, according to Kalff (2002), a total nitrate value of >1500 ug/L during summer months
would classify the waters of Chicken Coop Creek as eutrophic, indicating significant nutrient enrichment. Using Kalff’s classification scheme, Chicken Coop Creek’s total phosphate value of 222.8 ug/L also suggests that the water body is eutrophic, as the threshold for eutrophic waters based on summer total phosphates is >75 ug/L.

Other nutrient data from Sequim Bay tributaries collected over a ten year period from 1999 to 2008 were reported by Woodruff et al. (2009). Her report contains data for both Bell Creek and Johnson Creek, and in general indicated that Bell Creek over the study period demonstrated higher concentrations of total phosphates, total nitrates, and ammonia than Johnson Creek. The reported median concentrations of total phosphates, total nitrates, and ammonia in Bell Creek were 88 ug/L, 70 ug/L, and 15 ug/L, respectively. For Johnson Creek, the reported median concentrations for the same metrics were 63 ug/L, 34 ug/L, and 7 ug/L, respectively. Woodruff et al. (2009) indicated that the ammonia concentrations in Bell Creek did not change seasonally, which suggested that the source could be septic system runoff. While I cannot rigorously apply Kalff’s (2002) classification for trophic states to these results, because the time of year the samples were collected is unknown, the finding of median total phosphate values of 88 ug/L in Bell Creek and 70 ug/L in Johnson Creek still suggests considerable enrichment is occurring in each water body.

3.2.5 Temperature, pH, Dissolved Oxygen, and Turbidity

Accessible data for temperature, pH, dissolved oxygen, and turbidity were limited for the Sequim Bay watershed. However, a 2008 Water Quality Assessment of Sequim Bay conducted by the Washington State Department of Ecology, identified six areas located within Sequim Bay as category 2 on the State’s 303d list for dissolved oxygen (DOE 2008). Areas identified included the southern portion of the Bay near the mouths of Dean, Jimmycomelately and
Chicken Coop Creeks, the middle of Sequim Bay east of Washington Harbor, and also an area along the eastern shore of the Bay below Travis Spit (DOE 2008).

A 2009 Draft Watershed-Based Plan prepared by the local Jamestown S’Klallam Tribe (Tribe) reported similar findings of low dissolved oxygen both in the middle of Sequim Bay and on tidelands at the south shore of the Bay (Tribe 2009). This document also reported presence of the bacteria *Beggiatoa spp.* in parts of the Bay in 2008, and to a lesser extent in 2009. *Beggiatoa* is an indicator of low dissolved oxygen and high hydrogen sulfide and is often associated with wood debris, as microbial decomposition of the wood depletes oxygen (Tribe 2009).

Another survey conducted by the Tribe from February 2004 through August 2008, collected temperature, pH, dissolved oxygen, and turbidity data from the freshwater tributaries: Chicken Coop Creek, Jimmycomelately Creek, and Dean Creek. The results show that each tributary generally complied with State Water Quality Standards for all reported metrics (Tribe 2009). The exception was a single dissolved oxygen value of 7.84 mg/L (minimum value) for Jimmycomelately Creek which was below the State aquatic life dissolved oxygen standard of 9.5 mg/L for lowest 1-day minimum for core summer salmonid habitat (WSL 2010).

3.2.6 Summary Synthesis of Priority 2 Implementation and Success

Several plan recommendations were successfully accomplished. For example, the amounts of sediment, chemicals and plastics entering Sequim Bay have been reduced. Also, BMPs have been implemented around the watershed and have made some improvements in adjacent streams, but still many farms with livestock have not adopted best management practices for better manure management. For these reasons, I scored this element a ‘2’.

Water quality data focusing on fecal coliforms indicate that surface waters in the Sequim Bay watershed tributaries have shown some improvements compared to historical data, notably
in Jimmycomelately and Bell Creeks. However, there are still *Prohibited* areas at the mouths of most tributaries entering Sequim Bay. Furthermore, ample data collection still does not exist for some of the Sequim Bay tributaries, mainly Chicken Coop Creek and Dean Creek, in order to comprehensively evaluate water quality in those streams. For these reasons, I scored this element a ‘1’.

The major slides and failing culverts identified in the SBWMP were addressed and corrected; therefore I scored this element a ‘3’. Effective streamside protection was somewhat accomplished through Tribal and other restoration efforts; however, many riparian areas within the watershed are still in need of further buffering and revegetating. This element was scored a ‘2’.

Continuing water quality exceedences in the Sequim Bay watershed and the apparent apprehensive approach authorities have taken when enforcing water quality regulations, particularly those associated with septic systems have led me to score this enforcement element a ‘1’. I also found little evidence that adjustments to the SBWMP were made based on the collection of new data, which I scored a ‘0’.

The sewage pumpout and waste disposal facilities at John Wayne Marina are routinely used which scored a ‘3’. However, marina receipts provided to users and overnighters did not include boater education information which scored a ‘0’, resulting in an overall average score of ‘1.5’ for Priority 2.

**3.3 Priority 3: Habitat Protection and Enhancement**

The Watershed Management Committee had in mind the need to better coordinate stream inventories, stream rehabilitation and enhancement. The Watershed Management Committee also recommended the county recognize the importance of wetlands and encourage preservation
of wetlands and develop created wetlands to filter nonpoint source pollution before entry to the Bay.

Since plan inception, recommended actions outlined in the SBWMP promoting habitat enhancement and protection of biological diversity have been implemented and sustained, including compliance with city, county, and state guidelines (J. Podlesny, S. Tharinger, pers. comm.). Such procedures included identifying and protecting wetlands, creation of ordinances for developing on protected lands, and the enactment of a Critical Areas Ordinance\(^\text{11}\).

Also since plan adoption, stream habitat projects have been completed on every major tributary in the Sequim Bay watershed (Dean, Johnson, Chicken Coop, Bell and Jimmycomelately Creeks). The continuing shellfish bed closures (*Prohibited zones*) in Sequim Bay, however, suggest further, more extensive protection and enhancement projects may be necessary to fulfill the SBWMP’s goals and objectives in this regard.

### 3.3.1 Bell Creek

The SBWMP recommended rechanneling and restoring the lower two miles of Bell Creek. In August of 1989, Jefferson County Conservation District and Clallam Conservation District were awarded a single, one-year Centennial Clean Water Fund grant by the State Conservation Commission to address water quality concerns in their respective districts (Holtrop 1990) including the creation of a conservation plan for the Bell Creek Restoration Project. Subsequently, a 600-foot reach of Bell Creek was rechanneled and re-vegetated. Local garden clubs helped pay for the plant materials, and over 17 native species were planted including willow, red-osier dogwood, thimbleberry, sickle keeled lupine, and Pacific rhododendron. Students from the Sequim School District helped propagate cuttings for planting in 1991, and

\(^\text{11}\) Chapter 27.12 Clallam County Critical Areas Code 27.12.215. Protection standards for regulated wetlands and buffers required for any development within 200 feet of a regulated wetland (Clallam County 2010).
assisted in raising salmon from eggs in their classrooms. Over 600 students from the local elementary school released the fry into the restored portion of Bell Creek (Holtrop 1990).

Then in 1999-2000, Washington State Department of Transportation purchased the land adjacent to Bell Creek that once ran in a fairly straight line through a part of the valley lowland (Streamkeepers 2002). With the help of the local Clallam Conservation District, large sections of Bell Creek near Maple View Farms (within approximately a half mile from the mouth of the creek into Washington Harbor) was reconstructed and remeandered to create pools for over-wintering and summer rearing for salmon and cutthroat trout. Large woody debris and stream bank vegetation were installed, plus the addition of spawning gravel and debris removal restored salmonid habitat and increased flow capacity (Streamkeepers 1999).

3.3.2 Jimmycomelately Creek

In 2000, the Jamestown S’Klallam Tribe (Tribe) led a combined effort of 21 local, state, federal, and private partners in the process of planning a large restoration project on the lower mile of Jimmycomelately Creek and estuary. The lower mile of Jimmycomelately Creek was straightened, diked, and armored in the early 20th century to allow for agriculture and development (Tribe 2010). This action resulted in a disconnection to its natural estuary and eventually caused flooding across private property, State Highway 101, and Old Blyn Highway. In October 2004, one of the largest restoration projects in Puget Sound to date was completed by acquiring land, decommissioning buildings, removing a log yard and RV Park, and removing two roads, dikes, and wetland fill, which restored the Jimmycomelately Creek channel to its historical location (Tribe 2009).

Jimmycomelately Creek’s stream course was re-aligned improving hydrology and sediment and nutrient transport, and fish access to tidal channels, marshes, and upper watershed.
A new bridge replaced the existing culverts which were not large enough to accommodate flows in the old channel. This new bridge also improved sediment transport, and fish and wildlife passage, and reduced flooding of roadway and properties. Native vegetation was re-established along the realigned stream course, non-native species were removed, and wetland species, woody vegetation, and native grasses and forbs were planted to mitigate surface erosion. Gains of marsh, mudflat, and intertidal habitat, also improved water quality (Tribe 2003).

The Jimmycomelately Creek Restoration Project also greatly improved spawning habitat for chum salmon and provided for improved passage for other salmonids spawning in the upper watershed. Spawning escapement in Jimmycomelately Creek has varied substantially since the 1970s (Tribe 2003). In 1999, before Jimmycomelately Creek was restored, only seven chum returned to Jimmycomelately Creek to spawn. By 2003, approximately 460 summer chum returned (Tribe 2003).

