LUMMI NATION
NONPOINT-SOURCE MANAGEMENT PROGRAM

January 2002

LUMMI NATION
NONPOINT-SOURCE MANAGEMENT PROGRAM

Prepared For:

Lummi Indian Business Council
(LIBC)

Funded By:

Lummi Indian Business Council
and
U.S. Environmental Protection Agency
Grant # GA990990-01-4

Prepared By:

Water Resources Division
Lummi Natural Resources Department

Contributing Authors:

Jeremy Freimund LIBC Water Resources Manager
Steve Heywood LIBC Water Resources Planner II
Andy Ross LIBC Water Resources Specialist

January 2002

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

APPENDICES

Appendix A: Comprehensive Water Resources Management Program fact sheets

Appendix B: Unified Watershed Assessment for Watersheds within the Boundaries of the Lummi Nation

Appendix C: Memorandum of Agreement between the Lummi Nation, Whatcom County, City of Bellingham, and Whatcom County Public Utility District No. 1 regarding a watershed management plan for Water Resources Inventory Area (WRIA) 1

Appendix D: Memorandum of Agreement between the U.S. Environmental Protection Agency, Lummi Nation, Washington State Department of Ecology, and Washington State Department of Health regarding the Portage Bay Shellfish Closure

LUMMI NATION
NONPOINT-SOURCE MANAGEMENT PROGRAM

EXECUTIVE SUMMARY

The purpose of this Nonpoint-Source Management Program (NPSMP) report is to:

1. Identify an action plan to effectively control nonpoint sources of pollution on the Lummi Indian Reservation (Reservation);
2. Identify management practices that will reduce nonpoint-source (NPS) pollution on the Reservation and contributing watersheds;
3. Describe how NPS management practices will be implemented on the Reservation; and
4. Describe how the Lummi Water Resources Division will coordinate with appropriate jurisdictions to control nonpoint sources of pollution in the watersheds that discharge to the Reservation and adversely affect Reservation surface- and ground-water resources.

The primary goal of the Lummi Nation Nonpoint-Source Management Program is to protect high quality waters from degradation and improve substandard water-quality and aquatic habitat conditions on the Reservation and within the watersheds that discharge to the Reservation. This goal will be pursued through:

1. Administration, improvement, and enforcement of water-quality standards and federal, tribal, state, and local laws, codes, and regulations that relate to land use and water quality;
2. Design and implementation of on-the-ground projects to assist water-quality protection and restoration activities;
3. Public involvement and education by various means;
4. Monitoring of water-quality conditions for detection of trends, determination of beneficial effects of projects or of the implementation of best management practices (BMPs), location of chronic and acute sources of NPS pollution, and compliance with water-quality standards and criteria; and
5. Coordinated efforts on the Reservation and in the watersheds that discharge to the Reservation, ensuring an effective program and conservation of resources by the reduction of redundant efforts.

In addition to previous work completed by the Lummi Water Resources Division (LWRD 1997, LWRD 1998a, LWRD 1998b, LWRD 1998c, LWRD 1999a, LWRD 1999b, LWRD 2000a), an important element of the Lummi Nation NPSMP is the Lummi Nation Nonpoint Source Assessment Report (NPSAR). The Lummi Water Resources Division completed the NPSAR in December 2001 (LWRD 2001). The objectives of the NPSAR were (1) to determine the current and potential impairments of Reservation waterbodies due to NPS pollution, (2) to identify the primary nonpoint sources responsible for this pollution, and (3) to list the resources available to address NPS pollution.

The analysis of available water-quality data and potential sources of NPS pollution summarized in the Lummi Nation NPSAR shows that surface waters on and flowing onto

the Reservation are currently or potentially affected by all types of NPS pollutants. These types of pollution include bacteria/pathogens, fine sediment, nutrients, oxygen-demanding substances (which result in low dissolved-oxygen levels), pH, temperature, metals, pesticides, household and industrial chemicals, and oil and grease. Nonpoint-source pollution currently and/or potentially impairs the four major waterbodies (Nooksack River, Portage Bay/Bellingham Bay, Lummi River, and Lummi Bay/Strait of Georgia) and the ground water of the Reservation.

The three current impairments of greatest concern to the Lummi Nation are the closure of 220 acres of Portage Bay to commercial shellfish harvest, the degradation of salmonid habitat in the Nooksack River watershed and estuary, and saltwater intrusion into Reservation aquifers. The potential impairments of most concern are the threat of commercial shellfish closures in Lummi Bay and in the remaining approved areas of Portage Bay, and the contamination of Reservation ground water. These waters require NPS control measures to restore or maintain desired water uses and/or, in the case of surface waters, to meet or maintain the Draft Lummi Water-Quality Standards[1]. This NPSMP is focussed on addressing the three current impairments of greatest concern and the two potential impairments of most concern.

The primary NPS categories responsible for the current and potential impairments of surface and ground water on the Reservation are agriculture, silviculture, hydromodification (including aquatic and riparian habitat modification), urban runoff, and ground-water withdrawal. Other source categories, in particular atmospheric deposition, highway/road runoff, construction, and land disposal, are contributors to the impairment of Reservation waterbodies, but are not known to produce significant impairment at this time. Control of each NPS category should contribute to the improvement and maintenance of water quality on the Reservation. The primary sources of impairment are the priority targets for this NPSMP.

To reduce and/or eliminate the adverse effects of NPS pollution on surface and ground water and to achieve the NPS management goals, appropriate best-management practices (BMPs) must be effectively applied. Effective use of BMPs, which include land-use zoning, should minimize and/or eliminate the NPS pollution effects on Reservation waters.

The Lummi Nation currently addresses NPS pollution on the Reservation through 14 Lummi Indian Business Council environmental programs and various Lummi Natural Resource Department activities that specifically target the primary current and potential impairments of Reservation waterbodies. The NPSMP for the Reservation will support and complement these current programs and activities and will emphasize continued involvement in off-Reservation NPS pollution management activities.

[1] The Lummi Nation is currently in the application process with the EPA to administer Sections 303(d) and 401 of the Clean Water Act.

Community involvement will be a key element of the Lummi Nation NPSMP because surface- and ground-water movement does not follow property or political boundaries. In addition, community participation in developing and implementing the NPSMP is necessary for the program to be successful. The three elements of the community-involvement plan are (1) public education and outreach, (2) interjurisdictional coordination and cooperation for activities off-Reservation that affect on-Reservation resources, and (3) working with project applicants/proponents to assure compliance with Lummi Indian Business Council ordinances.

1. INTRODUCTION

The waters of the Lummi Indian Reservation (Reservation; see Figures 1.1 and 1.2 for the location of the Reservation and local geographic features) contain significant resources for both the Lummi Nation and the region. Numerous economically and culturally important species, including herring, salmon, oyster, manila clam, little neck clam, butter clam, horse clam, and dungeness crab, use the Reservation waters. Reservation waters also contain large eelgrass meadows and habitat for numerous species of waterfowl, marine birds, and raptors (including the bald eagle and peregrine falcon). Nonpoint-source pollution can result in economic and cultural hardship by decreasing the health and abundance of fish, shellfish, and wildlife; cause downgrades of commercial shellfish beds; and affect human health through consumption of contaminated fish and shellfish.

The Lummi Nation finds that contamination of surface- and ground-water resources on the Reservation has a direct, serious, and substantial effect on the political integrity, economic security, health, and welfare of the Lummi Nation, its members, and all persons present on the Reservation. Further, the Lummi Nation finds that those activities posing threats of such contamination, if left unregulated, could cause such adverse effects. Accordingly, the Lummi Natural Resources Department (LNR) is developing the Nonpoint-Source Management Program (NPSMP) for the Reservation based on the foregoing findings and the following considerations:

- The Lummi Nation goal for surface waters of the Reservation is that these waters comply with the federal Clean Water Act.
- With the exception of evapotranspirational losses and water discharged into off-Reservation water from the two wastewater-treatment plants operated by the Lummi Nation, all water that falls onto or passes through the Lummi Reservation discharges to resource-rich tidelands and/or estuaries of the Lummi Nation. These resources, which are culturally and economically important to the Lummi Nation and its members, surround the Reservation uplands along the shoreline. Intertidal and/or estuarine resources include salmon, shellfish, surf smelt, sand lance, waterfowl, raptors, other wildlife, extensive eelgrass beds, spawning grounds for herring, and water-supply intakes for salmon and shellfish hatcheries.
- Population projections, planned economic and institutional growth on the Reservation, and the small percentage of Reservation land that has been developed all suggest that portions of existing forested and agricultural lands will be converted to residential, commercial, or community uses in the coming years. Where forested or agricultural lands are converted to residential, commercial, or community uses, surface-water quantity and quality will be affected.
- In general, development affects vegetation and soil properties in a manner that results in greater storm-water volumes, higher peak discharges, and lower water quality. Minimizing these adverse effects from development and maximizing the protection of sensitive and important natural resources is necessary to protect the political integrity, economic security, health, and welfare of the Lummi Nation, its members, and all persons present on the Reservation.

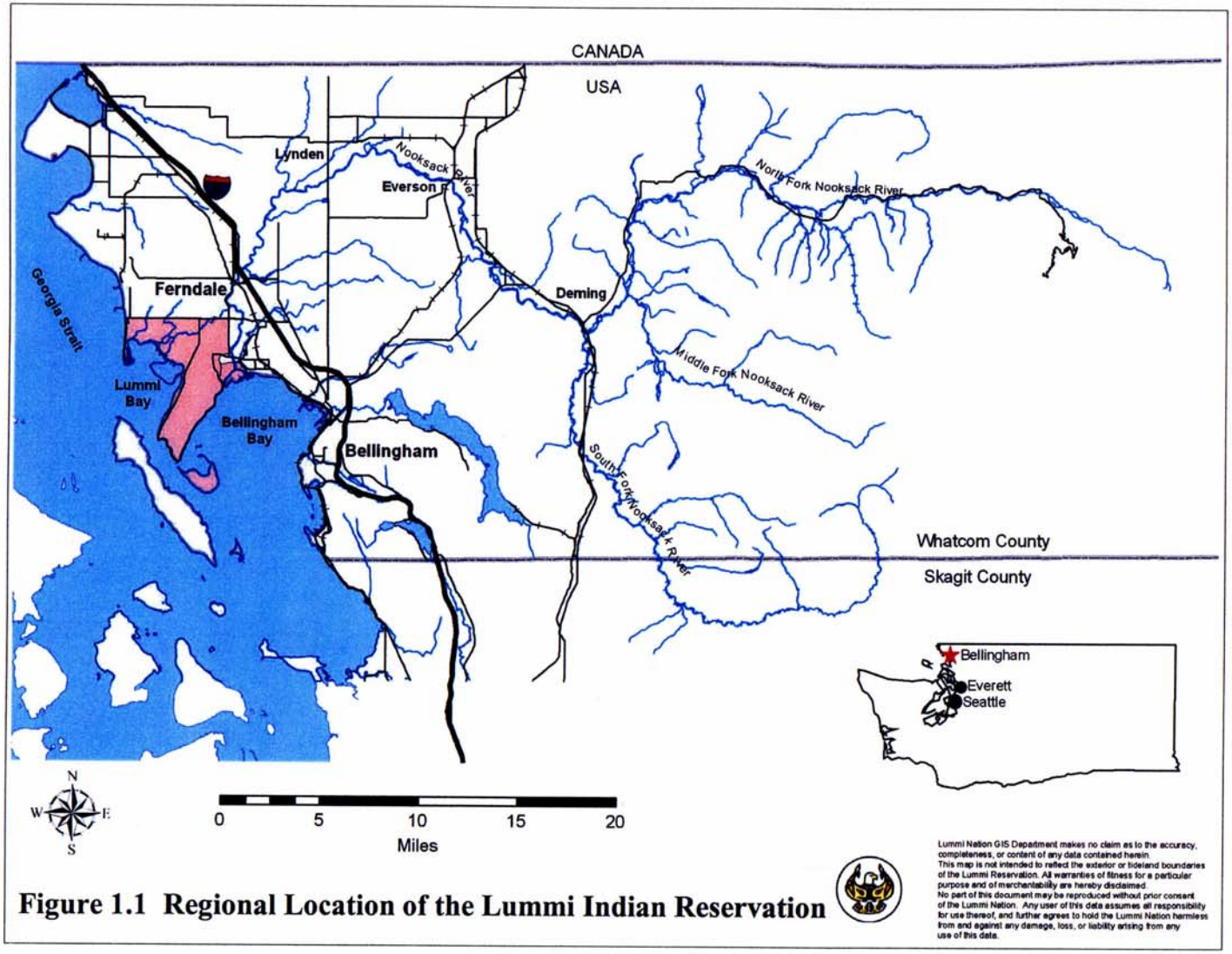

Figure 1.1 Regional Location of the Lummi Indian Reservation

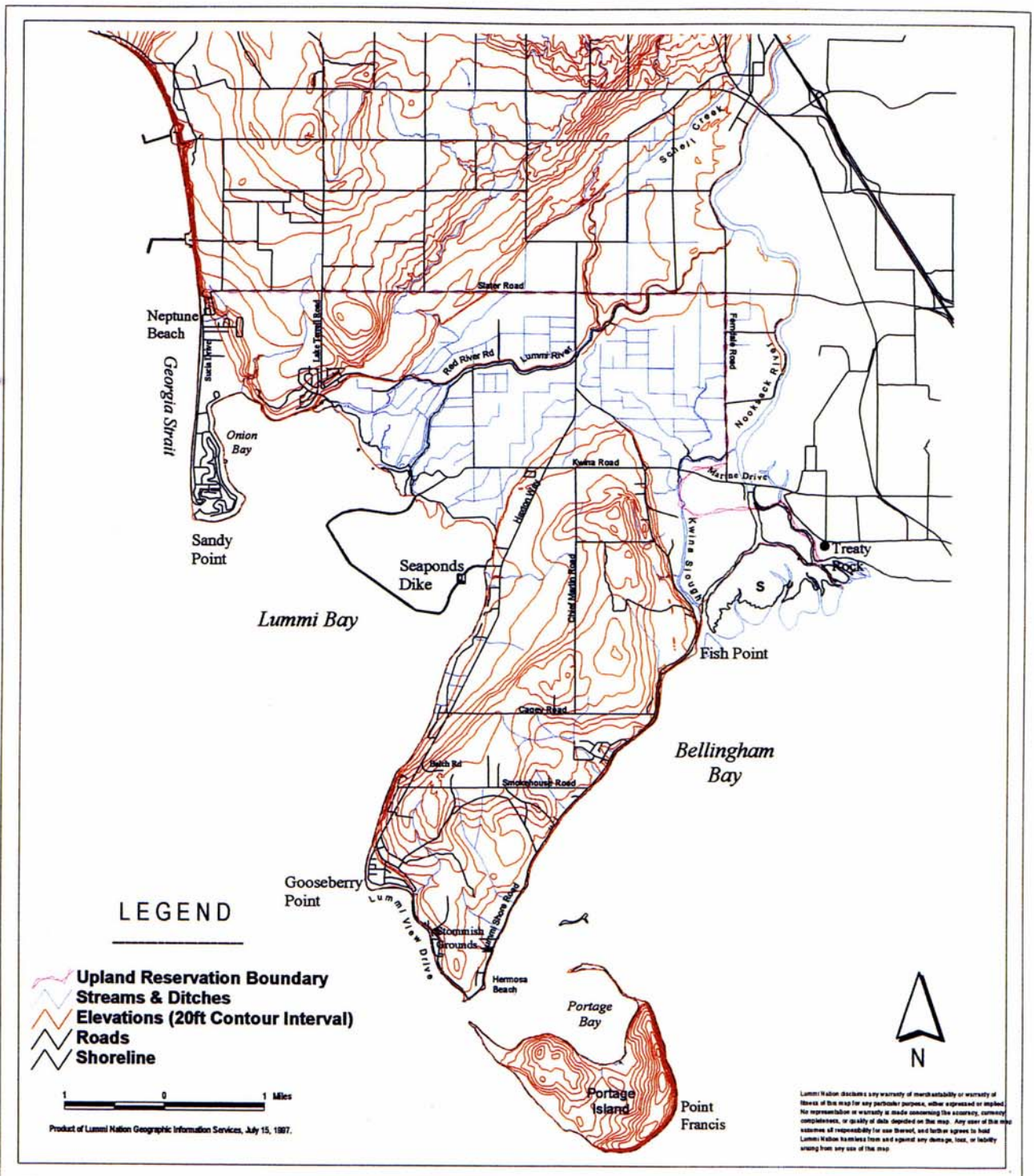

Figure 1.2 Topography, Surface Water Drainages, Place Names, and Roads of the Lummi Reservation

- Ample supplies of high-quality ground water are essential to serve the purposes of the Reservation as the permanent homeland of the Lummi Nation and its members.
- Over 95 percent of the residential water supply for the Reservation is pumped from local ground-water wells; contamination of wellheads carries the risk of adversely affecting the health of persons drinking or using water from these supplies.
- The salmon-hatchery program on the Reservation, which is culturally and economically significant to the Lummi Nation and its members, is dependent on high-quality ground and surface water.
- As a finite resource, ground water is one of the most important and critical of the Lummi Nation's resources. Storm water is an important source of ground-water recharge and a potentially significant source of ground-water contamination.
- Ground-water resources are vulnerable to contamination by pollutants introduced on or near the ground surface by human activities. Agricultural, residential, community, commercial, and industrial land uses increase the potential for ground-water contamination.
- Reservation ground-water resources are particularly vulnerable to pollution because of geographic and hydrogeologic conditions, which may be exacerbated by future growth and development on the Reservation. The Reservation is located in a coastal area along the inland marine waters of Puget Sound and Georgia Strait. Most of the existing water-supply wells on the Reservation are located within a half-mile of marine waters. Progressive saltwater intrusion already has led to the closure of several of these public water-supply wells. Increased pumping, possible future reductions in ground-water recharge areas as the forested Reservation uplands are converted to residential and other uses, and rapid economic and population growth could further threaten the Lummi Nation's ground-water resources if such activities are not managed effectively. Managing surface water to minimize water-quality impacts and to maximize ground-water recharge will help to protect the limited and vulnerable ground-water resources on the Reservation.
- Ground-water contamination could lead to the loss of the primary water-supply source for the Reservation because water-supply wells are difficult to replace, ground-water contamination is very expensive to treat, and some damages to ground water caused by contamination may be impossible or unfeasible to mitigate.
- Alternative water sources to serve the needs of the Reservation are expensive and may not be available in amounts sufficient to replace existing supplies and to provide for anticipated tribal economic and residential growth in the future. Moreover, alternative water sources would require substantial amounts of funding for the infrastructure upgrades that would be necessary to import larger volumes of water onto the Reservation. Finally, alternative water sources may be subject to service interruptions over the long term because of natural or human-generated disasters.

The Lummi Water Resources Division (LWRD) of the LNR, as part of the response to Lummi Indian Business Council (LIBC) resolutions 90-88 and 92-43, is developing the Lummi Nation Nonpoint-Source Management Program. These resolutions directed that a comprehensive water-resource management program be developed to ensure that the planning and development of Reservation water and land resources are safeguarded against surface- and ground-water degradation.

1.1 DEFINITION OF NONPOINT-SOURCE POLLUTION

Nonpoint-source (NPS) pollution is all pollution that cannot be identified as point-source pollution. The legal definition of a point source from Section 502(14) of the Clean Water Act (CWA) states:

> The term "point source" means any discernible, confined, and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal-feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged. This term does not include agricultural storm-water discharges and return flows from irrigated agriculture.

Nonpoint-source pollution is more aptly termed diffuse-source pollution because its sources are numerous and widespread. Nonpoint-source pollution occurs when water in any form (e.g., surface water, snow, rain, or fog) picks up contaminants. This can happen in lawns or fields where fertilizer or pesticides have been applied, anywhere that oil or other pollutants have leaked or spilled and come into contact with water, and anywhere that soils are exposed to erosion through activities such as construction, cultivation, or clearing. In short, NPS pollution can originate nearly anywhere. Polluting actions by individuals often appear insignificant when considered alone, but considering that many people have done, are doing, and will engage in the same activity, the pollution can add up to a significant problem. The cumulative effect of NPS pollution commonly results in impairment of surface and/or ground water.

The most effective way to reduce water pollution is to prevent contaminants from coming into contact with water. This proactive approach of pollution prevention requires proper handling, storage, and disposal of polluting materials as well as immediate clean up of spills. This in turn requires education, safe places to dispose of pollutants, and an awareness of the responsibility to do so. Where this is not possible (as with the wear of tires on roads), treatment of the water is required before it flows into a stream or infiltrates into the ground. Prevention of NPS pollution is far preferable to treatment because treatment is never 100 percent effective and can be very expensive.

Nonpoint-source pollution also includes physical modification of waterbodies through direct means (e.g., channelization, diking, or draining) and indirect means that alter the volume and timing of runoff (EPA 1993). Impermeable surfaces (e.g., roofs, parking lots) and drainage improvements associated with most land uses increase the amount of

storm-water runoff and reduce the amount of time required for the storm water to reach surface waters. The increased volume of water in the receiving waters can alter the composition of the streambed, contribute larger amounts of sediment, and erode the banks as the shape of the channel changes to accommodate more frequent high flows. In contrast, when rain water in the Pacific Northwest falls on land that is in a natural or unimproved state, the rain water only occasionally flows across the surface (i.e., overland flow) to nearby waterbodies. Further, the rapid runoff of storm water associated with increased impermeable area and/or improved drainage decreases infiltration and results in less ground water to augment stream flow during dry periods. The resulting low flows can effectively increase the concentration of contaminants and/or the probability of violations of water-quality criteria.

In summary, NPS pollution largely results from the cumulative effects of individual actions that appear insignificant when viewed independently. Pollution prevention is the most effective method to minimize the effects of NPS pollution because individual sources are numerous and dispersed and because treatment options are expensive and can have limited effectiveness.

1.2 GOALS AND OBJECTIVES

This Nonpoint-Source Management Program (NPSMP) is a part of the Lummi Nation Comprehensive Water Resources Management Program (CWRMP). As further described in Appendix A, the CWRMP also includes the Wellhead Protection (WPP), Storm Water Management (SWMP), Wetlands Management (WMP), and Water Quality Standards (WQS) programs. The CWRMP is being developed and implemented by the Water Resources Division of the Lummi Natural Resources Department (LNR) and will address the overall management of Reservation waters. The water-quality standards will provide criteria against which impacts from NPS pollution can be evaluated.

The primary goal of the Lummi Nation NPSMP is to protect high quality waters from degradation and improve substandard water-quality and aquatic habitat conditions on the Reservation and the watersheds that discharge to the Reservation. This goal will be pursued through:

1. Administration, improvement, and enforcement of water-quality standards and federal, tribal, state, and local laws, codes, and regulations that relate to land use and water quality;
2. Design and implementation of on-the-ground projects to assist water-quality protection and restoration activities;
3. Public involvement and education by various means;
4. Monitoring of water-quality conditions for detection of trends, determination of beneficial impacts of projects or of the implementation of best management practices (BMPs), location of chronic and acute sources of NPS pollution, and compliance with water-quality standards and criteria; and
5. Coordinated efforts on the Reservation and in the watersheds that discharge to the Reservation, ensuring an effective program and conservation of resources by the reduction of redundant efforts.

The specific objectives of this NPSMP report are to:

1. Identify an action plan to effectively control nonpoint sources of pollution on the Reservation;
2. Identify management practices that will reduce NPS pollution on the Reservation and contributing watersheds;
3. Describe how NPS management practices will be implemented on the Reservation; and
4. Describe how the Lummi Water Resources Division (LWRD) will coordinate with appropriate jurisdictions to control nonpoint sources of pollution in the watersheds that discharge to the Reservation and adversely affect Reservation surface- and ground-water resources.

1.3 ORGANIZATION OF REPORT

This report is divided into seven sections and also includes five appendices:

- Section 1 is this introductory section.
- Section 2 identifies the primary impairments of Reservation waterbodies and discusses the source categories responsible for these impairments.
- Section 3 presents the Lummi Nation Nonpoint-Source Management Program for the period 1 January 2003 through 31 December 2007.
- Section 4 describes the existing NPS pollution reduction programs on the Reservation and all potential NPS control programs available on and off the Reservation.
- Section 5 is a summary/conclusion section.
- Section 6 lists the references cited in this report.
- Section 7 lists the acronyms and abbreviations used in this report.

2. PRIMARY IMPAIRMENTS OF RESERVATION WATERBODIES

In this section, the methods used in the Lummi Nation Nonpoint-Source Assessment Report (NPSAR) to identify the primary impairments of major waterbodies are summarized and the primary impairments of Reservation waters are described.

2.1 METHODS USED TO IDENTIFY PRIMARY IMPAIRMENTS OF WATERBODIES

As described in the NPSAR (LWRD 2001), the closure of 220 acres of Portage Bay to commercial shellfish harvest, the degradation of salmonid habitat in the Nooksack River watershed and estuary, and saltwater intrusion into Reservation aquifers are the primary impairments of Reservation waters. Since the major sources of two of these impairments extend beyond the Reservation boundaries to the watersheds that discharge to the Reservation (i.e., into the Lummi River and Nooksack River watersheds), impairment of these two rivers was assessed on a watershed-wide basis.

Data from the LNR Surface Water Quality Monitoring Program (SWQMP) was used to assess the condition of surface waters on the Reservation. These data were collected starting in 1993 under CWA Section 106 grants and the Indian General Assistance Program (GAP) grants awarded to the Lummi Nation by the U.S. Environmental Protection Agency (EPA). The condition of surface waters off-Reservation was determined from both the 1998 Washington State 303(d) list (Ecology 2000a) and the Unified Watershed Assessment (Appendix B) prepared by the LNR.

In the NPSAR, surface waters on the Reservation that did not meet the Draft Lummi Water-Quality Standards (DLWQS, which are numerically identical to the current Washington State standards) and surface waters off-Reservation that were placed on the 303(d) list were considered impaired by NPS pollution, unless a point source was specifically identified as the cause of the impairment. In addition, if the watershed of a waterbody contained substantial sources of a type of nonpoint pollution (e.g., nutrients or metals) that can negatively affect salmonids, the waterbody was also considered impaired by that type of nonpoint pollution. In the NPSAR, a high degree of impairment equates to non-attainment of, or a lack of support for, a designated use at some point in time and in some portion of the watershed. Moderate impairment is associated with interference with designated uses that falls short of non-attainment, but is nonetheless significant. A low degree of impairment means that interference with designated uses is likely, but probably not significant. Table 2.1 summarizes these definitions of degrees of impairment used in the NPSAR.

Non-attainment of DLWQS (on-Reservation) or a 303(d) listing (off-Reservation) for more than three tributaries or for the mainstem of the Lummi or Nooksack rivers (including the three forks of the Nooksack) resulted in a determination of a high degree of impairment of the waterbody. A DLWQS non-attainment or 303(d) listing for three or fewer tributaries was generally judged a moderate degree of impairment. If substantial sources of a pollutant are present in the watershed, but DLWQS non-attainments or 303(d) listings were lacking (possibly because of a lack of sampling or testing), the

determination of the degree of impairment was based on the available literature that addresses the pollution potential of land uses in the contributing watershed. The relative contributions of documented impacts and potential impacts in the determination of waterbody impairment varied for each waterbody.

The contamination of Reservation ground water by salt water or other pollutants is a current and/or potential impairment of great concern to the Lummi Nation. Data from the LNR Ground Water Monitoring Program (GWMP) was used to assess the condition of ground waters on the Reservation. Saltwater intrusion constituted impairment of ground water because it makes the ground water unpotable and threatens the quality of the remaining water in the affected aquifer. Impairment of ground water by other contaminants was determined by non-compliance with Safe Drinking Water Act requirements or by a literature-based assessment of potential pollution from land uses in the affected watershed. The definitions of high, moderate, and low degrees of ground-water impairment used in this report are the same as those described for surface water. The degree of impairment was determined based on the number and productivity of affected wells and review of the current and/or potential impacts associated with individual pollutants (Table 2.1).