3.3.3 Dean Creek

As part of the Jimmycomelately Creek Restoration Project, a restoration design was also developed for Dean Creek which once shared many of the same impairments as Jimmycomelately Creek pre-restoration, but on a smaller scale. Like Jimmycomelately Creek, Dean Creek was moved into a straightened artificial channel in the past, and culverts and roads (Highway 101, Old Blyn Highway, and Log Deck Road) constricted both flood flows and tidal action (Shreffler Environmental 2003). Non-native vegetation (e.g., Himalayan blackberry, Scott’s broom, Japanese knotweed) colonized the creek banks and other associated fill, causing further constriction of the narrow, artificial creek channel. This constriction contributed to sediment build up at the mouth, as well as downstream of culverts. As a result, Dean Creek flooded regularly and has a long history of being dredged because of its steep drainage area and
loose soils (Tribe 2009). Restoration included realignment of the lower reach of Dean Creek into a more sinuous channel, placement of large woody debris at key locations in the realigned channel, and in the creek banks, placement of streambed spawning gravel in the realigned channel, and planting of native trees, shrubs, and groundcover in the riparian corridor and buffer areas (Shreffler Environmental 2003).

3.3.4 Summary Synthesis of Priority 3 Implementation and Success

In my opinion, Priority 3 of the SBWMP was implemented completely and successfully. Wetlands were protected and stream habitats specifically identified in the SBWMP were improved and rehabilitated. The local community was also highly involved throughout the process. These actions were what the SBWMP envisioned, and for that, this priority received my score of ‘3’.

3.4 Priority 4: Implementation with Ongoing Coordination, Monitoring, and Citizen Oversight and Participation

Actions recommended by the Watershed Management Committee to implement Priority 4 included coordination by Clallam County as the lead agency for SBWMP implementation, securing long-term comprehensive funding for full plan implementation, long-term water quality monitoring and evaluation, and ongoing citizen oversight and participation. Please note, that my evaluation of plan funding is included in Section 3.5 Plan Administration.

After review of the existing data, and interviews conducted with lead, support, and implementing agencies, it is apparent that while water quality monitoring of Sequim Bay’s waters is ongoing, other activities in support of this priority may be lacking the degree of coordination and oversight as originally intended by the SBWMP.
3.4.1 Reports and Meetings

Meetings are ongoing within the Sequim Watershed under the auspices of the Dungeness River Management Team (DRMT), however, the substance of those meetings are not what I think the SBWMP intended with this recommendation. As the Sequim Bay Watershed Management Committee meetings were winding down in late-1991, a report released on the progress of the SBWMP (1989) noted that more and improved contact among some agencies was needed, including more effective meetings and discussions (DCD 1991). The Watershed Management Committee completely quit meeting in 1992.

When the DRMT convened to create the Dungeness-Quilcene Water Resources Management Plan (DQ Plan 1994) around this same time, it was also intended that the DRMT carry out the remaining planning efforts for the Sequim Bay watershed, in addition to its Dungeness Bay efforts (A. Soule, K. Baril, pers. comm.). The DRMT convenes on a regular basis; however, focus is more heavily on the Dungeness Bay (not Sequim Bay). The On-Site Septic Workgroup and the Clean Water Workgroup also meet quarterly and are open for public participation; however, the Clean Water Workgroup, I learned, also focuses largely on the Dungeness watershed (Anonymous, pers. comm.).

Aside from meeting notes made available to the public from the aforementioned workgroups, other reports made available include water quality reports generated by the Clallam County Streamkeepers and the Jamestown S’Klallam Tribe. These reports, however, are intermittently published and distributed only as funding permits.

3.4.2 Water Quality Monitoring

As we have learned in Section 3.2, water quality monitoring is ongoing in the Sequim Bay Watershed. The Clallam County Streamkeepers and the Jamestown S’Klallam Tribe conduct
monitoring at sampling stations throughout the watershed. The Streamkeepers also offer citizen participation through volunteer projects.

I do think, however, that the comprehensive nature and methods of data collection and monitoring could be improved. A large percentage of total stream miles within the Sequim Bay watershed remain unassessed for fecal pollution, and the greatest concentration of samples in tributaries are collected in the lower reaches. I want to emphasize that the data collection efforts throughout the Sequim Bay watershed deserve great recognition and applause, especially considering the negligible manpower and funding behind these efforts over the years.

Monitoring, however, has not always been consistent in both time and location. Additionally, funding to accomplish long-term monitoring has not always been available.

3.4.3 Quality Assurance

Quality assurance controls for monitoring programs are important to ensure scientific validity. Controls employed in water quality data collection for this research included some data collection by different agencies at the same sampling site, which offer cross-referencing of data. The Jamestown S’Klallam Tribe (Tribe) addressed their field and laboratory sample variability by using duplicate samples at various stages of the sample process. Total variation for field sampling and laboratory analysis of nutrient samples were assessed by collecting one duplicate for every ten samples collected (L. Delorm, pers. comm.), which I think is too little, and could be increased to improve validity. For fecal coliforms, the Clallam County Streamkeepers conducted one field and lab replicate for every ten samples, and also used pre- and post-blanks (Streamkeepers, 2010). Again, replication may be an issue.
3.4.4 Community Recognition

The Watershed Management Committee believed that by recognizing farmers and land owners for implementing innovative and effective water quality protection practices, it would help encourage continued efforts to maintain awareness and stewardship. In compliance with this recommendation, in 1990, a new award called the Environmental Stewardship Award recognizing significant land owner efforts to conserve the county’s water and environmental quality was awarded to six Sequim citizens, organizations, businesses and projects. A panel of local citizens selected the Sequim winners (Sequim Gazette 1990).

The Environmental Stewardship Award was only offered for a few years, and the discontinuation of the award had a dampening effect on spirits and the idea of continued support for the public and their willingness to actively participate in water quality management (K. Baril, pers. comm.).

3.4.5 Summary Synthesis of Priority 4 Implementation and Success

Priority 4 unfortunately was the least implemented. The most successful elements of this priority were the continuation of water quality assessments and field data collection. Monitoring of the Sequim Bay watershed is ongoing, although perhaps not as comprehensive as I believe the SBWMP intended. Frequency and consistency of collection locations could be improved; therefore, I scored these elements a ‘2’. Employing only one field duplicate for every ten field samples collected is insufficient and scores a ‘2’ for quality assurance.

I gave a score of ‘1’ to the element addressing the facilitation of regular meetings, as for the most part, meaningful planning efforts focused on the Sequim Bay watershed stopped after funding ran out around 1991.
Because the Sequim Bay Watershed Committee no longer meets or provides meaningful oversight and participation to watershed efforts, I scored the elements regarding sustainability of the committee a ‘0’. Elements addressing adjustments to the SBWMP have not been sustained and were all also scored ‘0’, resulting in an overall average score of ‘1.0’ for Priority 4.

3.5 Administration of Plan

Assessment of the administration of the SBWMP focuses on the implementation of the recommended actions and whether they have or have not been sustained over the years. Equally important is the analysis of adequate funding for plan administration, and analysis of the level of ongoing cooperation among local, State, and Federal agencies.

3.5.1 Watershed Committee

The Sequim Bay Watershed Management Committee played a key role in the success of planning of the SBWMP. The Watershed Management Committee was able to develop a grassroots (unconventional) approach to watershed planning, establish community ownership of the SBWMP, and ensure continued consensus building throughout the early stages of the plan. The Watershed Management Committee accomplished such things as writing water quality monitoring plans, approving educational plans, reviewing educational and enforcement protocols, and growth management planning (DCD 1991).

Initially, the Watershed Management Committee met almost daily. They met quarterly during 1991. A report released at the end of 1991, reported attendance at meetings was not as high as desirable, ranging from a high of 11 in attendance to a low of six (25 percent) (DCD 1991). A letter sent to the Port of Port Angeles dated September 25, 1996 stated that “since 1992 when grant funding ran out, there has been no single group coordinating implementation of the Sequim Bay Plan,” (DCD 1996).
The Dungeness River Management Team (DRMT) convened to create the Dungeness-Quilcene Water Resources Management Plan around this same time period, and several of the Sequim Bay Watershed Management Committee members joined the DRMT to assist in Dungeness planning efforts (K. Baril, A. Seiter, and Anonymous, pers. comm.).

Successful implementation of the SBWMP required effective and ongoing planning and oversight by the Watershed Management Committee, but unfortunately, there was no real committee presence much beyond 1991.

3.5.2 Funding

Lead, support, and cooperating implementing agencies all reported lack of funding as a major limiting factor in fully implementing the SBWMP (A. Brastad, D. Freed, K. Baril, R. Amundson, J. Holtrop, pers. comm.).

Initial funding for the implementation of the SBWMP was provided through Centennial Clean Water Fund grants with a 25 percent match from Clallam County (DCD 1991). These original funds provided substantial support in early implementation strategies; however, these funds were exhausted by 1992. Clallam County had hoped to initiate as much as 90 percent of all the SBWMP’s recommended actions by the end of the implementation grant’s two year term in December of 1992. This could only be accomplished, however, through expanded efforts of the Sequim Bay Watershed Committee, Water Quality Office staff, and community at large (DCD 1991). Unfortunately at this key time in the implementation process for the SBWMP, the majority of the Watershed Committee was already absorbed into the Dungeness River Management Team and planning efforts for Dungeness Bay.

The focus of watershed planning has also evolved several times since SBWMP inception, making acquiring funds difficult when the State no longer shares the same vision for improving
water quality. The Jamestown S’Klallam Tribe was able to acquire funds to begin the Jimmycomelately Creek Restoration Project in the mid-1990s, which accomplished several pending recommended actions in the SBWMP.

In 2000, in an attempt to appropriate funding for further plan implementation, Clallam County formed a Shellfish Protection District; however, funds for the SBWMP were never acquired (J. Holtrop, pers. comm.). The Clallam County Streamkeepers have also acquired small amounts of funding through the years to continue their water and sediment monitoring of the Sequim Bay watershed.

3.5.3 Evolving Approach to Watershed Planning

Water Resource Inventory Areas (WRIAs)\textsuperscript{12} are areas designated by the State of Washington to delineate watershed boundaries within the state for management purposes (GSRO 2009). The establishment of WRIAs as the organizing geographical unit in watershed planning by the State of Washington in 1998 (90.54 RCW), is thought to have resulted in the unfortunate situation where continued implementation of many of the provisions of the SBWMP, even under different agencies, were suspended until planning anew was completed for WRIA 17, which initially included the Sequim Bay watershed.

Then in 2001, under a Memorandum of Agreement between the WRIA 17 Planning Unit and WRIA 18 Initiating Governments, it was agreed that the westernmost portions of WRIA 17, where Sequim Bay is located, was to be included in WRIA 18, and their subsequent Elwha-Dungeness WRIA 18 Plan (Elwha-Dungeness Watershed Plan 2005). This reorganization obviously resulted in more deadtime for the Sequim Bay watershed.

\textsuperscript{12} WRIAs were formalized under Washington Administrative Code (WAC) 173-500-040 and authorized under the Water Resources Act of 1971, Revised Code of Washington (RCW) 90.54 and were updated in 1998 and 2000 (DOE 2009).
Before planning efforts could refocus on Sequim Bay, another change in state watershed planning arose focusing on water *quantity* not *quality*. This new focus on quantity superseded the SBWMP in terms of large scale planning addressing quality, further exacerbated declining agency support for the SBWMP.

This most recent evolution in watershed planning, Instream Flows, is now underway. Instream flows are usually defined as the stream flows needed to protect and preserve instream resources and values, such as fish, wildlife and recreation (DOE 2010). Instream Flow Rules for both WRIA 17 and WRIA18 are currently being written but still there is a disconnect. The implementing agencies decided not to include Sequim Bay in either WRIA 17 or WRIA 18 Instream Flow Rules, but rather recommended addressing the Sequim Bay watershed in an amendment to the WRIA 17 rule, once the Instream Flow Rules have been written for WRIA 17 and WRIA 18 (A. Soule, pers. comm.). This continual *passing off* of the Sequim Bay watershed, I believe, could result in declining water quality and shellfish bed closures in the Bay.

3.5.4 Implementation of Recommended Actions

A progress report on the SBWMP released in December 1991 stated that 60 of the 85 recommendations were in progress, completed, or on the immediate agenda (DCD 1991). According to my research, I determined 57 of the 85 SBWMP recommendations were fully successful and sustained. This means since 1991, some of the recommendations that were already underway, for some reason, terminated. Furthermore, it is apparent that no more, or not many more recommendations were successfully implemented after 1991. This would indicate that forward momentum for implementation of the SBWMP had already climaxed by late 1991, and was already beginning to decline.
3.5.5 Summary Synthesis of Plan Administration Implementation and Success

Administration of the SBWMP began with full force. There was high energy and funding to drive initial implementation of the recommended actions; and cooperation among agencies was strong, offering full support and response to the SBWMP. Soon (1992), however, as funding ran out and implementing supporting agencies went separate ways, implementation of the SBWMP essentially came to an end.

Sequim Bay watershed planning has been delayed many years by adoption and implementation of the WRIA provisions. It can be said that elements of the SBWMP live on in activities taken by the Dungeness River Management Team and by WRIA 17 and WRIA 18 but the plan as envisioned no longer exists. For these reasons, I scored these elements a ‘2’. Since the early years of SBWMP implementation, sources of funding have been a real issue for the continued implementation of the SBWMP, so this is scored a ‘1’. Finally, because the Sequim Bay Watershed Management Committee does not convene any longer, I scored this a ‘0’, resulting in an overall average score of ‘1.5’ for Plan Administration.

3.6 Summary Synthesis of Plan Implementation and Success

Table-3 compiles the assigned plan priority scores described throughout Section 3.0.
Table-3: Implementation and Success Table

### IMPLEMENTATION SUCCESS

*Implementation success is measured on a four-point scale based on sound scientific judgment, cognizant interviews, and written hard evidence.*

<table>
<thead>
<tr>
<th>Ratings and Scores:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Not successful</td>
</tr>
<tr>
<td>5</td>
<td>Somewhat successful</td>
</tr>
<tr>
<td>6</td>
<td>Substantially successful</td>
</tr>
<tr>
<td>7</td>
<td>Very successful</td>
</tr>
</tbody>
</table>

#### Priority 1: Education and Public Participation

<table>
<thead>
<tr>
<th>Question</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Has information generally been made widely available? Have brochures been distributed? Workshops held?</td>
<td>2</td>
</tr>
<tr>
<td>Is there an ongoing public education program such as BAY WATCHERS in the local schools?</td>
<td>3</td>
</tr>
<tr>
<td>Have water quality programs been implemented with community support? Is there general, broad-based community support for and involvement in water quality issues?</td>
<td>3</td>
</tr>
<tr>
<td>Have citizens been involved in collecting data and evaluating it where possible (WAC 400-12-510)?</td>
<td>3</td>
</tr>
</tbody>
</table>

**AVERAGE:** 2.75

#### Priority 2: Keep Things Out of Water

<table>
<thead>
<tr>
<th>Question</th>
<th>Score</th>
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</thead>
<tbody>
<tr>
<td>Have there been reductions in levels of fecal coliform, sediment, chemicals and plastics in water?</td>
<td>1</td>
</tr>
<tr>
<td>Have BMPs been implemented by local landowners?</td>
<td>2</td>
</tr>
<tr>
<td>Were the failing culverts and slides repaired?</td>
<td>3</td>
</tr>
<tr>
<td>Is there effective streamside protection in the watershed?</td>
<td>2</td>
</tr>
<tr>
<td>Are water quality violations adequately enforced?</td>
<td>1</td>
</tr>
<tr>
<td>Have there been adjustments to the plan as necessary to achieve the goals?</td>
<td>0</td>
</tr>
<tr>
<td>Has there been a steady use of sewage pumpout and waste disposal facilities at marinas?</td>
<td>3</td>
</tr>
<tr>
<td>Have marina receipts provided to all users and overnighters included boater education information?</td>
<td>0</td>
</tr>
</tbody>
</table>

**AVERAGE:** 1.5
**IMPLEMENTATION SUCCESS**

*Implementation success is measured on a four-point scale based on sound scientific judgment, cognizant interviews, and written hard evidence.*

<table>
<thead>
<tr>
<th>Ratings and Scores:</th>
<th>4 – Not successful</th>
<th>5 – Somewhat successful</th>
<th>6 – Substantially successful</th>
<th>7 – Very successful</th>
</tr>
</thead>
</table>

**Priority 3: Habitat Protection and Enhancement**

<table>
<thead>
<tr>
<th>Question</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have wetlands been protected?</td>
<td>3</td>
</tr>
<tr>
<td>Has stream habitat been improved or rehabilitated?</td>
<td>3</td>
</tr>
<tr>
<td>Are citizens involved in rehabilitation and enhancement projects for fish? Wildlife? Habitat and vegetation?</td>
<td>3</td>
</tr>
<tr>
<td>Is there a general stewardship ethic in the community?</td>
<td>3</td>
</tr>
</tbody>
</table>

**AVERAGE:** 3

**Priority 4: Implementation with ongoing coordinated funding, monitoring, and citizen oversight and participation**

<table>
<thead>
<tr>
<th>Question</th>
<th>Score</th>
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</thead>
<tbody>
<tr>
<td>Is there continued assessment of water quality parameters and characteristics?</td>
<td>2</td>
</tr>
<tr>
<td>Have there been adjustments or revisions to the original recommendations?</td>
<td>0</td>
</tr>
<tr>
<td>Is the general objective of the plan being achieved?</td>
<td>1</td>
</tr>
<tr>
<td>Have there been regular reports and meetings with the public?</td>
<td>1</td>
</tr>
<tr>
<td>Have field data collection techniques emphasized visual evaluations of land use activities and physical conditions of water, stream banks, and habitats? (WAC 400-12-510)</td>
<td>2</td>
</tr>
<tr>
<td>Has the monitoring program been adequate, frequent and valid to accurately evaluate implementation of the program?</td>
<td>1</td>
</tr>
<tr>
<td>Does the monitoring program include quality assurance controls and scientific validity?</td>
<td>2</td>
</tr>
<tr>
<td>Has the overall trend in nonpoint pollution decreased?</td>
<td>1</td>
</tr>
<tr>
<td>Are there measureable improvements from BMPs?</td>
<td>1</td>
</tr>
<tr>
<td>Has the Watershed Committee continued to have a meaningful participation in all phases of plan implementation and evaluation?</td>
<td>0</td>
</tr>
<tr>
<td>Does the Watershed Committee continue to represent the broad and diverse interests in the Watershed and make their decisions by consensus?</td>
<td>0</td>
</tr>
</tbody>
</table>

**AVERAGE:** 1.0
**IMPLEMENTATION SUCCESS**

*Implementation success is measured on a four-point scale based on sound scientific judgment, cognizant interviews, and written hard evidence.*

<table>
<thead>
<tr>
<th>Administration of Plan</th>
<th>Ratings and Scores:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Were the recommendations in the plan implemented?</td>
<td>1 – Not successful</td>
</tr>
<tr>
<td>Are local entities responsive to the plan recommendations?</td>
<td>4 – Somewhat successful</td>
</tr>
<tr>
<td>Were adequate funds available to implement the plan?</td>
<td>5 – Substantially successful</td>
</tr>
<tr>
<td>Was there a positive relationship with implementing and cooperating agencies?</td>
<td>6 – Very successful</td>
</tr>
<tr>
<td>Has there been successful cooperation with State and local agencies including SCS, Agriculture, DNR, the Port Authority, and Tribes (WAC 400-12-10)?</td>
<td>2</td>
</tr>
<tr>
<td>Does the Watershed Committee continue to have effective advisory and oversight role?</td>
<td>0</td>
</tr>
</tbody>
</table>

**AVERAGE:** 1.5

*TOTAL PLAN IMPLEMENTATION RATING*:

1.95

After compiling the scores of the individual plan priorities in Table-3, the overall subjective score is a 1.95, which rates the SBWMP as *somewhat successful*. 
4.0 SUMMARY AND CONCLUSIONS

Specifically, which SBWMP priorities and recommended actions have been implemented and successful, and which have not, are summarized below. For the latter, the reasons why are also included.