Table 2.1 Summary of Degree of Impairment Definitions

Applicable Waters	High Impairment Criteria	Moderate Impairment Criteria	Low Impairment Criteria
All Waters	Non-attainment of or a lack of support for a designated use at some point in time and in some portion of the watershed or aquifer	Interference with designated uses that falls short of non-attainment but is nonetheless significant	Interference with designated uses is likely, but probably not significant
Surface Water	(1) Non-attainment of DLWQS (on-Reservation) or a 303(d) listing (off-Reservation) for more than three tributaries or for the mainstem of the Lummi or Nooksack rivers (including the three forks of the Nooksack), or (2) Literature-based assessment of the pollution potential of land uses in the contributing watershed(s)	(1) Non-attainment of DLWQS or 303(d) listing for three or fewer tributaries, or (2) Literature-based assessment of the pollution potential of land uses in the contributing watershed(s)	Literature-based assessment of the pollution potential of land uses in the contributing watershed(s)
Ground Water	Saltwater intrusion, non-compliance with Safe Drinking Water Act requirements, or an assessment based on the number and productivity of affected wells and an assessment of the current or potential impacts associated with individual pollutants		

Table 2.2 lists the NPS categories and subcategories used in the NPSAR and the types of NPS pollution assessed. (Table 2.2 does not list the NPS subcategories judged negligible or non-existent in the Reservation watersheds.)

Table 2.2 Nonpoint-Source Categories, Subcategories, and Pollution Types

NPS Category[1]	NPS Subcategory[1]	Types of NPS Pollution
Agriculture	Non-irrigated Crop Production	Bacteria/Pathogens
	Irrigated Crop Production	
	Specialty Crop Production	Fine Sediment
	Pasture Grazing	
	Confined Animal Feeding Operations	Habitat Alteration
Silviculture	Harvesting, Restoration, Residue Management	Metals
	Forest Management	
	Road Construction/Maintenance	Nutrients
Construction	Highway/Road/Bridge	
	Land Development	Oxygen-Demanding Substances (Organic Enrichment)
Urban Runoff/ Storm Sewers	Non-industrial Permitted	
	Industrial Permitted	
	Other Urban Runoff	Pesticides, Household and Industrial Chemicals, and Oil and Grease
	Highway/Road/Bridge Runoff	
	Erosion and Sedimentation	
Resource Extraction	Surface Mining (sand/gravel)	
Land Disposal	Landfills	pH
	On-site Wastewater Systems	
Hydromodification/ Habitat Modification	Channelization	Saltwater Intrusion
	Flow Modification	
	Removal of Riparian Vegetation	Temperature
	Streambank Modification or Destabilization	
	Draining/Filling of Wetlands	
Marinas and Recreational Boating		
Atmospheric Deposition		
Waste Storage/Storage Tank Leaks		
Highway Maintenance and Runoff		
Spills		
Natural Sources		
Recreation Activities	Golf Courses	
Ground-Water Withdrawal		

[1] "Guidelines for Preparation of the Comprehensive State Water Quality Assessments [305(b) Reports] and Electronic Updates: Supplement," EPA-841-B-97-002B, (EPA 1997a)

Nonpoint-source categories (e.g., agriculture, silviculture, hydromodification, and urban runoff) contributing pollutants to Reservation waters were ranked in Table 2.3 based on the estimated impact their associated pollutants have on designated water uses. In the NPSAR, a high level of impact means that the NPS category contributes the majority of the NPS pollution responsible for a high degree of waterbody impairment. A moderate level of impact is associated with a significant, but not primary, source category or a moderate degree of impairment. A low level of impact is associated with a minor source of NPS pollution or a low degree of impairment. These impacts were determined using the criteria listed in Sections 2.1 and 2.3 and a literature-based assessment of the pollution potential of land uses/NPS categories in the contributing watersheds.

2.2 PRIMARY IMPAIRMENTS OF MAJOR WATERBODIES

The NPSAR concluded that the four major waterbodies and the ground water on the Reservation are currently and/or potentially impaired by NPS pollution. The three current impairments of greatest concern to the Lummi Nation are the closure of 220 acres of shellfish beds in Portage Bay to commercial harvest of shellfish, the degradation of salmonid habitat in the Nooksack River watershed and estuary, and saltwater intrusion into Reservation aquifers. The potential impairments of most concern are the threat of commercial shellfish closures in Lummi Bay and in the remaining approved areas of Portage Bay and the contamination of Reservation ground water by various pollutants. These waters require NPS control measures to restore or maintain desired water uses and to meet or maintain water-quality standards.

2.3 NONPOINT-SOURCE CATEGORIES RESPONSIBLE FOR IMPAIRMENT

In order to rank the NPS categories affecting surface and ground water on or flowing onto the Reservation, the level of impact due to each contributed pollutant was estimated for each source category identified in the NPSAR. Table 2.3 lists these impact levels. The source categories in Table 2.3 descend from the category producing the greatest estimated overall impairment of Reservation water resources to that producing the least estimated impairment. The following criteria were used to estimate the levels of impact:

(1) The number of waterbody segments listed on the Washington 303(d) list or having violations of the Draft Lummi Water-Quality Standards (DLWQS);
(2) Current and potential impacts on shellfish;
(3) Current and potential impacts on salmonids;
(4) Approximate proportion of land area represented by the source category (both on- and off-Reservation);
(5) Literature-based assessment of the amount of pollution produced by each source; and
(6) Literature-based assessment of the relative, overall impact of each pollutant on water resources (both on- and off-Reservation).

Table 2.3 Estimated Pollutant Impacts[1] by Nonpoint-Source Category

Source Category	Bacteria/ Pathogens	Fine Sediment	Habitat Alteration	Metals	Nutrients	Oxygen-Demanding Substances	Pesticides, Oil, Grease, and Other Chemicals	pH	Saltwater Intrusion	Temperature
Agriculture	H	M/H	M/H		M/H	H	M	M	L	H
Hydromodification/ Habitat Modification	M	H	H		L/M	M		L	L/M	M/H
Silviculture		H	L/M		L		L	L	L	H
Urban Runoff	L/M	L/M	L/M	L/M	L/M	L/M	M/H	L	L	L/M
Construction		L/M	L/M		L	L	L/M	L	L	L/M
Atmospheric Deposition		L		L/M	L/M		L/M	L/M		
Highway Maintenance and Runoff		L/M		L	L	L/M	L/M	L		L
Land Disposal	L/M			L, ~H	L/M	L	L, ~H	L		
Ground-Water Withdrawal									L/M, ~H	L/M
Resource Extraction (sand/gravel mining)		L, ~M	L, ~M				L	L	L	L
Spills	L, ~H				L, ~H		L, ~H	L, ~H		
Waste Storage or Storage Tank Leaks	L				L	L	L, ~H	L		
Recreation Activities (golf courses)			L		L		L, ~H			L
Marinas and Recreational Boating	L, ~H			L, ~H						

[1] L = Low Impact; M = Moderate; H = High; L/M = Low to Moderate; M/H = Moderate to High; ~ = Potentially. (Blank = no, or insignificant, impact)

3. LUMMI NATION NONPOINT-SOURCE MANAGEMENT PROGRAM

As stated previously, this NPSMP is focussed on addressing the three current impairments of greatest concern and the two potential impairments of most concern. The three current impairments of greatest concern to the Lummi Nation are the closure of 220 acres of shellfish beds in Portage Bay to commercial harvest of shellfish, the degradation of salmonid habitat in the Nooksack River watershed and estuary, and saltwater intrusion into Reservation aquifers. The potential impairments of most concern are the threat of commercial shellfish closures in Lummi Bay and in the remaining approved areas of Portage Bay and the contamination of Reservation ground water by various pollutants. These waters require NPS control measures to restore or maintain desired water uses and to meet or maintain water-quality standards.

The primary NPS categories responsible for the current and potential impairments of surface and ground water on the Reservation are agriculture, hydromodification (including aquatic and riparian habitat modification), silviculture, urban runoff, and ground-water withdrawal. Although construction, atmospheric deposition, highway/road runoff, and land disposal may be significant contributors to the impairment of Reservation waters, these four sources and the remaining source categories listed in Table 2.3 do not appear to be major sources at this time. However, control of each NPS category should contribute to the improvement and preservation of water quality and aquatic habitats both on and off the Reservation. The primary and potentially significant sources of impairment are the priority targets for this NPSMP.

The primary goal of this management program is to protect high quality waters from degradation and improve substandard water-quality conditions on the Reservation and the watersheds that discharge to the Reservation. This goal will be pursued through:

1. Administration, improvement, and enforcement of water-quality standards and federal, tribal, state, and local laws, codes, and regulations that relate to land use and water quality;
2. Design and implementation of on-the-ground projects to assist water-quality protection and restoration activities;
3. Public involvement and education by various means;
4. Monitoring of water-quality conditions for detection of trends, determination of beneficial impacts of projects or the implementation of best management practices (BMPs), location of chronic and acute sources of NPS pollution, and compliance with water-quality standards and criteria;
5. Coordinated efforts on the Reservation and watersheds that discharge to the Reservation, ensuring an effective program and conservation of resources by the reduction of redundant efforts.

In this section of the report, there are four subsections. The first subsection is a description of the Lummi Nation Nonpoint-Source Management Program administration. The second subsection identifies the best management practices that will be used as part of this NPSMP. The third subsection is a discussion of the effects of the NPS pollution categories on each of the three current impairments of greatest concern and the two

potential impairments of most concern. This third subsection is organized by the NPS pollution categories (e.g., agriculture, hydromodification, and silviculture). The fourth subsection is a description of the action plan for the 1 January 2003 through 31 December 2007 period. The fourth subsection is organized by the three current impairments of greatest concern and the two potential impairments of most concern.

3.1 LUMMI NATION NONPOINT-SOURCE MANAGEMENT PROGRAM ADMINISTRATION

As described previously, the Lummi Nation Nonpoint-Source Management Program (NPSMP) is a part of the Lummi Nation Comprehensive Water Resources Management Program (CWRMP). The Lummi Water Resources Division (LWRD) of the Lummi Natural Resources Department (LNR) is the lead agency tasked with developing and implementing the NPSMP and CWRMP in response to Lummi Indian Business Council (LIBC) resolutions 90-88 and 92-43. These resolutions directed that a comprehensive water resource management program be developed to ensure that the planning and development of Reservation water and land resources are safeguarded against surface- and ground-water degradation. As further described in Appendix A, the CWRMP also includes the Wellhead Protection (WPP), Storm Water Management (SWMP), Wetlands Management (WMP), and Water Quality Standards (WQS) programs. The CWRMP is intended to address the overall management of Reservation waters. The water-quality standards will provide criteria against which impacts from NPS pollution can be evaluated. The LIBC Resources Protection Division and the Harvest Management/Endangered Species Act (ESA) Division have been active addressing the degradation of salmonid habitat in the Nooksack River and Lummi River watersheds and estuaries.

The primary LIBC staff members responsible for developing and implementing elements of the NPSMP are identified in Figure 3.1. As shown in Figure 3.1, although the LWRD is the lead agency for developing and implementing the NPSMP, staff from the Resource Protection Division and the Harvest Management/ESA Program of the Lummi Natural Resources Department are also involved in implementing elements of the NPSMP. The Resource Protection Division and the Harvest Management/ESA Division are particularly involved with the elements that address the degradation of salmonid habitat in the Nooksack River watershed and estuary. Table 3.1 is a summary of the background/qualifications of the LWRD (lead agency) staff members involved in the development and implementation of the NPSMP. In addition to the LIBC staff members identified in Figure 3.1 and Table 3.1, staff members from other federal, tribal, state, and local governmental agencies and a number of natural resources management contractors support the Lummi Nation NPSMP implementation.