4.1 Synthesis of Data

Using Table-3 to synthesize the voluminous data base I collected and evaluated, the total average score for SBWMP implementation and success was 1.95 of a possible 3.0, which indicates that the plan has only been partly implemented and successful. The score of 1.95 falls between the ratings of somewhat successful and substantially successful, but still allows me to generally accept the hypothesis that says the priorities and recommendations of the SBWMP were for the most part implemented and successful. With respect to the water quality of the Sequim Bay watershed, I cannot be as unequivocal when accepting or rejecting the hypothesis. While there was measurable improvement in some metrics that resulted from SBWMP implementation, there also are some significant lingering water quality deficiencies.

4.2 Priorities and Recommended Actions That Have Been Fully Implemented and Their Success

Only one of the SBWMP’s overarching priorities, Priority 3 and its associated actions, in my opinion, can be considered as implemented completely and successfully. Priority 3 recommended actions focused on protection, and enhancement of habitat and biological diversity.

In particular, the Jimmycomelately Creek Restoration Project completed in late-2004, greatly improved spawning habitat for chum salmon and provided for improved passage for other salmonids spawning in the upper watershed. Bell Creek also has undergone some of the
most comprehensive restoration efforts in Clallam County. Projects included habitat restoration on private properties to eliminate cattle access, restoration and remeandering channels, addition of spawning gravel and large woody debris, and debris removal to increase flow capacity.

The realignment of Dean Creek significantly improved instream flow and reduced sedimentation that resulted in the frequent flooding of the creek. Revegetation improved salmonid habitat by more effectively shading the creek and reducing pollutant runoff into the stream. Remeandering Dean Creek, along with the strategic placement of native vegetation and groundcover in the riparian corridor and buffer areas assisted in reducing surface erosion into the creek.

4.3 Priorities and Recommended Actions That Have Not Been Fully Implemented

My research indicated that many of the recommended acts of Priorities 1, 2, and 4 were not fully implemented and therefore not completely successful.

4.3.1 Priority 1

The recommended actions under Priority 1 focused on education, technical assistance, and public involvement. Implemented actions included expanded volunteer programs, work with local media, holding annual conferences, creating additional outreach programs, and widespread posting of educational signs.

Initially the Watershed Committee published brochures and flyers and held an annual conference to evaluate plan progress. The WSU Cooperative Extension Services supported the volunteer group known as Baywatchers, and still sponsors Beachwatchers, a similar organization. The county has and continues to be responsible for signage.

Unfortunately, evolving State watershed planning efforts and eventual adoption of the WRIA concept brought about an early end to the SQWMP as we know it in 1992. The
subsequent lack of interest and funding by WRIA 17, and then by WRIA 18 in undertaking specific planning in support of Sequim Bay issues, in my opinion, continues to dampen enthusiasm for the task at hand and works against achieving a fully engaged public.

4.3.2 Priority 2

There were some successful projects achieved under Priority 2 that undoubtedly improved water quality in both Sequim Bay and some of its tributaries. These included to name a few: fixing the slide at Johnson Creek, removal of the log storage yard at the south end of Sequim Bay, outfitting the John Wayne Marina with a waste treatment technology, and implementing hazardous roundups and household waste recycling. However, many Priority 2 recommended actions were not implemented.

One of the key actions that was not implemented was failure to identify all parcels in the watershed which have the potential for degrading water quality. This would have facilitated work with property owners to develop an approved conservation plan for each parcel. Many of the degraded streams in the watershed are adjacent to agricultural lands where better BMPs could greatly improve water quality. Examples are the unbuffered farm land and residential properties along Bell Creek off Washington Harbor Road. Although the cattle were fenced out of the creek, the pasture was found to lack vegetative cover to reduce storm runoff into the creek. As a consequence, fecal coliform concentrations downstream of this area have shown elevated bacterial levels. Washington State Department of Health (DOH) also currently lists a Prohibited area where Bell Creek enters Washington Harbor and where Washington Harbor enters Sequim Bay, attributable to upstream pollution sources.

Sequim Bay’s Class AA (Extraordinary quality) classification and other accomplishments are at risk due to the continued presence of the DOH Prohibited beaches in Sequim Bay. The
beach closures are at the outfalls of most of the major tributaries indicating that these tributaries do not always meet the Class AA (Extraordinary quality) classification. Projects designed to decrease coliform pollution have not always been effective. This is not what was intended by the SBWMP.

Following adoption of the SBWMP, there also appeared to be an initial apprehensiveness by community leaders to enforce much needed regulations for on-site septic systems because they did not want to be seen as heavy-handed. Instead of effectively communicating the need for proper maintenance and/or repair of failed systems, the recommended actions lay dormant. This non-action, in my opinion, has contributed to the lingering coliform pollution in Sequim Bay’s major tributaries, which in the course of time has negatively affected Sequim Bay.

The passage of the 1990 Growth Management Act and associated provisions also disallowed extending a modern sewage system to housing on Sequim Bay, resulting in the persistence of aged and failing septic systems throughout the watershed. Recently reported elevated levels of nutrients (total phosphates, total nitrates, and ammonia) found in Sequim Bay tributaries also can negatively affect fish and shellfish habitat.

4.3.3 Priority 4

This priority focused on implementation of water quality monitoring as well as citizen oversight and participation.

While water quality monitoring has continued over the years, it could be improved. Not every station was sampled each year and station locations changed frequently. Too few replicate samples are routinely collected. A large percentage of the total stream miles within the Sequim Bay watershed also remain unassessed for fecal pollution. Monitoring generally focuses on the lower reaches of the streams. The absence of effective forestry management in the Sequim Bay
watershed also has major implications pertaining to the legacy of unstable soils and landforms in the watershed.

Unfortunately, because implementation of the SBWMP largely ended in 1992, public participation and oversight in the original process also ended. While some of the original Sequim Bay watershed recommended projects have continued as the State’s strategy has evolved to embrace the WRIA concept, I do not think the level of public participation and oversight has been substantive during the ensuing years, because Sequim Bay watershed issues have largely been put on the back burner.

4.4 Legacy of the SBWMP

While the SBWMP may have been short-lived, I think the Sequim Bay community continues to reap the benefits of the many programs initiated in 1992 to improve Sequim Bay watershed water quality and fish and wildlife habitat. While there are still some water quality problem areas, most would agree that there have been notable improvements in the watershed. Salmon and other finfish are also better off now that their habitat has been rehabilitated. Salmon productivity appears to have increased and most of Sequim Bay is also still certified for producing shellfish. I think it is also fair to say that the principal supporting agency, Clallam County, has not lost its sense of purpose, and has continued to find ways to implement many of the SBWMP’s originally recommended actions, and with success.

The SBWMP was intended as a pioneering effort to safeguard valued resources from the impacts of nonpoint pollution, and in this regard it has lived-up to its billing. The planning was unique in that it was accomplished by local citizens and support was built by community education and participation in volunteer projects. All decisions were by consensus, which in the long run was generally satisfying to the participants, although the process took much longer to
run its course. Interviewees generally praised the planning process and recommended that it become a model for how community participation can improve the effectiveness of fish and shellfish habitat protection.
5.0 RECOMMENDATIONS

My research developed the following recommendations for future watershed planning efforts in the Sequim Bay watershed. These recommendations are based upon my interviews with key respondents and my evaluations of available data. Noted successes as well as shortcomings encountered in my review of the SBWMP planning and implementation processes are important foundations to these recommendations.

5.1 Accountability

There are a number of recommended actions in the SBWMP that were never determined as successful or not successful. This was due in part to not knowing who actually was responsible for assuring their implementation. Accountability should be required throughout implementation and should embrace an adaptive management approach in assuring success. As Sequim Bay resource issues are folded into the State’s evolving watershed management strategy, better defined roles among state WRIA planners, county agencies, local, and tribal entities will be needed to establish a better track record of accountability and improve the success rate of projects on the ground. Further, given the complexities of the issues, the problems to date, and the impacts of future decisions on the local economy, culture, ecology and politics, what perhaps is needed is some one individual in charge, a czar, that has decision making authority. It follows that this individual would be chosen by the state, county, local entities, and the tribe, and that these agencies would be responsible to appropriate funds to execute plans to continue improving water quality and wildlife habitat in the Sequin Bay watershed.

5.2 Communication

Facilitating more routine and meaningful communication among WRIA planning efforts, stakeholders, and the Sequim Bay watershed community is key to fulfilling the original
SBWMP’s implementation goals as well as the emerging WRIA 17 goals. This type of involvement could help facilitate better BMPs and the willingness to implement them by bringing a heightened level of awareness to the need for better stewardship among the affected parties. Better stewardship of natural resources does not need a rigid set of rules and agency administration. Rather, good stewardship is built on relationships, shared principles, and open lines of communication.

5.3 Quality Assurance

A frequent issue encountered in my research was inconsistency in water quality data collection. This included the too few samples collected, changing locations of sampling year to year, infrequent sampling, and a lack of sample replication. Reliability and scientific integrity of the data being analyzed can be highly affected when the methods used to collect the data are inconsistent and less than rigorous.

While many of the above deficiencies are likely traceable to a lack of continuing funding, I still must recommend that a more comprehensive and rigorous water quality sampling protocol be adopted. Use of additional sampling stations, a fixed set of sampling stations, more routine sampling, and greater replication could greatly help analysts recognize more clearly increasing or decreasing trends in the levels of pollutants over time, particularly for fecal coliforms. New technologies, e.g., DNA fingerprinting, to better determine and differentiate sources of fecal coliform pollution (animal versus human), could also be implemented.

5.4 Community Ownership

It is important for cognizant WRIA planning agencies to work closely with county officials and locals in the Sequim Bay watershed to reinstate community ownership in keeping Sequim Bay’s waters clean. In conducting this research, I found that people recalled quite vividly
the early stages of the planning process when the community was highly involved. Additionally, people recalled, and evidence shows more productivity and forward momentum in plan implementation during the beginning stages of the SBWMP process. The community shared a heightened level of community ownership of the SBWMP; they were excited to mobilize and see the plan through. Perhaps employing a large scale community based monitoring program could help regenerate that sense of community ownership of the Sequim Bay watershed. This would facilitate a higher level of involvement among the community and also foster a heightened level of awareness of water quality in the Bay.

5.5 Funding

Continuing funding is needed to support water quality monitoring of the Sequim Bay watershed. Small permit fees and recreational charges, or even a small increase in property taxes, may be necessary to generate these funds. Grants are available through several organizations and government agencies, and these monies need to be continually sought to assure continuous and meaningful water quality data collection and analyses. Furthermore, funding is rarely available in the quantities that might be needed; and in such situations, the application of good management practices, such as efficient coordination, appropriate investments, and the involvement of volunteers are critical to the process of setting and achieving planning goals.


Clallam County Department of Community Development. 1996. Dear Sequim Bay Watershed Management Committee Member. A letter sent by Clallam County, Washington.


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Appendices
# APPENDIX A: Implementing Agencies

<table>
<thead>
<tr>
<th>Agricultural Stabilization and Conservation Service (no longer exists)</th>
<th>Clallam County Water Quality Office (no longer exists)</th>
<th>Sequim Bay Watershed Management Plan Committee (no longer exists)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clallam County Building Office 223 East 4th Street, Suite 5 Port Angeles, WA 98362 360-417-2318</td>
<td>Clallam County Public Works Office 223 East 4th Street, Suite 6 Port Angeles, WA 98362 360-417-2319</td>
<td>Washington State Department of Parks and Recreation 360-902-8844 <a href="http://www.parks.wa.gov/">http://www.parks.wa.gov/</a></td>
</tr>
<tr>
<td>Clallam County Conservation District Contact: Joe Holtrop 1601 E. Front Street Suite A Port Angeles, WA 98362 360-452-1912 ext. 5</td>
<td>Jamestown S’Klallam Tribe Contact: Hansi Hals or Lori Delorm 1033 Old Blyn Highway Sequim, WA 98382 360-683-1109</td>
<td>Washington State Department of Fish &amp; Wildlife 360-902-2200 <a href="http://wdfw.wa.gov/">http://wdfw.wa.gov/</a></td>
</tr>
<tr>
<td>Clallam County Environmental Health Office Contact: Andy Brastad 223 East 4th Street, Suite 14 Port Angeles, WA 98362 360-417-2258</td>
<td>Port of Port Angeles John Wayne Marina Contact: Ron Amundson 338 West First Street Port Angeles, WA 98362</td>
<td>Washington State Department of Social and Health Service 800-737-0617 <a href="http://www.dshs.wa.gov/">http://www.dshs.wa.gov/</a></td>
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<tr>
<td>Clallam County Planning Office 223 East 4th Street, Suite 5 Port Angeles, WA 98362 360-417-2420</td>
<td>Local citizenry of the Sequim Bay watershed</td>
<td>Washington State University Cooperative Extension Contact: David Freed Clallam County Beachwatchers 223 East Fourth Street Port Angeles, WA 98362 360-565-2619</td>
</tr>
<tr>
<td>Washington State University Cooperative Extension Contact: David Freed Clallam County Beachwatchers 223 East Fourth Street Port Angeles, WA 98362 360-565-2619</td>
<td>United States Forest Service <a href="http://www.fs.fed.us/">http://www.fs.fed.us/</a></td>
<td>Washington State University Cooperative Extension Contact: David Freed Clallam County Beachwatchers 223 East Fourth Street Port Angeles, WA 98362 360-565-2619</td>
</tr>
</tbody>
</table>
APPENDIX B: Research Questionnaire

Administration of Plan

a. As best as you can recall, were the recommendations in the Plan implemented?
b. As far as you can tell, are/were local entities responsive to the Plan recommendations?
c. Do you think there are/were adequate funds to implement the Plan?
d. Was there a positive relationship with implementing and cooperating agencies?
e. Has/was there been successful cooperation with State and local agencies including SCS, Agriculture, DNR, the Port Authority, and Tribes (WAC 400-12-10)?
f. Does the Watershed Committee (or you) continue to have an effective advisory and oversight role?

Education and Public Participation

1. Has information generally been made widely available? Have brochures been distributed? Workshops held?
2. Is there an ongoing public education program such as BAY WATCHERS in the local schools?
3. Have water quality programs been implemented with community support? Is/was there general, broad-based community support for and involvement in water quality issues?
4. Have citizens been involved in collecting data and evaluating it where possible (WAC 400-12-510)?

Keep Things Out of Water

1. Have there been reductions in levels of fecal coliform, sediment, chemicals and plastics in water?
2. Have BMPs been implemented by local landowners?
3. Were the failing culverts and slides repaired?
4. Is there effective streamside protection in the watershed?
5. Are water quality violations adequately enforced?
APPENDIX B: Questionnaire (continued)

6. Have there been adjustments to the Plan as necessary to achieve the goals?

7. Has there been a steady increase in rate of use of sewage pumpout and waste disposal facilities at marinas?

8. Have marina receipts provided to all users and overnighters included boater education information?

Habitat Protection and Enhancement

1. Have wetlands been protected?

2. Has stream habitat been improved or rehabilitated?

3. Are citizens involved in rehabilitation and enhancement projects for fish? wildlife? habitat and vegetation?

4. Is there a general stewardship ethic in the community?

Implementation with ongoing coordinated funding, monitoring, and citizen oversight and participation

1. Is there continued assessment of water quality parameters and characteristics?

2. Have there been adjustments or revisions to the original recommendations?

3. Is the general objective of the Plan being achieved?

4. Have there been regular reports and meetings with the public?

5. Have field data collection techniques emphasized visual evaluations of land use activities and physical conditions of water, stream banks, and habitats? (WAC 400-12-510)

6. Has the monitoring program been adequate, frequent and valid to accurately evaluate implementation of the program?

7. Does the monitoring program include quality assurance controls and scientific validity?

8. Has the overall trend in nonpoint pollution decreased?

9. Are there measureable improvements from BMPs?
APPENDIX B: Questionnaire (continued)

10. Has the Watershed Committee continued to have a meaningful participation in all phases of Plan implementation and evaluation?

11. Does the Watershed Committee continue to represent the broad and diverse interests in the Watershed and make their decisions by consensus?

Lastly,

In the space below, please note any additional feedback on the Sequim Bay Watershed Management Plan implementation and/or planning process, current water and sediment quality, or any other information or issues you would like to share:
## Appendix C: Interviews Conducted / Correspondence Reviewed

<table>
<thead>
<tr>
<th>Name</th>
<th>Affiliation</th>
<th>Date of Interview/Initial Correspondence</th>
<th>Type of Correspondence</th>
<th>Location of Interview</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andy Brastad</td>
<td>EN VH</td>
<td>06-23-2010</td>
<td>Personal Interview</td>
<td>EN VH Office, Port Angeles, WA</td>
</tr>
<tr>
<td>Ann Seiter</td>
<td>WMC, Tribe</td>
<td>03-18-2010</td>
<td>Personal Interview</td>
<td>Jamestown S’Klallam Tribal Center, Blyn, WA</td>
</tr>
<tr>
<td>Ann Soule</td>
<td>EN VH</td>
<td>06-25-2010</td>
<td>Personal Interview/Email correspondence</td>
<td>EN VH Office, Port Angeles, WA</td>
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<td>Anonymous</td>
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<td>Anonymous</td>
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<td>09-27-2010</td>
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<tr>
<td>Cindy Swegele</td>
<td>DCD</td>
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<td>Dana Woodruff</td>
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<td>David Freed</td>
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<td>Jim Podlesny</td>
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## Appendix C: Interviews Conducted / Correspondence Reviewed (continued)

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<tr>
<th>Name</th>
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<tr>
<td>John Cambalik</td>
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<td>Julia Bos</td>
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<td>Katherine Baril</td>
<td>SBWMP Project Director, CES – Jefferson County</td>
<td>06-25-2010</td>
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<td>Lawrence Sullivan</td>
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<td>Lori Delorm</td>
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<td>Lyn Muench</td>
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<td>Robert Knapp</td>
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<td>Ron Amundson</td>
<td>John Wayne Marina</td>
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<td>Personal Interview</td>
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<td>Personal Interview</td>
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<td>08-20-2010</td>
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APPENDIX D: Interview Data Sheets

Interview Data Sheet
SBWMP Evaluation

Date: June 23, 2010

Name: Andy Brastad

Affiliation: Clallam County Department of Environmental Health

Location: Clallam County Office of Environmental Health
          Port Angeles, WA

Topics:

SBWMP Recommended Actions

Andy and I reviewed and discussed the SBWMP recommended actions listing the Office
of Environmental Health as an implementing agency.