Lummi Natural Resources Department

(January 2002)

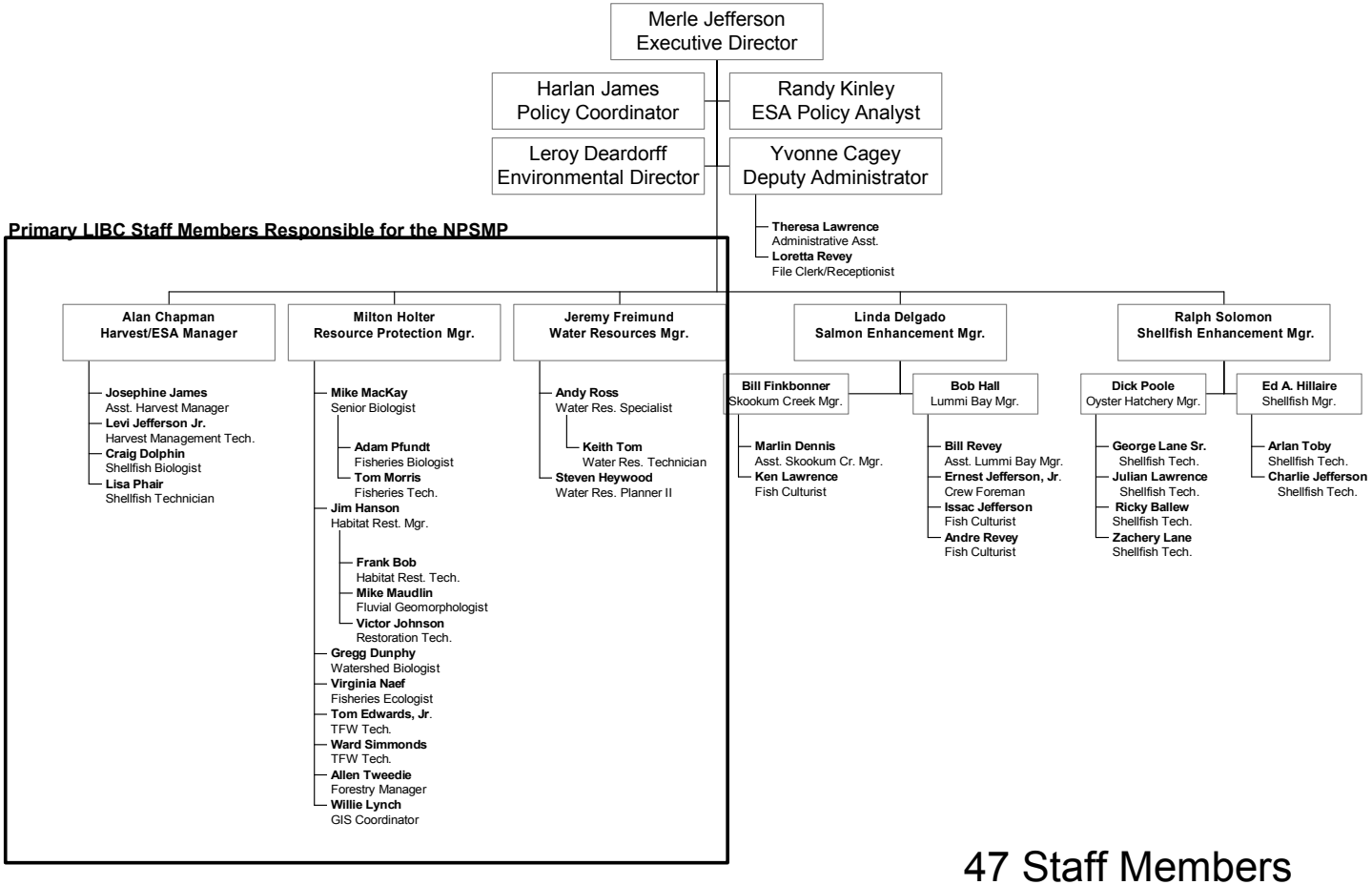

Figure 3.1 Lummi Natural Resources Organization Chart

47 Staff Members

33 Lummi Tribal Members (70%)

14 Non-Tribal Members (30%)

Table 3.1 Lead Agency Members Responsible for Developing and Implementing NPSMP

Name	Title	Background/Qualifications
Leroy Deardorff	LIBC Environmental Program Director	B.S. degree in Environmental Sciences and over 25 years of experience in administrative, technical, and policy positions with the Lummi Nation. Leroy is an enrolled member of the Lummi Nation and is one of eleven members of the tribal council (i.e., the LIBC).
Water Resources Division (Lead Agency)		
Jeremy Freimund	LIBC Water Resources Manager	B.S. degree in Zoology and an M.S. degree in Watershed Management. Jeremy has over 16 years of experience in water resources management and planning in the public and private sector and has worked within the Lummi Water Resources Division since 1996.
Andy Ross	LIBC Water Resources Specialist	B.S. degree in Geology and an M.S. degree in Watershed Studies. Andy has over 15 years of experience in natural resource management and has worked within the Lummi Water Resources Division since 1993.
Steven Heywood	LIBC Water Resources Planner II	B.A. degree in Biology and an M.S. degree in Environmental Science. Steve has 7 years of experience in natural resource management and has worked within the Lummi Water Resources Division since 2000
Keith Tom	LIBC Water Resources Technician	G.E.D. and is working towards completion of an A.A. in natural resources management. Keith has 4 years of experience in natural resource management and has worked within the Lummi Water Resources Division since 1998.

3.2 NONPOINT-SOURCE MANAGEMENT PROGRAM BEST MANAGEMENT PRACTICES

The LWRD staff will select appropriate project-specific BMPs after reviewing pertinent publications on NPS management measures (e.g., LWRD 1998a; Ecology 1992; EPA 1992; MWCOG 1992; EPA 1993; IDHW 1996; EPA 1996) and consulting, as needed, with other LIBC departments and local NPS management agencies (i.e., USDA-Natural Resources Conservation Service [NRCS], WSU Cooperative Extension Service, Whatcom Conservation District, Washington State Department of Ecology [Ecology], EPA, U.S. Forest Service, and Washington State Department of Natural Resources [DNR]).

Of the existing BMPs in use on the Reservation, the BMPs addressing land disposal of sewage in on-site septic systems are the only currently codified BMPs. These BMPs are found in the Lummi Nation Title 16 Sewer Code. Other BMPs, addressing nonpoint sources such as silviculture, hydromodification, construction, and urban and road runoff, are implemented through the review process for land-use permits conducted by the Lummi Technical Review Committee (TRC). In the near future, anticipated passage of ordinances developed in the CWRMP will promulgate BMPs addressing NPS pollution from resource extraction, construction, and urban and road runoff. The Lummi Nation Title 17 Water Code will require permits for land-use activities that potentially affect water quality in wellhead-protection areas, streams, wetlands, and stream and wetland

buffers. The TRC will review permit applications and will, as needed, attach appropriate project-specific BMPs as conditions on approved permits. Specific BMPs that protect the quality of storm-water runoff from construction sites, urban areas, and roads are identified in the SWMP Technical Background Document (LWRD 1998a).

The EPA may require BMPs for the control of all nonpoint sources through the Section 401 (CWA) certification process. (After the adoption of WQS and the authorization for the Lummi Nation to administer the 401 certification process, the LNR will be responsible for certifying that proposed projects that potentially affect Reservation waters will not cause exceedences of water-quality standards.) The U.S. Army Corps of Engineers (Corps) implements hydromodification BMPs both on and off the Reservation through the Section 404 (CWA) and Section 10 (River and Harbors Act) permit process. The primary impairments of Reservation waters will continue to be addressed through the activities described in Section 4 of this report.

The primary nonpoint sources affecting Reservation waters from outside the Reservation boundaries are agriculture, hydromodification/habitat modification, silviculture, and urban runoff. BMPs addressing these sources are developed and implemented by other government agencies (e.g., USDA-NRCS, WSU Cooperative Extension Service, Whatcom Conservation District, Portage Bay Shellfish Protection District, Ecology, EPA, U.S. Forest Service, and DNR); the LNR has been involved in the selection process and has encouraged the implementation of off-Reservation BMPs.

Because surface- and ground-water movement does not follow private property or political boundaries and because community participation in developing and implementing the management plan is necessary for a successful program, community involvement will be a key element of the Lummi Nation NPSMP. The two elements of the community-involvement plan are (1) public education and (2) interjurisdictional coordination and cooperation for activities off-Reservation that affect on-Reservation resources. One example of interjurisdictional coordination already implemented is the participation of LNR (for the Lummi Nation) as a participating government in the WRIA 1 Watershed Management Project. (The Memorandum of Agreement outlining Lummi Nation's participation is presented in Appendix C). Agency and public involvement in this process will be openly solicited as required by the EPA and LIBC and as specified in 40 CFR 25 and Lummi Title 27, respectively. Since a large portion of the NPS pollution within the Reservation is addressed in the SWMP, the public participation process of the NPSMP will be integrated with that of the SWMP.

The Lummi Nation NPSMP will emphasize continued involvement in NPS pollution issues off the Reservation and implementation of BMPs and other actions identified in the CWRMP for nonpoint sources on the Reservation. The activities and programs described in this NPSMP should result in the maintenance or improvement of surface- and ground-water quality on the Reservation.

3.3 NONPOINT-SOURCE CATEGORIES THAT IMPAIR RESERVATION WATERS

Based on the NPSAR and Table 2.3, the NPS categories primarily responsible for the current and potential impairments of Reservation water resources are agriculture, hydromodification/habitat modification, silviculture, urban runoff, and ground-water withdrawal. Although construction, atmospheric deposition, highway/road runoff, and land disposal may be significant contributors to the impairment of Reservation water resources, these four sources and the remaining source categories listed in Table 2.3 do not appear to be major sources at this time. However, control of each NPS category should contribute to the improvement and the preservation of water quality and aquatic habitats both on and off the Reservation. The following discussion describes how the major and potentially significant NPS categories contribute to the impairment of Reservation water resources. These primary and potentially significant sources of impairment will be the high priority targets for NPS management.

3.3.1 Agriculture

Agricultural land uses, especially by dairy operations, have been identified as the major source of the fecal coliform bacteria that are responsible for the closure to commercial harvest of Portage Bay shellfish beds (DOH 1997; WCD 1998; Ecology 2000b) and the potential closure of Lummi Bay shellfish beds. The agricultural activities that allow bacteria to reach surface waters in the Nooksack and Lummi river watersheds include dairy-waste application to fields, leaking manure lagoons, direct animal access to surface water, direct discharge to waterways, and runoff from pastures, feedlots, and animal holding areas.

Agriculture is also a significant source of all the other types of pollutants, except for metals, that are responsible for salmonid and shellfish impacts in the Nooksack and Lummi river watersheds and estuaries. Reduced summer flows, removal of shade-providing riparian vegetation, and organic enrichment due to animal wastes contribute to low dissolved-oxygen levels in Nooksack and Lummi river tributaries. Land clearing, soil disturbance, and removal of riparian vegetation combine to increase storm-water runoff and fine sediment loads to the streams and rivers. Higher peak flows due to the increased runoff results in greater streambank erosion. Increased nutrient levels in streams are largely due to input of fertilizers, animal wastes, and crop residues from farm lands. Agricultural chemicals, including insecticides, herbicides, fungicides, and their degradation products, are one of the sources of chemical contamination of surface and ground water in the watersheds. The Nooksack tributaries on the 303(d) list for pH violations all flow through agricultural areas. Removal of shade-providing riparian vegetation and reduced summer flows resulting from agricultural land uses contribute to elevated water temperatures in the streams of the Lummi and lower Nooksack river watersheds. In addition, the loss of riparian vegetation, alteration of creeks into channeled drainage ditches, and livestock access to streams damage and alter stream habitats (EPA 1997b). Hydromodification in agricultural areas, particularly drainage activities, affects the timing of the annual hydrograph (an earlier peak) and contributions to streams during the low flow season by removing water from the system. Many of these agricultural effects on water quality are combined with the effects arising from other NPS pollutant sources, which are described in the following subsections.

Agriculture in the Reservation watersheds occurs largely on the floodplain of the Nooksack and Lummi rivers. The floodplain is a sensitive area in regard to water quality because it is periodically inundated by flood waters and the soil, which may contain accumulated contaminants, can be eroded and transported to areas with important aquatic resources. There is little opportunity for retention of pollutants during flooding because of the proximity of farm lands to surface waters and the lack of riparian vegetation. In addition, ground water under the floodplain is generally in hydraulic connection with adjacent streams, providing another potential route for pollutants to reach surface waters.

Since some agricultural activity presumably occurs in the recharge zones that have been generally identified for Reservation aquifers (LWRD 1997), the potential exists for impacts on the aquifers below the Reservation uplands. Crop production or over-grazing could reduce ground-water recharge by increasing surface runoff. This would increase the probability and magnitude of saltwater intrusion. The use of fertilizers and agricultural chemicals generally contributes to ground-water contamination. These impacts, however, are probably not significant in the Reservation aquifers because of the limited extent of agriculture in the recharge zones.

3.3.2 Hydromodification/Habitat Modification

Hydromodification, including aquatic and riparian habitat modification, is a significant source of salmonid and shellfish impairment in the lower Nooksack and Lummi river watersheds and estuaries. Its main impacts on habitat and water quality in streams are due to direct alteration of channel morphology and salmonid habitat, isolation of streams from floodplains and side channels, input of fine sediment, drainage activities that reduce the amount of water available to support instream flows during the low flow season (July – October), and elevated water temperatures; other impacts include reduction of dissolved oxygen, increased nutrient levels, and pH alterations. In Lummi Bay, the main impacts of hydromodification on habitat and water quality in estuarine habitats are due to the sea wall that physically separates nutrient sources in upland areas from the estuary and that results in a decrease in salt marsh habitat. The Lummi and Bellingham bay estuaries can also be affected by increased input of fine sediment resulting from hydromodification.

Hydromodification can be a less obvious source of NPS pollution relative to other sources because some of its effects are generated indirectly. For example, several forms of hydromodification indirectly affect dissolved-oxygen levels: channelization often reduces the turbulence that mixes oxygen into the water column; reduced flow due to flow modification also reduces turbulence as well as the dilution of oxygen-depleting substances; removal of riparian vegetation produces elevated water temperatures that in turn reduce dissolved-gas saturation concentrations; loss of riparian vegetation and streambank destabilization also result in increased loading of sediment and other oxygen-depleting substances in runoff; and the draining/filling of wetlands results in reduced streamflow and less removal of oxygen-demanding substances from runoff.

Other significant impacts of hydromodification include the effect of increased streambank erosion due to channelization, removal of riparian vegetation, and streambank destabilization. The draining/filling of wetlands and isolation of streams from their floodplains due to channelization reduces opportunities for fine sediments to be deposited outside of the streambed. In addition to the effect of removal of riparian vegetation, reduced streamflow due to flow modification and draining/filling of wetlands also results in higher water temperatures in streams. All of these processes have smaller effects on the nutrient and pH levels in streams (EPA 1997b).

3.3.3 Silviculture

Forestry activity is probably the primary source of impairment to salmonids in the upper Nooksack River watershed (i.e., along the North, Middle, and South Forks of the Nooksack River and their tributaries) and is a contributing source of NPS pollutants affecting, or potentially affecting, shellfish in Portage and Lummi bays. The main impacts to streams are increased sediment and elevated water temperature; lesser impacts result from habitat alteration and the input of nutrients and pesticides. Harvesting, road construction, and road use and maintenance are the activities that generate sediment contributions to streams; mass-wasting events from roads and harvested areas, however, are the main source of sediment. Harvest of shade-providing trees results in elevated stream temperatures. The removal of potential large woody debris during harvests and bridge construction both alter stream habitats. Fertilizers used during reforestation and leaching of nutrients from soils exposed by harvest activity result in nutrient inputs to streams. Silvicultural chemicals, including pesticides and their degradation products, are also carried to streams by runoff and by leaching into the ground water that feeds streams (EPA 1997b).