Clean Water Workgroup

Brastad actively participates in Clallam County’s Clean Water Work Group (CWWG) and Septics Group. He provided me with a copy of the group’s Clean Water Herald that is published and sent out to the community (Recommendation B12) when funding is available. Focus is on the Clean Water Strategy Detailed Implementation Plan (Dungeness Plan, 2007). The CWWG focuses a lot in the Dungeness, but may also do some work in areas of the Sequim Bay Watershed. Liz Maier is a good one to ask about that.

Septics

Although Brastad agreed the park and lodge’s switch to sewer was beneficial to the water quality, he said views have somewhat changed about septics in the way it is portrayed in the SBWMP. When the Plan was being written, Brastad said that septic systems were viewed as a temporary solution until an alternative could be reached, and that it was once the goal to eventually have the majority of the watershed on a sewage system.

However, in an attempt to limit urban sprawl, passage of the 1991 Growth Management Act disallowed sewage systems outside areas designated as ‘Urban Growth areas’. This subsequently superseded SBWMP Recommendation B19. One exception to this is Carlsborg, a small town in the watershed that is highly supported in its current attempts to be re-designated as an Urban Growth area in order to be put on a sewage system.
APPENDIX D: Interview Data Sheets (A. Brastad interview continued)

Carlsborg’s geographical location was once a river bed, so the town essentially is on top of large river rocks with hardly any soil to absorb or filter a potential septic leak.

As septic systems’ interim status became more permanent, and after the passage of the Growth Management Act, recommendations suggesting education on alternative systems evolved into today’s brochures which now focus on septic education including proper septic maintenance.

Additional Comments:

- The Washington State Department of Ecology – Water Quality Section will likely have data collected per a NPDES permit.
- Andy and I discussed the improved water quality in the area after the log yard was removed, and also after Sequim Bay State Park and the adjacent lodge went from onsite septic to the City of Sequim’s sewer system.
- Salmon Recovery Projects in Bay helped water quality.
- For Implementing agency, IRR, contact Water Users Association.
- Septic can attribute to nutrient loading versus sewer systems.

Materials Provided:

- Clean Water Herald newsletter: Used to publish and send out per SBWMP Recommendation B12 when funding was available.
- Sewage Disposal Status of Developed Parcels in MRA Map: used to show permitting status of sewage disposal in area.
APPENDIX D: Interview Data Sheets

Interview Data Sheet
SBWMP Evaluation

Date: March 18, 2010

Name: Ann Seiter
Lyn Muench
Hansi Hals

Affiliation: Jamestown S’Klallam Tribe / Sequim Bay Watershed Management Committee members

Location: Jamestown S’Klallam Tribal Center
Blyn, WA

Topics:

Importance of the SBWMP

The SBWMP generated more public awareness with respect to things environmental. The City of Sequim was forced into an upgrade of their sewage treatment plant. The Port of Port Angeles was also forced to do things differently. *I took the latter to mean that the new John Wayne Marina had to operate with minimum impact on water quality. The Baywatchers kept the public aware of water quality.*

The log dump was also forced to make changes. It was finally bought out by the Tribe with help from local agencies.

The SBWMP was the first and guided other planning that followed.

Evolving Management Strategy for Watershed Management

Dungeness River Management Team formed in 1988 and eventually included Sequim Bay in their planning. They did not pay much attention initially to Sequim Bay matters. One reason why was the lack of public access in Sequim Bay, where there is public access to Dungeness Spit.

Additional Comments:

-Discussed the Jimmycomelately Project.
-Salmon restoration efforts.
-Local partnership of County, Tribe & Conservation District.
APPENDIX D: Interview Data Sheets (A. Seiter, L. Muench, and H. Hals interview continued)

- Septic system improvements.
- NOAA mapping toxic algal blooms.
- Gunstone’s harvest.
- Dairy farmer BMPs.
- Irrigation practices changed.
- Boater education.
- Sequim Bay State Park sewage system.

Possible Contacts:

- Kathrine Baril, WSU- Jefferson County
- Leanne Jenkins, Tribal Director of Planning
- Joe Holtrop, Conservation District
- Gary Smith, dairy farmer
- Harbor master at marina
APPENDIX D: Interview Data Sheets

Interview Data Sheet
SBWMP Evaluation

Date: June 25, 2010
Name: Ann Soule
Affiliation: Clallam County Department of Environmental Health
Location: Clallam County Office of Environmental Health
Port Angeles, WA

Topics:

WRUA Planning Efforts

Natural resource-wise, Sequim Bay Planning is done by DRMT. Sequim Bay has always been kind of the black sheep of WRIA 17 & 18. It is currently not covered in either WRIA 17 or 18, but will be addressed as an amendment to the WRIA 17 Rule. Instream Rules for WRIA 17 & 18 are currently being constructed. Once they are adopted, Sequim Bay will be addressed. Sequim Bay is not a priority right now. WRIA 18 (Dungeness Plan) is a priority because of the River and associated wildlife, species, etc.

SBWMP as a Pilot

The SBWMP was a pilot; Dungeness Plan was the first. The success of the SBWMP had great impact on getting the Dungeness funded. You need plans to justify grants. SBWMP had great influence on funding for the Dungeness and the Port Angeles Watershed Land Use Plan (under Growth Management Act).

Water Quality Office

In the late 1990s, the Department of Community Development created the Water Quality Office (WQ). The WQ was absorbed by the Planning Division, then Natural Resources, and then split into the Department of Environmental Health and Department of Natural Resources. See Cathy Lear for Natural Resources.

Outreach

- “Water Quality Tidings” (mostly for Dungeness)
- “Clean Water Herald” (mostly for Dungeness)
- Liz Maier and CD, CWWG, WSU do a lot of outreach
APPENDIX D: Interview Data Sheets (A. Soule interview continued)

- Septic System education flyers/newspaper inserts
- Nonpoint (often including data) flyers/newspaper inserts
- Clear Water Herald Septic Edition
- TRIBE does a lot of work.

Water Resource Planning in the late 1990s

Quilcene was the pilot, focused on ‘quantity’ not ‘quality’. The ‘new’ focus in watershed planning sort of superseded the SBWMP. Then in 2005, the Elwah-Dungeness WRIA 18 Plan integrated Sequim Bay & Dungeness into new plan. DRMT did make conscious effort to integrate SBWMP into new plan. Elwah-Dungeness now used as technical justification for more grant money (where SBWMP used to be).

Additional Comments:

- Electronic copy of Ed Chad’s project on watershed plan implementation.
- Check into grant proposals: 1989 Proposal for Dungeness & Port Angeles Land Use Plan.
- SBWMP Recommendations have been generalized to include all areas, not just Sequim Bay.
- Johnson & Bell Creek in the Dungeness Planning.
- As for groundwater: Density in Sequim Bay watershed not bad enough for concern; except for potential well over-pumping and subsequent sea water intrusion.
- Septic: 1991 Growth Management Act disallowed sewage systems outside Urban Growth Areas to prevent urban sprawl.

Materials Provided:

- Video: Sequim Bay, A Puget Sound Success Story
Interview Data Sheet
SBWMP Evaluation

Date: March 18, 2010

Name: Dana Woodruff
John Cambalik

Affiliation: Battelle Marine Sciences Laboratory
Puget Sound Partnership

Location: Sequim, WA

Topics:

- Discussed action areas.
- Irrigation pipelined now.
- Coastal reports (change analysis reports).
- Point-no point treaty council (analysis report).
- Recovery of summer chum.
- PSAMP: Puget Sound sampling update (every 2 years).
- Mesa Report – Clallam Resource Committee website.

Possible Contacts:

- Dave Shreffler
- Byron Rot, Senior Habitat Specialist, per recovery of summer chum

Materials Provided:

- Effectiveness Monitoring Study (Woodruff et al., 2009)
- Final EIS Appendices for the Wastewater Disposal System
- Puget Sound Partnership publications
## Interview Data Sheet

**SBWMP Evaluation**

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<thead>
<tr>
<th>Date:</th>
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<tbody>
<tr>
<td>Name:</td>
<td>David Freed</td>
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<tr>
<td>Affiliation:</td>
<td>Clallam County Beachwatchers</td>
</tr>
<tr>
<td>Location:</td>
<td>Clallam County WSU Cooperative Extension Services Office&lt;br&gt;Port Angeles, WA</td>
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### History of the Bay Watchers and Beachwatchers

Freed gave me as much of a history on the Bay Watchers as he knows. He explained that the Bay Watchers turned into the 8 Streams Project run by the Dept. of Community Development, then moved more towards monitoring, and then into the Beachwatchers in Island County, and then moved back to Clallam County. He had three notebooks of teachings by the Bay Watchers that he lent me. Freed explained that the Bay Watchers were more of a class with an actual curriculum, where the Beachwatchers are less classroom-driven. Beachwatchers have one summer of Bay water data.

### SBWMP Recommended Actions

David and I reviewed and discussed the SBWMP recommended actions listing the WSU Cooperative Extension Services as an implementing agency. Although, many of the actions were carried out at one time, Freed mentioned that a lot more things would be currently happening if there were funds.

### Additional Comments:

- State Dept. of Health Shellfish Program collects water samples in the Bay.
- Lab costs are huge; much more would happen is the money was there.
- Seemingly more bacterial threats than nutrients.
- Always the threat of spills.
- Better forest practices have improved water quality in the watershed.

### Other Possible Contacts:

- Kristen Cooly: Puget Sound Partnership
APPENDIX D: Interview Data Sheets (D. Freed interview continued)

- Janine Reed, ENVH: Onsite septic systems

**Materials Provided:**

- Brochure on tidepools and local wildlife
- Information on Beachwatcher Program
- Example volunteer schedule
- Three Baywatchers notebooks on teachings and doings
Interview Data Sheet  
SBWMP Evaluation

Date:       June 23, 2010

Name:       Ed Chad
            Robert Knapp

Affiliation:  Clallam County Streamkeepers

Location:    Clallam County Streamkeepers Office
            Port Angeles, WA

Topics:

Background on the Streamkeepers

Ed and Robert gave me an overview of what services the Streamkeepers provide for water quality in the Sequim Bay area. They also showed me their Streamkeeper database and gave directions on how to navigate through the system.

Additional Comments:

- See TWG Data on Johnson and Bell Creek: ask Ann Soule.
- See Dana’s study: Effectiveness Monitoring of FC Bacteria and Nutrients in the Dungeness Watershed, Washington.

Materials Provided:

- SK database
APPENDIX D: Interview Data Sheets

Interview Data Sheet
SBWMP Evaluation

Date: June 23, 2010

Name: Ron Amundson
Jesse Waknitz

Affiliation: John Wayne Marina
Port of Port Angeles

Location: John Wayne Marina Harbormaster’s Office
Port Angeles, WA

Topics:

SBWMP Recommended Actions

Ron, Jesse, and I reviewed and discussed the SBWMP recommended actions listing the Port of Port Angeles as an implementing agency, and also discussed any recommendations pertaining to the marina.

Ron showed me around the marina where I saw several signs and information posted as recommended by the Plan. A kiosk was built in the marina’s main parking lot depicting critical habitat and marine life in the area (SBWMP Recommendation E8). The kiosk also held several brochures on marine-related education. Flyers were posted in the Harbor Master’s Office for different boater education courses offered throughout the community (SBWMP Recommendation B21). A meter was installed on the pumpout station as recommended by the Plan. The intention for this recommendation was to be able to track and estimate increased usage of the pumpout station. The actual data is not kept at the marina; however, Jesse gave me the contact information to locate the historical data for the station’s use. Ron showed me the inside of the many Oil Response Kits located at each dock (SBWMP Recommendation T11). The Jamestown S’Klallam Tribe (TRIBE) also provided the marina with a Spill Response Trailer that holds additional cleanup materials.

Additional Comments:

- Overall, Amundson and Waknitz both felt water quality at the marina is currently good. Amundson said patrons of the marina are fairly compliant with rules and respect the regulations.
- Has no further recommendations for improved water quality in his experience as Harbormaster (since 1992).
APPENDIX D: Interview Data Sheets (R. Amundson and J. Waknitz interview continued)

- Water quality workshops are available.

Materials Provided:

- Jesse provided then Port Official, Ken Sweeney’s WMC notes from the planning process. Sweeney was the Port Official at the time of the planning process for the Sequim Bay Watershed Management Plan (SBWMP), and he was also a Sequim Bay Watershed Management Committee Member (WMC).
- Jesse provided last meeting notes from 1996 per Recommendation I8.
- Ron provided a copy of the boaters manual.
- Ron provided an example BMP flyer posted at the marina.
APPENDIX D: Interview Data Sheets

Interview Data Sheet
SBWMP Evaluation

Date: September 20, 2010
Name: Jim Podlesny
Affiliation: Clallam County Department of Planning
Location: Telephone Interview

Topics:

SBWMP Recommended Actions

Jim and I reviewed and discussed the SBWMP recommended actions listing Clallam County Department of Planning as an implementing agency.

Additional Comments:

- Discussed Shoreline Management Program Critical Areas Code (27.12.2.15).
- Discussed Critical Areas Map with state and stream layer, provided and adopted.

Other Possible Contacts:

- Tom Chindler, GIS Data Coordinator
- Susan Lunsted, State Tech
APPENDIX D: Interview Data Sheets

Interview Data Sheet
SBWMP Evaluation

Date:  June 24, 2010
Name:  Joe Holtrop
Affiliation:  Clallam Conservation District
Location:  Clallam Conservation District Office
           Port Angeles, WA

Topics:

SBWMP Recommended Actions

Joe and I reviewed and discussed the SBWMP recommended actions listing the Clallam
Conservation District as an implementing agency.

Water Quality Office

The Water Quality (WQ) office is no longer in place; ask Ann Soule about WQ. For
more information on WQ contact Tim McNulty, Education Coordinator for the Clallam County
WQ office. Jeff Bowman was also involved in the WQ office – may work for DNR or Forestry
now.

Thoughts on the SBWMP

The SBWMP was first of its kind. There have been several subsequent plans since. The
SBWMP engaged a lot of people. Joe thinks the SBWMP was a successful plan.

Additional Comments:

- Water quality gets good newspaper coverage in regards to reaching the general public.
- The CD is grant funded, so everything they do relies on receiving grants.
- Many of the recommended actions related to education and outreach seem to be things
  that have always been ongoing, even before the Plan.
- As a member of the general public, Joe doesn’t feel like he’s been approached too much
  about water quality in his community; everything he knows is through work.
APPENDIX D: Interview Data Sheets (J. Holtrop interview continued)

Materials Provided:

- Memorandum of understanding between Clallam County Division of Water Quality and Clallam Conservation District per SBWMP Recommendation B3
- SBWMP Recommendation B7:
- SBWMP Recommendation B9: Ongoing award or honor program for Clallam County farmers and landowners
APPENDIX D: Interview Data Sheets

Interview Data Sheet
SBWMP Evaluation

Date: June 25, 2010

Name: Katherine Baril

Affiliation: SBWMP Project Director, CES – Jefferson County

Location: Port Townsend, WA

Topics:

SBWMP Recommended Actions

Katherine and I reviewed and discussed the implementation of the SBWMP, as well as plan administration. Katherine discussed the planning process and the general feelings and emotions that fueled this Plan. Katherine believes the SBWMP was hugely successful; however, also sadly believes it was not followed through as the years went on. Katherine also said that many of the Sequim Bay Watershed Committee Members went on to work on the Dungeness planning process.

Thoughts on the SBWMP

The SBWMP was innovative & successful. It had a grassroots (unconventional) approach. Before, there was no consensus model. There was more community involvement than usual. There was agreement among citizens. Citizens were not just an advisory position; there was an empowerment of the people. The SBWMP was about changing hearts and minds. SBWMP only plan with no legal appeals.

Suggestions for Success

Some suggestions Katherine offered as key to successful Plan implementation include: citizen monitoring, continually innovative to keep interest, keep as non-profit (don’t institutionalize), and keep reminding the community of its accomplishments. Needs to be continually innovative to keep interest.

Additional Comments:

- Katherine suggested that I look into other watershed groups to see how they approached the planning process and see what outcomes they ended up with as a comparison to the SBWMP planning process.
• The County doesn’t do ongoing award or honor programs for Clallam County farmers and landowners.
• The Plan isn’t legally binding anymore, it’s solely advisory. Used to be, but after initial grant monies, no one was actually liable for carrying out the plan in full.
• Katherine believed the SBWMP helped obtain funding for Jimmycomelately Restoration and Peabody Creek.
• Watershed planning not as effective if public is not fully involved.
• Can’t be top-down (lacks innovation and ongoing support).
• Citizen monitoring: Salmon in your backyard, and Shellfish in your front yard.
APPENDIX D: Interview Data Sheets

Interview Data Sheet
SBWMP Evaluation

Date: March 19, 2010

Name: Liz Maier

Affiliation: Clallam County Department of Environmental Health

Location: Clallam County Office of Environmental Health
Port Angeles, WA

Topics:

Liz Maier, Clallam County Environmental Specialist II, specializes in surface water quality and she was very helpful in explaining where we may find data on beach closures and information on shellfish.

She also introduced us to a very helpful website and also led us to another local organization, the Streamkeepers.

Possible Contacts:

- Clean water work group
- Ann Soule, Hydrogeologist involved in WRIA 18 planning
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<th>Date:</th>
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<tr>
<td>Name:</td>
<td>Commissioner Steve Tharinger</td>
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<tr>
<td>Affiliation:</td>
<td>Clallam County</td>
</tr>
</tbody>
</table>
| Location:    | Clallam County Commissioner’s Office       
               | Port Angeles, WA |

**Topics:**

**SBWMP Recommended Actions**

Commissioner Tharinger and I reviewed and discussed some of the SBWMP recommended actions including, the Sequim Sewage system, John Wayne Marina, replacement of culvert in west Sequim Bay.

**Additional Comments:**

- Planning efforts have evolved into Action Areas.
- Other plans to refer to:
  - DQ Plan
  - Metow Plan

**Possible Contacts:**

- Protect the Peninsula’s Future
- Jeff Rob, Port Commissioner per monitoring protocol
- Andy Brastad, Clallam County Environmental Health Manager
- Sean Hynes, Water Conservation District, nonpoint
- Randy Johnson, Jimmycomelately restoration
Introduce Data Sheet
SBWMP Evaluation

Date: July 7, 2010
Name: Anonymous #1
Affiliation: Sequim Bay Watershed Management Committee Member
Location: NA – Questionnaire

Topics:

Thoughts on the SBWMP as it was being created

I was very apprehensive about the process when it began. As we worked through the consensus process, which was very time consuming but did get everyone understanding the issues in the drainage, I became more comfortable with the plan. We had a good group of people on the committee and compromise was accepted as a solution.

What the SBWMP achieved

We definitely have cleaner water going into Sequim Bay and a general education on water quality was started. It increased the awareness of water quality issues without getting in people’s faces.

What the SBWMP didn't achieve

I have not kept up with water quality data for Sequim Bay but I believe there are still red tide problems so not all water issues have been solved.

Is water quality in the watershed better, worse or the same since SBWMP adoption?

Definitely better.

Did the SBWMP 'safeguard' Sequim Bay?

Yes.
Public education and outreach efforts pertaining to water quality and BMPs

There is continuous work being done on water quality in this county. There is a goodly amount of published information specific to our county/watershed. The current water quality effort is being made in the area of storm water and septic discharge.