Since much of the Reservation uplands are forested, future harvesting of these forests may have impacts on ground water. Harvest-induced alteration of forest hydrology could reduce ground-water recharge by increasing surface runoff during storm events. This could increase the probability and magnitude of saltwater intrusion, depending on whether the land was retained in forestry or converted to another use. The use of fertilizers and silvicultural chemicals during reforestation and forest management activities could contribute to ground-water contamination.

3.3.4 Urban Runoff

Urban runoff is a source of all the types of pollutants (bacteria, fine sediment, habitat alteration, metals, nutrients, oxygen-demanding substances, pesticides and other chemicals, pH, and temperature) that are responsible for salmonid and shellfish impacts in the Lummi and Nooksack river watersheds and estuaries. Oxygen-demanding substances, such as pet waste, oil, grease, detergents, waxes, and other household chemicals, and reduced streamflow due to hydrologic alterations likely contribute to low dissolved-oxygen levels in Nooksack and Lummi tributaries. The increase of impervious surfaces (e.g., driveways, roads, parking lots, and roofs) associated with development can significantly increase storm-water runoff and fine sediment loads to the streams and

rivers in the watersheds. Higher instream flows due to the increased storm runoff result in greater streambank erosion. Creeks channelized into roadside ditches and streambed scouring due to storm runoff result in habitat alterations. In addition, pollutants that accumulate on surfaces and in the atmosphere between precipitation events can produce high pollutant levels in the initial runoff from a storm. These runoff pollutants include the nutrients derived from fertilizers, automotive wastes, failing septic systems, and other sources. Also included are the significant levels of heavy metals, petroleum hydrocarbons, and various other chemicals, including pesticides and their degradation products, that are derived from automotive wastes and various residential, commercial, and industrial sources (EPA 1997b). Many of these sources (e.g., leaking batteries) can alter the pH in watershed streams. Loss of shade-providing riparian vegetation and reduced streamflow due to hydrologic alterations contribute to elevated stream temperatures in the Lummi and lower Nooksack river watersheds.

Streams and storm runoff transport some of the pollutants described above, especially metals, pesticides, and other chemicals, from urban areas to the resource-rich tideland habitats along the Reservation shorelines. With the highest housing density on the Reservation occurring along the shorelines, contaminated storm water can flow directly onto the resource-rich tidelands. Because freshwater will generally "float" over denser seawater before gradually mixing with the seawater, species that reproduce, live, or feed in the intertidal zone or in the upper portion of the water column are particularly vulnerable to contaminated freshwater input. These species include juvenile salmon, herring, other small forage fish, shellfish, great blue herons, and bald eagles. This marine exposure pathway also exists for pollutants that enter surface waters from other source categories (e.g., agriculture, silviculture, atmospheric deposition, and highway runoff).

Although much lower than agriculture, urban runoff is a contributing source of fecal coliform bacteria responsible for the closure of Portage Bay shellfish beds and potential closure of Lummi Bay shellfish beds (Ecology 2000b). Exposure of pet waste and failing septic systems to surface runoff of storm water are the routes through which bacteria reach surface waters in the Reservation watersheds. The pathway described in the previous paragraph acts to expose the shellfish in the tidelands of Bellingham, Portage, and Lummi bays to bacterial contamination with the ebb and flow of each tide.

Since urban runoff occurs in the generally identified recharge zones for Reservation aquifers, the potential exists for impacts on the ground water where surface waters contribute to aquifer recharge. The nutrients, metals, and chemicals present in urban runoff can contribute to ground-water contamination. In addition, increased storm-water runoff due to impervious surfaces results in reduced ground-water recharge. This will potentially increase the probability and magnitude of saltwater intrusion.

3.3.5 Construction

Land development and associated construction activities are contributing, possibly significant sources of seven of the nine types of pollutants (fine sediment, habitat alteration, nutrients, oxygen-demanding substances, pesticides and other chemicals, pH,

and temperature) that are responsible for salmonid and shellfish impacts in the Lummi and Nooksack river watersheds, other Reservation watersheds, and in the marine waters on or adjacent to the Reservation. The types of impacts associated with land development and construction activities are very similar to those of urban runoff and the details may be found above. These impacts are those that occur during the development and construction of buildings and roads; once construction is completed, the land area becomes a source of urban or highway runoff. The contaminants associated with construction are also similar to those of urban runoff with the exception of bacteria and metals. Construction chemicals, such as paints, acids, cleaning solvents, asphalt products, soil additives, concrete-curing compounds, and pollutants in wash water from concrete mixers (EPA 1997b), largely match or replace the various commercial and industrial chemicals found in urban runoff. Pollution from construction differs from that of urban runoff in that soil erosion is generally greater (EPA 1997b). Control of soil erosion is therefore a high priority at construction sites.

3.3.6 Atmospheric Deposition

Though significant quantities of atmospheric pollutants are generated in (NWAPA 1999) or pass through the region (USGS 1999), the amount of atmospheric deposition within Reservation watersheds is unknown. The levels of impact from atmospheric deposition listed in Table 2.3 are estimated relative to the impacts determined for the other source categories. Pollutants deposited regionally from the atmosphere in significant amounts include nitrogen, mercury and other heavy metals, fine particulate matter, sulfuric and hydrochloric acids, pesticides, and various organic chemicals (NWAPA 1999; USGS 1999). The major sources of atmospheric pollutants are exhaust from combustion of fuels, waste incineration, pesticide applications, commercial and industrial processes, and natural sources such as volcanism. Industrial sources relatively close to the Reservation include four oil refineries, an aluminum smelter, a pulp (now closed) and paper mill, and a waste incineration facility (now closed). Since their distribution is widespread, the deposition of atmospheric pollutants can potentially, if not currently, affect salmonids, shellfish, surface-water quality, and ground-water quality both on and off the Reservation.

3.3.7 Highway Maintenance and Runoff

Storm-water runoff from highways and roads is a contributing, possibly significant source of seven of the nine types of pollutants (fine sediment, metals, nutrients, oxygen-demanding substances, pesticides and other chemicals, pH, and temperature) that are responsible for salmonid and shellfish impacts in the Lummi and Nooksack river watersheds, other Reservation watersheds, and in the marine waters on or adjacent to the Reservation. Since this category is a component of the urban-runoff source category, the types of impacts on surface and ground water associated with highway runoff are the same as for urban runoff and the details may be found above. However, the contaminants in highway runoff are limited to those found in atmospheric deposition and in automotive wastes, including rubber worn from tires (oxygen-demanding substance), heavy metals, phosphorus, acids, oil, grease, and various other automotive chemicals.

3.3.8 Land Disposal

Nonpoint-source pollution due to land disposal of wastes is a contributing, possibly significant source of six of the nine types of pollutants (bacteria, metals, nutrients, oxygen-demanding substances, pesticides and other chemicals, and pH) that are responsible for salmonid and shellfish impacts in the Lummi and Nooksack river watersheds, other Reservation watersheds, and in the marine waters on or adjacent to the Reservation. The main sources of these pollutants in Reservation watersheds are failing septic systems and abandoned landfills. Both of these sources may leach organic material, bacteria, nutrients, pesticides, and household chemicals into ground water; landfills may also leach metals, petrochemicals, and various commercial and industrial chemicals, depending on what was placed in the landfill. If ground water from these sites reaches the surface, streams may also become contaminated. For on-site septic systems, this could result in a contribution to bacterial contamination of Portage and Lummi bays, but on a far smaller scale than that due to agricultural sources (Ecology 2000b).

3.3.9 Ground-Water Withdrawal

Saltwater intrusion into Reservation aquifers has been documented since the 1970s and was the subject of a federal lawsuit (*United States v. Bel Bay Community et al*., Civil No. 303-71C2 (W.D. Wash.)). Assessments by the U.S. Geological Survey (USGS) and Ecology, presented as exhibits in *United States v. Bel Bay Community et al*., indicate that ground-water withdrawals from two new wells will increase the likelihood of saltwater intrusion into the Lummi Peninsula Aquifer. The USGS report (Cline 1974) stated:

> "…the conclusion that must be reached from the available data is that, even under the most favorable conditions, the pumping of the Bel Bay well at the proposed rate (or pumping of any other well that would cause a lowering of the average water level in the Pierre well) would increase the risk of salty ground water reaching the Pierre well."

Further, the third affidavit of Duane Wegner (formerly an engineering geologist with Ecology and the Head of the Shorelands Division of Ecology at the time of the affidavit) stated:

> "This study [Cline 1974] shows, and subsequent data gathered by Department of Ecology personnel confirms, that there are no public ground waters available for appropriation in the area of the Lummi Peninsula on the Lummi Reservation. This is because the recharge to the ground water in the area is not adequate to support further ground water appropriation. When the appropriation in the Lummi Peninsula exceeds the recharge, there is increased saltwater intrusion into existing wells. Accordingly, no further waters can be developed without impacting existing rights by degrading water quality."

In 1990, recognizing the threatened state of the Reservation aquifers, the Lummi Nation offered to take over all of the non-tribal water associations on the Reservation and to meet all of their contractual commitments to provide water service. The goal was to consolidate the management of the fragile ground-water resource so that the chances of additional saltwater intrusion would be reduced. Only one of the associations accepted the offer.

In 1992, the Lummi Nation formally and publicly declared its intent to quantify its water rights through negotiation, if possible, or through litigation, if necessary. The initial focus would be on the Reservation, with the off-Reservation stream-flow issues to follow.

In July 1995, the state and federal governments agreed to government-to-government negotiations with the Lummi Nation. After lengthy negotiations and several failed proposals, the parties agreed that an Agreement in Principle would be drafted that would accomplish two things: (1) determine if there is an off-Reservation source(s) of an assured, uninterruptible water supply that is legally, politically, environmentally, and economically available; and (2) identify issues that need to be resolved before a final settlement agreement could be reached. The negotiation teams signed the Agreement in Principle on 27 January 1998. Although the parties successfully identified an off-Reservation water source, success was more limited in resolving the other outstanding issues. The negotiations effectively ended in April 2000 when one of the non-tribal water associations filed a lawsuit in state court that seeks to prevent the Lummi Nation from using one of the tribal wells. A federal lawsuit was filed by the United States Department of Justice in January 2001 (Civ. No. C01-47Z [WD WA]) and litigation is underway.

Saltwater intrusion due to excessive pumping of ground water is a current threat to Reservation aquifers. Most of the active water-supply wells on the Reservation are located within a half-mile of marine waters. Progressive saltwater intrusion has already led to the closure of several public and private water-supply wells. Since future residential development would both increase the demand for ground water and potentially decrease the area available for ground-water recharge, the potential for further saltwater intrusion is high. Increased pumping due to future economic and population growth could further threaten the ground-water resources of the Lummi Nation if such activities are not managed effectively.

3.4 NPS MANAGEMENT PROGRAM ACTION PLAN (2003-2007)

The action plan for the Lummi Nation NPSMP is focussed on addressing the three current impairments of greatest concern and the two potential impairments of most concern. Nonpoint-source pollution control measures are required to restore or maintain desired water uses and to meet or maintain water-quality standards in affected waterbodies. Each of the primary NPS categories responsible for the current and potential impairments of surface and ground water on the Reservation were described in Section 3.3. Although the NPSAR assessed all currently and potentially significant

sources of NPS pollution and all current types of NPS pollutants in the Reservation and Nooksack River watersheds, the applicable primary sources of the current and potential major impairments are the priority targets for this NPSMP. This section identifies specific actions that LIBC agencies will undertake over the 2003-2007 period to address the current and potential impairments of greatest concern and the associated primary sources of impairment. The criteria that will be used to evaluate the effectiveness of this NPSMP are also identified.

3.4.1 Closure Of Shellfish Beds In Portage Bay To Commercial Harvest

In response to the closure of commercial shellfish beds in Portage Bay, the U.S. Environmental Protection Agency (EPA), the Lummi Natural Resources Department (LNR), the Washington Department of Ecology (Ecology), and the Washington Department of Health (DOH) developed a Memorandum of Agreement (see Appendix D). The purpose of the agreement is to define the roles and responsibilities of federal, tribal, and state agencies in the effort to reclassify the shellfish beds within and adjacent to Portage Bay on the Reservation as "Approved" for commercial harvest. The action plan to address this current impairment of greatest concern is aligned with the LNR's roles and responsibilities identified in the inter-governmental agreement. Table 3.2 summarizes the actions and implementation schedule to address sources that have led to the closure of 220 acres of Portage Bay shellfish beds to commercial harvest. Section 4.2.1 describes current and past implementation activities in greater detail. The effectiveness of the action plan to address the closure of Portage Bay commercial shellfish beds will be evaluated in terms of the classification status of the beds. If the shellfish beds are reclassified as "Approved" within the duration of the plan, the action plan will be judged to be effective. If not successful, subsequent versions of the management program will have to incorporate additional or more effective actions.

During 2001, the Lummi Water Resources Division applied for and was awarded Section 319 funding through the Washington State Centennial Clean Water Program to conduct a monitoring program for the TMDL implementation in Water Resources Inventory Area 1 (WRIA 1). The goals of the WRIA 1 TMDL-implementation monitoring project are to collect and analyze semi-monthly (two samples per month) water-quality samples at 65 sites throughout the lowland areas of WRIA 1 over the 1 January 2002 through 31 December 2003 period and establish 20 stream-gaging stations that will allow fecal coliform loading to be calculated. Dissolved oxygen levels and water temperature will also be measured and recorded during each site visit. This action plan calls for the continuation of this implementation monitoring program until the TMDL goals are achieved and the shellfish beds within and adjacent to Portage Bay on the Reservation are reclassified as "Approved" for commercial harvest.

Table 3.2 Action Plan to Address Closure of Portage Bay Shellfish Beds

Activity	2003	2004	2005	2006	2007	Comments
1) Implement on-Reservation Surface Water Quality Monitoring Program	X	X	X	X	X	Program started in 1993; coordinated with DOH sampling; funded through

Table 3.2 Action Plan to Address Closure of Portage Bay Shellfish Beds

Activity	2003	2004	2005	2006	2007	Comments
						EPA Section 106 grants
2) Sample discharge from wastewater treatment plants	X	X	X	X	X	Program started in 2000; funded through LIBC appropriations
3) Improve coordination and spill response with Lummi Sewer District for collection and treatment system	X	X	X	X	X	Funded through LIBC appropriations; future funding through Section 319 possible
4) Coordination and support of dye studies to evaluate fecal coliform dilution and travel time from potential sources	X	X				DOH, EPA, and LNR staff conducted a dye study of wastewater treatment plant during 2001; dye study of Nooksack River flow pending funding
5) Conduct literature review of fecal coliform survival in fresh and saline waters	X	X				Pending funding through either Section 319 and/or General Assistance Program (GAP) grants
6) Support fecal coliform TMDL implementation in Nooksack River	X	X	X	X	X	Continue existing monitoring program starting in 2004 with Section 319 funding
7) Continue Reservation Water Quality Standards development	X	X	X	X	X	Funded through EPA Section 106 grant and LIBC appropriations
8) Develop and implement Wellhead Protection, Storm Water Management, and Stream and Wetland Management regulations and public education programs	X	X	X	X	X	Program started in 1996; funded through Bureau of Reclamation, EPA, and LIBC appropriations; future funding through Section 319 possible
9) Continue LNR participation on Technical Review Committee (see Section 4.1.13)	X	X	X	X	X	Funded through EPA grants (Section 106, GAP) and LIBC appropriations; future funding through Section 319 possible
10) Continue coordination with other federal, tribal, state, and local agencies	X	X	X	X	X	Funded through EPA grants (Section 106, GAP, Section 319) and LIBC appropriations

3.4.2 Salmonid Habitat Degradation in the Nooksack River Watershed and Estuary

As noted above, the LNR Restoration Division and LNR Habitat Assessment Program are involved in many of the on-the-ground activities that address degradation of salmonid habitat in the Nooksack River watershed and estuary. Table 3.3 summarizes the actions and implementation schedule to address sources that have led to degradation of salmonid habitat. Section 4.2.2 describes current and past implementation activities in greater detail. The effectiveness of the action plan to address degradation of salmonid habitat will be evaluated in terms of salmonid production from the Nooksack River watershed. If salmon production and harvests increase to levels that occurred in the mid-1980s within the next 10 years, the action plan will be judged to be effective. However, it is

recognized that habitat protection and restoration activities can take many years to result in measurable improvements in salmonid habitat. For example, revegetation of a riparian buffer may take several years to complete substantial lengths of stream and 10 to 15 or more years to mature. The positive habitat effects of a functioning riparian zone may then take several years to manifest in the form of increased salmonid populations.

Table 3.3 Action Plan to Address Salmonid Habitat Degradation

Activity	2003	2004	2005	2006	2007	Comments
1) Stabilize abandoned logging roads	X	X	X	X	X	Funded through various federal and state grant programs; future funding through Section 319 possible
2) Enhancement of riparian buffers	X	X	X	X	X	Funded through various federal and state grant programs; future funding through Section 319 possible
3) Installation of engineered log jams	X	X	X	X	X	Funded through various federal and state grant programs; future funding through Section 319 possible
4) Implementation of the Nooksack Estuary Recovery Project	X	X	X	X	X	Continue evaluation of habitat potential of the Nooksack River estuary; funded through various federal and state grant programs; future funding through Section 319 possible
5) Monitor and protect estuarine water quality and habitat via the SWQMP, CWRMP, CZMP, and Tidelands Management	X	X	X	X	X	Funded through EPA grants (Section 106, GAP) and LIBC appropriations; future funding through Section 319 possible
6) Develop and implement Wellhead Protection, Stream and Wetland Management, and Storm Water Management regulations and education programs	X	X	X	X	X	Program started in 1996; funded through Bureau of Reclamation, EPA, and LIBC appropriations; future funding through Section 319 possible
7) Implement Spill Prevention and Response Plan	X	X	X	X	X	Funded through EPA grants (Section 106, GAP) and LIBC appropriations; future funding through Section 319 possible
8) Conduct case-specific investigations of water-quality problems	X	X	X	X	X	Funded through EPA grants (Section 106, GAP) and LIBC appropriations
9) Continue studies to identify ecological flow regime needs	X	X	X			On-going as part of the WRIA 1 Watershed Management Project; funded through local funding sources and various federal and state grant programs; future funding through Section 319 possible
10) Stream temperature monitoring	X	X	X	X	X	Continue and expand existing monitoring programs; funded through local funding sources and various

Table 3.3 Action Plan to Address Salmonid Habitat Degradation

Activity	2003	2004	2005	2006	2007	Comments
						federal and state grant programs; future funding through Section 319 possible
11) Continue coordination with other federal, tribal, state, and local agencies and private interests	X	X	X	X	X	On-going as part of the WRIA 1 Watershed Management Project, Nooksack Recovery Team, and similar activities; funded through EPA grants (Section 106, GAP, Section 319) and LIBC appropriations

3.4.3 Saltwater Intrusion Into Reservation Aquifers

Although the primary causes of saltwater intrusion into Reservation aquifers are being addressed through negotiations and, as necessary, litigation, which are beyond the scope of this management program, there are several efforts to address the problem either underway as part of the Comprehensive Water Resources Management Program (CWRMP) or planned for the future. Table 3.4 summarizes the activities and implementation schedule to address sources that have led to saltwater intrusion into Reservation aquifers. Section 4.2.3 describes current and past implementation activities in greater detail. The effectiveness of the action plan to address saltwater intrusion into Reservation aquifers will be evaluated based on the results of the ground-water monitoring program. If the chloride level in monitoring wells does not increase over time or with increasing aquifer pumping within the duration of the NPSMP, the action plan will be judged to be effective. If not successful, subsequent versions of the management program will have to incorporate additional or more effective actions to minimize saltwater intrusion into Reservation aquifers.

Table 3.4 Action Plan to Address Saltwater Intrusion into Reservation Aquifers

Activity	2003	2004	2005	2006	2007	Comments
1) Implement on-Reservation Ground Water Monitoring Program	X	X	X	X	X	Program started in 1993; funded through LIBC appropriations and BIA grants
2) Develop and implement Wellhead Protection, Storm Water Management, and Stream and Wetland Management regulations and public education programs	X	X	X	X	X	Program started in 1996; funded through Bureau of Reclamation, EPA, and LIBC appropriations; future funding through Section 319 possible
3) Continue LNR participation on Technical Review Committee (see Section 4.1.13)	X	X	X	X	X	Funded through EPA grants (Section 106, GAP) and LIBC appropriations; future funding through Section 319 possible
4) Develop a Water Conservation Program in conjunction with the Lummi Water District	X	X	X	X	X	Pending funding; future funding through Section 319 possible

Table 3.4 Action Plan to Address Saltwater Intrusion into Reservation Aquifers

Activity	2003	2004	2005	2006	2007	Comments
5) Ensure EPA oversight of Safe Drinking Water Act compliance of non-tribal water associations on the Reservation	X	X	X	X	X	EPA Program initiated during 2001; future funding through Section 319 possible
6) Potential purchase of wells that threaten aquifer water quality	X	X	X	X	X	Future funding through Section 319 possible
7) Pursue negotiated or litigated resolution of conflicting claims over water rights to Reservation ground water	X	X	X	X	X	Being addressed through actions independent of NPSMP

3.4.4 Threat Of Additional Closures of Commercial Shellfish Beds

Substantial commercial shellfish beds are located in and adjacent to both Portage Bay and Lummi Bay on the Reservation. These stations are regularly monitored by the Washington Department of Health in consultation with the Lummi Nation under the Shellfish Consent Decree (Order Regarding Shellfish Sanitation, *United States v. Washington [Shellfish]*, Civil Number 9213, Subproceeding 89-3, Western District of Washington, 1994). The purpose of this monitoring is to ensure that the National Shellfish Sanitation Program (NSSP) standards for certification by the federal Food and Drug Administration are met. Certification of commercial shellfish beds is based on both the quality of surface waters over the growing areas and land-use practices in the watersheds that discharge to the growing areas.

Table 3.5 summarizes the actions and implementation schedule to prevent additional closures of tribal shellfish beds to commercial harvest. Section 4.2.4 describes current and past implementation activities in greater detail. The effectiveness of the action plan will be evaluated in terms of the classification status of tribal shellfish beds. If there are no additional closures of tribal commercial shellfish beds on- and off-Reservation during the duration of the management program, the action plan will be judged to be effective. If not successful, subsequent versions of the management program will have to incorporate additional or more effective actions.

Table 3.5 Action Plan to Address Additional Closures of Commercial Shellfish Beds

Activity	2003	2004	2005	2006	2007	Comments
1) Implement on-Reservation Surface Water Quality Monitoring Program	X	X	X	X	X	Program started in 1993; coordinated with DOH sampling; funded through EPA Section 106 grants
2) Sample Discharge from Wastewater Treatment Plants	X	X	X	X	X	Program started in 2000; funded through LIBC appropriations
3) Improve coordination and spill response with Lummi Sewer District for collection and	X	X	X	X	X	Funded through LIBC appropriations; future funding through Section

Table 3.5 Action Plan to Address Additional Closures of Commercial Shellfish Beds

Activity	2003	2004	2005	2006	2007	Comments
treatment system						319 possible
4) Coordination and support of dye studies to evaluate fecal coliform dilution and travel time from potential sources	X	X				DOH, EPA, and LNR staff conducted a dye study of wastewater treatment plant during 2001; dye study of Nooksack and Lummi River flow pending funding
5) Conduct literature review of fecal coliform survival in fresh and saline waters	X	X				Pending funding through either Section 319 and/or General Assistance Program (GAP) grants
6) Support fecal coliform TMDL implementation in Nooksack River and TMDL development in Drayton Harbor	X	X	X	X	X	Continue existing monitoring program starting in 2004 with Section 319 funding
7) Continue Reservation Water Quality Standards development	X	X	X	X	X	Funded through EPA Section 106 grant and LIBC appropriations
8) Develop and implement Wellhead Protection, Storm Water Management, and Stream and Wetland Management regulations and public education programs	X	X	X	X	X	Program started in 1996; funded through Bureau of Reclamation, EPA, and LIBC appropriations; future funding through Section 319 possible
9) Continue LNR participation on Technical Review Committee (see Section 4.1.13)	X	X	X	X	X	Funded through EPA grants (Section 106, GAP) and LIBC appropriations; future funding through Section 319 possible
10) Continue coordination with other federal, tribal, state, and local agencies	X	X	X	X	X	Funded through EPA grants (Section 106, GAP, Section 319 grant and LIBC appropriations

3.4.5 Contamination Of Reservation Ground Water By Various Pollutants

In addition to the NPSMP, the potential contamination of Reservation aquifers is being addressed through the Wellhead Protection Program element of the Comprehensive Water Resources Management Program (CWRMP). Table 3.6 summarizes the activities and implementation schedule to address potential contamination of Reservation aquifers. Section 4.2.5 describes current and past implementation activities in greater detail. The effectiveness of the action plan to protect Reservation aquifers will be evaluated based on the results of the LNR ground-water monitoring program and monitoring results from the Lummi Water District's Safe Drinking Water Act sampling. If the levels of contaminants in water samples collected and analyzed by the Lummi Water District does not increase over time or with increasing aquifer pumping within the duration of the NPSMP, the action plan will be judged to be effective. If not successful, subsequent versions of the

management program will have to incorporate additional or more effective actions to preclude contamination of Reservation aquifers.

Table 3.6 Action Plan to Address Contamination of Reservation Ground Water

Activity	2003	2004	2005	2006	2007	Comments
1) Implement on-Reservation Ground Water Monitoring Program	X	X	X	X	X	Program started in 1993; funded through LIBC appropriations and BIA grants
2) Develop and implement Wellhead Protection, Storm Water Management, and Stream and Wetland Management regulations and public education programs	X	X	X	X	X	Program started in 1996; funded through Bureau of Reclamation, EPA, and LIBC appropriations; future funding through Section 319 possible
3) Implement Spill Prevention and Response Plan	X	X	X	X	X	Funded through EPA grants (Section 106, GAP) and LIBC appropriations; future funding through Section 319 possible
4) Conduct case-specific investigations of water-quality problems	X	X	X	X	X	Funded through EPA grants (Section 106, GAP) and LIBC appropriations
5) Incorporate the results of the Lummi Water District sampling program into the LNR database	X	X	X	X	X	Sampling program funded through the Lummi Water District; future funding through Section 319 possible for additional sampling and coordination
6) Continue LNR participation on Technical Review Committee (see Section 4.1.13)	X	X	X	X	X	Funded through EPA grants (Section 106, GAP) and LIBC appropriations; future funding through Section 319 possible
7) Improve coordination and spill response with Lummi Sewer District for collection and treatment system	X	X	X	X	X	Funded through LIBC appropriations; future funding through Section 319 possible
8) Continue coordination with other federal, tribal, state, and local agencies	X	X	X	X	X	Funded through EPA grants (Section 106, GAP, Section 319 grant and LIBC appropriations

4. EXISTING NONPOINT-SOURCE POLLUTION REDUCTION PROGRAMS

In this section, the existing LIBC environmental programs directed toward managing nonpoint sources of pollution on the Reservation are identified and described. Following this description, a summary of how the various programs address the five primary NPS pollution issues on the Reservation is presented. The section concludes with a listing of all available programs for NPS control under the NPS category that is primarily addressed by the NPS control program

4.1 LIBC ENVIRONMENTAL PROGRAMS

Fourteen LIBC environmental programs on the Reservation directly relate to managing Reservation water quality. Other programs may indirectly protect Reservation water quality (e.g., Public Health and Safety). These programs are part of the LIBC's efforts to protect the political integrity, economic security, health, and welfare of the Lummi Nation. The LNR administers eleven of the programs and the Lummi Planning Department (LPD) administers three programs. These fourteen LIBC environmental programs address the current and potential impairments of water quality on the Reservation. The LNR administers the following environmental programs:

- Surface Water Quality Monitoring Program (SWQMP)
- Ground Water Monitoring Program (GWMP)
- Comprehensive Water Resources Management Program (CWRMP)
    - Storm Water Management Program (SWMP)
    - Wellhead Protection Program (WPP)
    - Wetland Management Program (WMP)
    - Water Quality Standards (WQS) Program
- Investigation of Storm-Water Contributions to Portage Bay
- Case-Specific Investigations of Water-Quality Problems
- Nooksack Estuary Recovery Project (NERP)
- Coastal Zone Management Plan (CZMP)
- Tidelands Management
- Natural Resources Ordinance (Forest Management)
- Flood Damage Reduction Plan (FDRP)
- Spill Prevention and Response Plan

The LPD administers the following programs:

- General Land Use Plan (GLUP)
- Technical Review Committee (TRC)
- Sewer District and Sewer Code

4.1.1 Surface Water Quality Monitoring Program

The Lummi Nation SWQMP has been in place since 1993. The SWQMP currently consists of monthly sampling at 48 sample stations (sites) on and around the Reservation. The number of sites has increased significantly since 1993 in response to the downgrade

of shellfish beds in Portage Bay by the National Shellfish Sanitation Program and to address concerns about Lummi Bay and its watershed. In addition, bacteria sampling was expanded in 1998 from standard membrane filtration of fecal coliform bacteria to membrane filtration with recovery steps for both fecal coliform bacteria and *E. coli*. In 2000, *Enterococcus* enumeration was added to the bacteria analysis. The SWQMP is an on-going program.