Additional Comments:

- There is also an effort being made to reuse the city sewer discharge which will keep that out of the bay.
Date: September 27, 2010
Name: Anonymous #2
Affiliation: Sequim Bay Watershed Management Committee Member
Location: NA – Telephone Interview

Topics:

- Contentious planning effort.
- Did do some shoreline cleanup.
- Department of Ecology (DOE) brought many of the actions to the table not developed by the Watershed Committee.
- Marine mammals were not adequately addressed. We needed to keep them from eating the salmon, but DOE wouldn’t do anything.
APPENDIX D: Interview Data Sheets

Interview Data Sheet
SBWMP Evaluation

Date: September 28, 2010

Name: Anonymous #3

Affiliation: Sequim Bay Watershed Management Committee Member

Location: NA – Questionnaire

Administration of Plan

1. As best as you can recall, were the recommendations in the Plan implemented?
   No.

2. As far as you can tell, are/were local entities responsive to the Plan recommendations?
   Forgotten plan but they might be responsive.

3. Do you think there are/were adequate funds to implement the Plan?
   ?

4. Was there a positive relationship with implementing and cooperating agencies?
   Better than the past.

5. Has/was there been successful cooperation with State and local agencies including SCS, Agriculture, DNR, the Port Authority, and Tribes (WAC 400-12-10)?
   Yes.

6. Does the Watershed Committee (or you) continue to have an effective advisory and oversight role?
   No.

Education and Public Participation

1. Has information generally been made widely available? Have brochures been distributed?
   Workshops held?
   In the past, at the time.

2. Is there an ongoing public education program such as BAY WATCHERS in the local schools?
   Bay Watchers were in the county early on – now Streamwatchers.
APPENDIX D: Interview Data Sheets (Anon. #3 continued)

3. Have water quality programs been implemented with community support? Is/was there general, broad-based community support for and involvement in water quality issues?
   *Very positive.*

4. Have citizens been involved in collecting data and evaluating it where possible (WAC 400-12-510)?
   *Yes.*

Keep Things Out of Water

1. Have there been reductions in levels of fecal coliform, sediment, chemicals and plastics in water?
   *Yes.*

2. Have BMPs been implemented by local landowners?
   *Yes.*

3. Were the failing culverts and slides repaired?
   *Yes.*

4. Is there effective streamside protection in the watershed?
   *Yes.*

5. Are water quality violations adequately enforced?
   ?

6. Have there been adjustments to the Plan as necessary to achieve the goals?
   ?

7. Has there been a steady increase in rate of use of sewage pumpout and waste disposal facilities at marinas?
   ?

8. Have marina receipts provided to all users and overnighters included boater education information?
   ?

Habitat Protection and Enhancement

1. Have wetlands been protected?
   *There are efforts to enforce rules.*
2. Has stream habitat been improved or rehabilitated?
   Yes.

3. Are citizens involved in rehabilitation and enhancement projects for fish? wildlife? habitat and vegetation?
   Some, used to be more I think.

4. Is there a general stewardship ethic in the community?
   Implementation with ongoing coordinated funding, monitoring, and citizen oversight and participation

1. Is there continued assessment of water quality parameters and characteristics?
   Yes.

2. Have there been adjustments or revisions to the original recommendations?
   ?

3. Is the general objective of the Plan being achieved?
   ?

4. Have there been regular reports and meetings with the public?
   There is a River Management Team, or Dungeness River Management Team.

5. Have field data collection techniques emphasized visual evaluations of land use activities and physical conditions of water, stream banks, and habitats? (WAC 400-12-510)
   ?

6. Has the monitoring program been adequate, frequent and valid to accurately evaluate implementation of the program?
   ?

7. Does the monitoring program include quality assurance controls and scientific validity?
   ?

8. Has the overall trend in nonpoint pollution decreased?
   Possibly.

9. Are there measureable improvements from BMPs?
   Possibly.
APPENDIX D: Interview Data Sheets (Anon. #3 continued)

10. Has the Watershed Committee continued to have a meaningful participation in all phases of Plan implementation and evaluation?
   No.

11. Does the Watershed Committee continue to represent the broad and diverse interests in the Watershed and make their decisions by consensus?
    No.

Lastly,

In the space below, please note any additional feedback on the Sequim Bay Watershed Management Plan implementation and/or planning process, current water and sediment quality, or any other information or issues you would like to share:

   As Eloise Kaitlin (leader of Protect the Peninsula’s Future) said, the most obvious implementation was the stopping of creosote pilings being used. Also, the creation of the Dungeness River Management Team which still has regular meetings and minutes.
Interview Data Sheet
SBWMP Evaluation

Date: October 4, 2010
Name: Anonymous #4
Affiliation: Sequim Bay Watershed Management Committee Member
Location: NA – Questionnaire

Administration of Plan

1. As best as you can recall, were the recommendations in the Plan implemented? Some of them. I know the log yard was eliminated. The removal of the RV Park and restoration of Jimmycomelately Creek has been very good!

2. As far as you can tell, are/were local entities responsive to the Plan recommendations? Yes.

3. Do you think there are/were adequate funds to implement the Plan? Probably not.

4. Was there a positive relationship with implementing and cooperating agencies? Seems to be.

5. Has/was there been successful cooperation with State and local agencies including SCS, Agriculture, DNR, the Port Authority, and Tribes (WAC 400-12-10)? Mostly. I don’t know if the Port has been involved. DNR had rented the log yard land to Dunlap Towing (or such).

6. Does the Watershed Committee (or you) continue to have an effective advisory and oversight role? Neither are involved. The oversight and implementation was taken over by the Dungeness River Management Team, the County, the Jamestown S’Klallam Tribe, and some help from WDFW, and other agencies (USFWS).

Education and Public Participation

1. Has information generally been made widely available? Have brochures been distributed? Workshops held? On the county website, and through Streamkeepers.
2. Is there an ongoing public education program such as BAY WATCHERS in the local schools?
   I believe that Streamkeepers goes to the schools. Most of the emphasis would be on water quality and fish life in the streams and rivers.

3. Have water quality programs been implemented with community support? Is/was there general, broad-based community support for and involvement in water quality issues?
   Yes. DOE is viewed as heavy-handed and manipulating by many. Everyone cares about our water quality. There is not enough money to do everything. Some programs are seen as over-kill and over-regulatory – But, in general, the people work with the county and with the Conservation District.

4. Have citizens been involved in collecting data and evaluating it where possible (WAC 400-12-510)?
   Streamkeepers.

Keep Things Out of Water

1. Have there been reductions in levels of fecal coliform, sediment, chemicals and plastics in water?
   A lot of the fecal coliform comes from seabirds, seals, and wildlife.

2. Have BMPs been implemented by local landowners?
   Yes – with help from the Clallam County Conservation Districts. And, the Tribe is a major property owner, who uses BMPs.

3. Were the failing culverts and slides repaired?
   I know some were for sure. Doubt all of them were.

4. Is there effective streamside protection in the watershed?
   Mostly, yes.

5. Are water quality violations adequately enforced?
   Some are. Some aren’t. People try to take good care of Sequim Bay.

6. Have there been adjustments to the Plan as necessary to achieve the goals?
   Out of my hands.

7. Has there been a steady increase in rate of use of sewage pumpout and waste disposal facilities at marinas?
   Hope so. Don’t know.
APPENDIX D: Interview Data Sheets (Anon. #4 continued)

8. Have marina receipts provided to all users and overnighters included boater education information?
   Probably.

Habitat Protection and Enhancement

1. Have wetlands been protected?
   Yes.

2. Has stream habitat been improved or rehabilitated?
   Jimmycomelately and Dean Creeks.

3. Are citizens involved in rehabilitation and enhancement projects for fish? wildlife? habitat and vegetation?
   School kids, Streamkeepers, volunteers, and private property owners, through the Conservation District.

4. Is there a general stewardship ethic in the community?
   Yes!

Implementation with ongoing coordinated funding, monitoring, and citizen oversight and participation

1. Is there continued assessment of water quality parameters and characteristics?
   Yes.

2. Have there been adjustments or revisions to the original recommendations?
   We were more about education – getting people to do the right thing.

3. Is the general objective of the Plan being achieved?
   Pretty much.

4. Have there been regular reports and meetings with the public?
   Through the Dungeness River Management Team. More emphasis on the River and Dungeness Bay.

5. Have field data collection techniques emphasized visual evaluations of land use activities and physical conditions of water, stream banks, and habitats? (WAC 400-12-510)
   Yes.

6. Has the monitoring program been adequate, frequent and valid to accurately evaluate implementation of the program?
   Don’t know.
7. Does the monitoring program include quality assurance controls and scientific validity?
   *When you’re working with a bunch of volunteers and a large Bay, there is always the chance to get skewed samples and science!*

8. Has the overall trend in nonpoint pollution decreased?
   *I hope so. More septic inspections and repairs, for sure.*

9. Are there measurable improvements from BMPs?
   *Along Jimmycomelately and Dean Creeks. Doubt there’s much change in the Bay itself.*

10. Has the Watershed Committee continued to have a meaningful participation in all phases of Plan implementation and evaluation?
    *No. None. It’s all been given to the Dungeness River Management Team, the Tribe, County, etc.*

11. Does the Watershed Committee continue to represent the broad and diverse interests in the Watershed and make their decisions by consensus?
    *We don’t operate any more.*

Lastly,

In the space below, please note any additional feedback on the Sequim Bay Watershed Management Plan implementation and/or planning process, current water and sediment quality, or any other information or issues you would like to share:
APPENDIX F: Jamestown S'Klallam Tribe S. Sequim Bay Freshwater Monitoring Sites