For all sites, air temperature, water temperature, conductivity, salinity, salinity-based stratification, flow and/or current direction, water depth, and dissolved oxygen are measured and recorded. Secchi depth is measured at the marine sites. In addition, fecal coliform, *E. coli*, and *Enterococcus* samples are collected at 44 of the 48 sites and analyzed at a laboratory certified by Washington State. In the 2001 calendar year, turbidity, pH, and redox will possibly be added to the parameters measured at each site (equipment problems have limited pH and turbidity measurements). On a quarterly basis at selected sites, samples for nutrients, total petroleum hydrocarbons, and metals are collected for analysis at a laboratory certified by Washington State. All measurements are performed and recorded in accordance with a Quality Assurance and Quality Control (QA/QC) plan most recently approved by the EPA in February 2000.

The SWQMP is intended to collect baseline information about the quality of Reservation surface waters and to identify and locate point- and nonpoint-source pollution problems. It also supports development of the Lummi WQS program. Bacteria data from sample stations along the Reservation boundary are shared with Ecology on a regular basis to identify and address water-quality problems that originate off-Reservation. Information from the SWQMP has also been used to assist the DOH with shoreline surveys.

4.1.2 Ground Water Monitoring Program

The GWMP has been in place since 1993. The GWMP currently consists of monthly monitoring of 23 wells on the Reservation. Two of these wells are monitored weekly or more frequently, depending on water use and environmental factors. Depending on access to the well and whether the well is still in use, some or all of the following parameters are measured at each well: pump rate, water level, conductivity, water temperature, and chloride concentration. All measurements are performed and recorded in accordance with a QA/QC plan. The GWMP is an on-going program.

The purpose of the GWMP is to collect baseline information about the quality and quantity of Reservation ground water. Specifically, the GWMP provides information to support management decisions related to protecting the Reservation aquifers from saltwater intrusion and ground-water mining.

4.1.3 Comprehensive Water Resources Management Program

The CWRMP is an effort to ensure that the planning and development of Reservation water and land resources are safeguarded against surface- and ground-water degradation. The Lummi Water Code, which is currently under revision as part of the CWRMP, will improve the administrative infrastructure for water-resources management on the Reservation. The water code is intended to provide for knowledge-based, integrated, efficient, and equitable management of Reservation waters. The CWRMP includes the SWMP, the WPP, the WMP, the WQS program, and administrative procedures. These programs involve assessments of resource conditions as well as conservation, public-education, and regulatory mechanisms to protect water resources for future generations. Nonpoint-source pollution assessments and reduction efforts are integral to the CWRMP.

The CWRMP is under development using a three-stage approach for each component. Technical background documents are developed initially, a literature review of ordinances and regulations from other tribal, federal, state, and local jurisdictions is conducted, and then ordinances and regulations are developed based on the technical background documents and literature reviews. The technical background documents are based on field data, literature reviews, and scientific investigations. Community education and outreach occur during the ordinance development phase (and will continue to occur after adoption of the respective ordinances). Appendix A contains fact sheets describing the CWRMP.

4.1.3.1 Storm Water Management Program

The purposes of the Lummi Reservation SWMP are to (1) protect Reservation surface waters, ground water, and tidelands from contamination and (2) protect downstream property owners from upstream development. A technical background document (LWRD 1998a) and a literature review of storm-water ordinances developed by other jurisdictions have been completed. The draft ordinance has been developed and the community education phase is in progress. The ordinance is tentatively scheduled for adoption in the winter of 2002. Appendix A contains a fact sheet describing the program.

In general, the SWMP will help protect against NPS pollution by (1) identifying receiving waters using maps of storm-water facilities and the Reservation stream and ditch network (LWRD 1998a); (2) identifying and analyzing potential pollutant sources and impacts; and (3) identifying and applying appropriate best-management practices and/or other conditions (e.g., changing a project to avoid an impact) to prevent pollution of Reservation surface waters.

4.1.3.2 Wellhead Protection Program

The purpose of the Lummi Nation WPP is to protect the Reservation ground-water supplies from contamination. A technical background document (LWRD 1997, 1998c) and a literature review of wellhead-protection ordinances developed by other jurisdictions have been completed. The draft ordinance has been developed and the community education phase is in progress. The ordinance is tentatively scheduled for adoption in the winter of 2002. Appendix A contains a fact sheet describing the program.

In general, the WPP will protect against NPS pollution through mapping specific wellhead protection areas, identifying potential pollutant sources, and identifying and applying best-management practices to prevent pollution of Reservation ground waters at the scale of both the overall recharge area as well as the specific wellhead areas.

4.1.3.3 Wetland Management Program

The goals of the Lummi Nation WMP are to (1) protect Reservation ground-water supplies; (2) protect surface-water resources, including tidelands and estuaries; (3) protect both the functions and values of Reservation wetlands; and (4) accommodate the interests of businesses and property owners by providing defined wetland-management standards, requirements, and mitigation alternatives for efficient and effective project planning. A Reservation wetland inventory and a technical background document have been completed (LWRD 2000a), and the community education component has begun. A literature review of wetland-management ordinances from other jurisdictions was also completed, and adoption of an ordinance is scheduled for the winter of 2002. Appendix A contains a fact sheet describing the program.

In general, the WMP will protect against NPS pollution by (1) identifying receiving waters using maps of wetland locations (LWRD 2000a); (2) identifying wetland functions and values in need of protection; and (3) identifying and applying best-management practices and/or other conditions to protect the beneficial functions of wetlands vis-à-vis NPS pollution reduction.

4.1.3.4 Water Quality Standards Program

The purpose of the Lummi Nation WQS program is to attain the goals of the CWA for Reservation surface waters. The draft Lummi WQS and the application to administer the WQS have been submitted to the EPA. The WQS for the Lummi Reservation have the same numerical criteria as the Washington State WQS (but need to be revised to incorporate changes to the Washington WQS). It is anticipated that the application to administer the program will be approved by the EPA in 2001 and that the WQS will be adopted by the LIBC and approved by the EPA in late 2001. Appendix A contains a fact sheet describing the WQS program. In general, the WQS and associated anti-degradation policies will provide an administrative and legal mechanism to ensure attainment of the water quality needed to support beneficial uses.

4.1.4 Investigation of Storm-Water Runoff to Portage Bay

In 1998, a three-year targeted sampling program (also known as the Dairy Waste Impact Study) was initiated to characterize storm-water contributions from the Hermosa Beach area of the Lummi Peninsula to Portage Bay. The winter of 2001 was the last sampling period of the program. The targeted sampling program included daily or more frequent sampling along Hermosa Beach and a few other sites for two weeks during the onset of flow in the fall. The sampling was repeated for two weeks in the winter when the intermittent streams were supported by baseflow. During each two-week period, 11 sites

were sampled daily or more frequently, and 14 additional sites were sampled twice (i.e., all culverts discharging to or near Portage Bay were sampled at least twice during each 14-day period). For all sites, water temperature, conductivity, salinity, depth, flow or current, fecal coliform bacteria, and *E. coli* were measured or enumerated. Bacteria samples were enumerated at a laboratory accredited by Washington State. All measurements were performed and recorded in accordance with a QA/QC plan most recently approved by the EPA in February 2000.

In general, this investigation is intended to evaluate NPS pollution from the uplands immediately adjacent to Portage Bay and to assess to what extent these sources contribute to the shellfish downgrade in Portage Bay.

4.1.5 Case-Specific Investigations of Water-Quality Problems

The staff of the Lummi Nation Water Resources Division conduct water-quality investigations when specific items or problems are identified that threaten Reservation waters. Sample bottles for metals, nutrients, total petroleum hydrocarbons, and bacteria are maintained specifically for these investigations and arrangements have been made with a contracted, accredited, analytical laboratory to accept samples during holidays and weekends if necessary. These investigations are intended to provide information needed to evaluate identified threats and to determine appropriate responses to address the threat.

4.1.6 Nooksack Estuary Recovery Project

The NERP is a project to restore coastal wetlands and marshes on the Lummi Reservation, including the possible reconnection of the Lummi and Nooksack rivers (instead of the Lummi River only receiving Nooksack water at high flows). One issue limiting the possibility of reconnection of the rivers is that the introduction of substantial Nooksack River water to Lummi Bay could cause decertification of the shellfish beds in the bay. A major goal of this project is to facilitate the recovery of salmonids in the Nooksack River system. The NERP is in the preliminary phases of project evaluation and feasibility. In cooperation with the U.S. Army Corps of Engineers (Corps), a Section 22 Planning Study to evaluate the environmental benefits and costs of alternative restoration actions in the estuary was completed in mid-2000. Planning is currently underway to conduct baseline habitat assessments in the estuary. In the near future, an Environmental Impact Statement may be prepared, at which point specific action items will be identified and targeted for implementation. In general, the NERP will address hydromodification in the Lummi River and Nooksack River estuaries.

4.1.7 Coastal Zone Management Plan

The purpose of the Lummi Nation's 1979 CZMP is threefold: to protect and preserve the shoreline areas of the Lummi Nation, to implement the United States Coastal Zone Management Act of 1972, and to cooperate with the state of Washington in the implementation of the Washington State Shoreline Management Act. The CZMP

provides guidelines for reviewing development proposals according to sound environmental principles. The policies are developed around the elements found in the guidelines for the Washington State Environmental Policy Act and the Washington State Shoreline Management Act. A Coastal Zone Management Permit (a.k.a. coastal zone permit) must be obtained from the LNR for all non-exempt permitted uses and conditional uses before any construction or other activities take place within 200 feet of Reservation shorelines (i.e., the coastal zone). The Lummi CZMP is intended to minimize NPS pollution along Reservation shorelines by prohibiting or limiting certain activities in the coastal zone and ensuring the application of best-management practices intended to prevent pollution.

4.1.8 Tidelands Management

The Lummi Nation Title 13 Tidelands Code establishes rules and regulations related to uses of tribal tidelands. Tidelands are defined as any lands, including beaches, seaward of the line of natural vegetation or the meander line, whichever be more landward along all salt water bordering the Reservation, including all such lands east of the Point Francis/Treaty Rock line. The Reservation tidelands extend to the Extreme Lower Low Water line (-4.5 feet mean lower low water). In general, the tidelands code minimizes NPS pollution along Reservation tidelands by prohibiting or limiting certain activities on Reservation tidelands.

4.1.9 Natural Resources Ordinance

The Lummi Nation Title 10 Natural Resources Ordinance establishes rules and regulations related to seafood harvesting, hunting, and forestry. The primary portions of Title 10 that apply to Reservation water quality relate to shellfish harvest and forestry activities. Any activity that produces a forest product requires that a permit be obtained from LNR before the harvest activity. As part of the permitting process for timber harvests, best-management practices intended to protect water quality are required.

4.1.10 Flood Damage Reduction Plan

The LNR has developed a FDRP to complement the Lummi Nation Title 15A Flood Damage Prevention Code and the eligibility of the Reservation for the National Flood Insurance Program administered by the Federal Emergency Management Agency. Title 15A establishes construction requirements for development in flood hazard areas; new construction that meets these requirements can be insured under the National Flood Insurance Program. The large portion of the Reservation that lies in the floodplains of the Lummi and Nooksack rivers and the coastal areas of the Reservation (especially the Sandy Point Peninsula and Gooseberry Point) are vulnerable to flood damage and the resulting transport of NPS pollutants to the Reservation tidelands and estuaries. The FDRP proposes actions that will reduce the vulnerability to floods of the Reservation and its waters. By reducing flood damage, these actions will reduce the transport of NPS pollution to Reservation waters.

4.1.11 Spill Prevention and Response Plan

An integrated Spill Prevention and Response Plan for the Reservation is expected to be completed in early 2002. This plan will identify measures the Lummi Nation can take to prevent spills of polluting material on the Reservation and actions the Lummi Nation should take in response to spills on or off the Reservation that threaten Reservation waters.

Lummi Law and Order, in cooperation with the Whatcom County Division of Emergency Management (in the county Sheriff's Department) and local fire and police agencies, is trained and prepared to respond to minor spills or releases of some hazardous materials. Small quantities of hazardous materials are known to be used and transported through the Reservation on a regular basis. The most significant operations using hazardous materials are the two oil refineries and one aluminum smelter located just north of the Reservation. The main transportation route to and from these operations is Slater Road, which follows the northern boundary of the Reservation. In response to a major spill, experts from the EPA, Ecology, and local industries would be called in to help control the damage. The Spill Prevention and Response Plan will further describe emergency response capabilities of these agencies.

4.1.12 General Land Use Plan

The Lummi Planning Department is developing a GLUP for the Lummi Reservation. The plan will show, in general, how land on the Reservation will be used over the next 20 years. The GLUP will identify areas that will be developed for residential, commercial, industrial, and agricultural purposes, as well as showing areas that require protection (e.g., wetlands and aquifer-recharge zones). To date, a technical background document (LIBC 1996) has been developed, public-opinion surveys conducted, a preliminary version of the GLUP drafted, a second round of maps developed, and focused planning workshops and meetings with commissions and community groups have occurred. The GLUP will be codified in the Lummi Nation Title 15 Zoning Code. The GLUP and the revised zoning code will prevent NPS pollution by ensuring that land use is compatible with the landscape, that infrastructure is developed in a coordinated fashion, and that development should have the overall effect of minimizing land-disturbing activities.

4.1.13 Technical Review Committee

The TRC was established by the LIBC in 1997 in response to increasing development pressure on the Reservation and the need for coordinated review of Reservation development projects. The TRC consists of representatives from the following departments or divisions of departments: Cultural, Economic Development, Lummi Indian Family Enrichment Center (public health), Law and Order, Maintenance, Tribal Employment Rights Office, Natural Resources, Lummi Education, Lummi Sewer and Water Districts, Construction/Engineering, Housing, and Land Development. The TRC

meets weekly to review land-use applications distributed to committee members before the meeting. At the TRC meeting, comments and conditions are stated and the application either is delayed for further information or a Lummi Land Use Permit is approved, approved with conditions, or denied. In addition, where necessary, Environmental Assessments and/or Environmental Impact Statements are required before a decision. Development of a Tribal Environmental Policy Act (TEPA) is scheduled for completion by December 2002. The Lummi TEPA will complement the TRC efforts.

Land-use activities can affect many people. Without careful planning, future opportunities for development may be lost to current land-use activities. The TRC is providing for comprehensive and balanced review of proposed land-use activities on the Reservation. Participation of the LNR in the TRC provides for the protection of natural resources as well as an opportunity to provide information to applicants that can improve their projects.

4.1.14 Sewer District and Sewer Code

The Lummi Sewer District, which is administratively within the Lummi Planning Department, operates a comprehensive, Reservation-wide, sewage-collection and treatment system that serves the majority of households on the Reservation. The sewer facilities consist of sewer collectors, sewer interceptors, 26 lift stations, and two treatment plants (LIBC 1996). For residences not on a sewer line, the Lummi Nation Title 16 Sewer Code regulates sewage disposal for public health and safety and establishes criteria for the design, construction, alteration, and operation of on-site septic systems. The Lummi Sewer District enforces the sewer code and inspects on-site septic systems. The sewer district and sewer code serve to minimize NPS pollution by ensuring that appropriate sanitary sewer facilities are used by Reservation residents and that the systems are operated and maintained in a manner that protects public health.

4.2 Programs and Activities Addressing Primary NPS Pollution Issues

Each of the five current or potential primary impairments of Reservation waters identified in this report is currently being addressed by LIBC programs and by specific activities that are designed to help resolve the impairments. This section summarizes how these programs and activities address each impairment.

4.2.1 Shellfish Closure in Portage Bay

The shellfish-closure problem in Portage Bay is being addressed in several ways:
(1) the SWQMP was expanded to include 17 new stations in and around Portage Bay;
(2) the targeted sampling program along Hermosa Beach was implemented;
(3) the LNR is developing the WQS, WPP, and SWMP, which will provide regulatory mechanisms to address Portage Bay water quality.
(4) the LNR has been working with the EPA to address the sources of pollution;
(5) the LNR has been working with Ecology to develop and implement the Nooksack River Watershed Bacteria TMDL;

(6) the LNR is working with the DOH to conduct and coordinate water-quality sampling;
(7) the LNR worked with the DOH and the EPA to conduct a dye study of the Gooseberry Point Sewer Treatment Plant outfall;
(8) the LNR and Northwest Indian College (NWIC) obtained an Environmental Justice grant from the EPA to address the interaction of the Nooksack River and Portage Bay and to conduct fecal coliform sampling in the Nooksack River watershed;
(9) the LNR and NWIC have worked cooperatively with the EPA, Ecology, and Portage Bay Shellfish Protection District to obtain grants to conduct fecal coliform sampling in the lower Nooksack River basin; and
(10) the LNR has been participating in the Portage Bay Shellfish Protection District.

In 1996-97, the EPA increased their enforcement presence in the Nooksack River basin to prevent dairy farmers from polluting surface waters. In response to the stepped-up EPA enforcement, the Washington State legislature passed the Dairy Nutrient Management Act (ESSB 6161) in 1998, which mandates inspections of dairy operations and the development and implementation of farm plans. In addition, Whatcom County passed an ordinance preventing dairy-waste application to bare ground or corn stubble during the wet season.

The LNR cooperation in the TMDL resulted in the TMDL addressing storms (a significant source of fecal coliform loading to the Nooksack River) and in assuring that the NSSP shellfish criteria would be met in the marine waters of Bellingham and Portage bays (which receive Nooksack River water). Working with the DOH has provided for collection of duplicate samples during the DOH monitoring as well as coordination of sampling in the Nooksack River basin while DOH is sampling Portage Bay. Collaboration with NWIC, EPA, and the Portage Bay Shellfish Protection District (items 7, 8, and 9 above) has provided data to evaluate where and when much of the bacteria are entering the Nooksack River system (not to a specific source, but to tributaries, or reaches of tributaries). The Lummi Nation, in cooperation with the Whatcom Conservation District, has led tours on the Reservation focused on shellfish production and harvest. If other measures are not successful, adoption of WQS by the Lummi Nation could lead to the development of a TMDL to address fecal coliform bacteria in Portage Bay. Many of the actions listed above are included in the Memorandum of Agreement (MOA) between the EPA, Lummi Nation, Ecology, and DOH (Appendix D).

4.2.2 Salmonid Impairment in the Nooksack River Watershed

Salmonid impairment in the Nooksack River watershed is being addressed in the following ways:
(1) LNR is monitoring and protecting estuarine water quality and habitat via the SWQMP, the CWRMP, the CZMP, and tidelands management;
(2) LNR conducts case-specific investigations of water-quality problems;
(3) LNR is evaluating the improvement of estuarine habitat via the NERP;
(4) LNR conducts restoration projects to improve salmonid habitat in the Nooksack River watershed;

(5) LNR conducts research on and monitors populations of salmonids in the Nooksack River watershed; and
(6) LNR is participating as an initiating government in the WRIA 1 Watershed Management Project (see Appendix C).

4.2.3 Saltwater Intrusion into Reservation Aquifers

The saltwater intrusion problem is being addressed in several ways, some of which are beyond the scope of environmental programs:
(1) the LIBC purchased and retired the wells of one water system that had experienced saltwater intrusion;
(2) the LIBC has shut down or curtailed production from tribal water-supply wells when conditions that could lead to saltwater intrusion are observed (based in part on the GWMP);
(3) the LIBC offered to take over the operation of the private water systems on the Reservation and connect them to the Lummi Water District, which would allow individual wells to be shut down if saltwater intrusion occurred or was imminent, while still providing water to customers (only one private system became part of the Lummi Water District);
(4) the GWMP provides information for effective management of ground-water resources;
(5) development of the SWMP and WPP will provide regulatory mechanisms to protect aquifers from saltwater intrusion; and
(6) to protect the resource for future use, the LIBC helped initiate and was actively involved in federal-tribal-state water-rights negotiations for on-Reservation ground water since 1995. Despite substantial progress toward achieving a settlement that would have provided water for all parties (from an off-Reservation surface-water source), the negotiations collapsed during the summer of 1999. In January 2001 the U.S. Department of Justice filed a lawsuit to quantify and protect the Lummi Nation's rights to ground water on the Lummi Peninsula.

4.2.4 Shellfish Concerns in Lummi Bay

The water-quality threats to Lummi Bay are being addressed through several means:
(1) the SWQMP was expanded to include a total of 12 sample stations in the Lummi Bay watershed and five stations in Lummi Bay;
(2) LNR is developing the WQS, WPP, and SWMP, which will provide regulatory mechanisms to protect Lummi Bay water quality;
(3) LNR coordinates with Ecology farm inspectors when potential problems are observed off-Reservation in the Lummi River watershed;
(4) LNR coordinates with EPA inspectors when potential problems are observed on-Reservation in the Lummi River watershed; and

(5) the NERP may provide a mechanism to treat contaminated runoff from the watershed through created or enhanced wetlands.

4.2.5 Contamination of Reservation Ground Water

The following programs and activities are protecting ground-water quality:
(1) the GWMP provides information for effective management of ground-water quality;
(2) LNR is developing the WQS, WPP, WMP, and SWMP, which will provide regulatory mechanisms to protect aquifers from contamination;
(3) LNR conducts case-specific investigations of water-quality problems;
(4) LNR works with the EPA to address the on-Reservation sources of pollution;
(5) LNR coordinates with Ecology inspectors when potential problems are observed off-Reservation; and
(6) LPD administers the GLUP and the TRC, which protect ground-water quality by ensuring that land use and development occur with minimal impacts.

4.3 NONPOINT-SOURCE CONTROL PROGRAMS

In this section, all available programs for NPS control are listed under the NPS category that is primarily addressed by the NPS control program. General programs that address many or all NPS categories are listed separately under "all NPS categories." Programs that apply to Reservation lands are listed under "On-Reservation;" some of these programs (e.g., Federal programs) may apply off-Reservation as well. Programs that do not apply to Reservation lands but do apply to the watersheds that flow to the Reservation are listed under "Off-Reservation." Each program is listed once. Responsible agencies are enclosed in parentheses; program acronyms are bracketed.

All (or Multiple) NPS Categories

On-Reservation:

- Lummi Surface Water Quality Monitoring Program
- Lummi Ground Water Monitoring Program
- Lummi Comprehensive Water Resources Management Program
  - Storm Water Management Program
  - Wellhead Protection Program
  - Wetland Management Program
  - Water Quality Standards Program
- Lummi Case-Specific Investigations of Water-Quality Problems
- Lummi Investigation of Storm-Water Input to Portage Bay (sampling completed)
- Lummi General Land Use Plan
- Lummi Technical Review Committee
- Lummi Sewer District
- Lummi Nation Sewer Code
- LIBC Funding for the LNR WRD and Environmental Protection Programs
- Tribal Habitat Restoration Projects (Lummi and Nooksack)

- Portage Bay Shellfish Protection District: Closure Response Plan
- Shellfish Certification Program (DOH)
- Clean Water Action Plan (various federal departments and agencies)
- Clean Water Act Section 319 Grants (EPA)
- Clean Water Act Section 106 Grants (EPA)
- Clean Water Act Section 404 Permit Process (Corps and EPA)
- Clean Water Act Section 401 Permit Process (EPA)
- Tribal Watershed Assessment and Planning Process (EPA)
- EPA General Assistance Program
- EPA Multi-Media Grants
- ESA Section 4(d) Rules for Nooksack Chinook Salmon (NMFS)
- ESA Section 7 or Section 10 Consultation (NMFS, USFWS)
- National Environmental Policy Act [NEPA]
- Consolidated Pesticide Compliance Monitoring Program (EPA)
- National Water Quality Assessment Program (USGS)
- Bureau of Indian Affairs [BIA] Water Resources Grant Programs
- Public Law 93-638 Indian Self-Determination Contracts
- Centennial Clean Water Act Grant Program (Ecology)

Off-Reservation:

- Nooksack Salmon Enhancement Association (Stream-monitoring, restoration, and enhancement projects)
- Whatcom County Land Trust
- Whatcom Watershed Information Network
- WAC 400-12: Local Planning and Management of Nonpoint-Source Pollution
  - Nonpoint Watershed Action Plans for Kamm, Tenmile, and Silver creeks
- Local Wellhead Protection Programs
- State Watershed Planning Act (RCW 90.82): WRIA 1 Watershed Management Project
- Clean Water Act Section 303(d) Process (Ecology/EPA)
  - TMDL studies on the Nooksack River and its tributaries
- Pollution Prevention Incentives to States [PPIS] Grant Program (EPA)
- Whatcom County Comprehensive Plan
- Whatcom County Critical Areas Ordinance
- State Growth Management Act
- Puget Sound Water Quality Management Plan
- Puget Sound Water Quality Authority Grants and PIE projects
- Salmon Recovery Act [SRA] (SB 5595)
- Centennial Clean Water Fund
- State Revolving Loan Fund [SRF]
- State Water Pollution Control Act (Ecology)
- State 208 Water Quality Management Plan (Ecology)
- State Coordinated Water System Plans (Ecology)
- State Ground Water Management Program (Ecology)
- State Wetland Mitigation Banks Rule (Ecology)

- Habitat Conservation Plans
- SEPA review of proposed projects

Agriculture

On-Reservation:

- Cooperative Extension Service (USDA)
- Natural Resources Conservation Service (USDA):
  - Environmental Quality Incentive Program [EQIP]
  - Conservation Reserve Enhancement Program [CREP]
  - Wetlands Reserve Program [WRP]
  - Wildlife Habitat Incentive Program [WHIP]
  - Resource Conservation and Development Program
  - Public Law 566 (Small Watershed Protection and Flood Prevention Act)
  - Conservation Technical Assistance Program
- Emergency Conservation Program (USDA Farm Service Agency)
- Agricultural Stabilization and Conservation Service (USDA):
  - Agricultural Conservation Practices Program
  - Conservation Reserve Program
- Rural Clean Water Act/Program (USDA)
- Farmers Home Administration (USDA)
- Rural Development Administration (USDA)
- Sustainable Agriculture Research and Education (USDA)
- Farmers Home Administration (USDA)
- Agriculture in Concert with the Environment Program (EPA and USDA)
- National Water Quality Assessment Program (USGS)
- Rural Economic and Community Development Service

Off-Reservation:

- Whatcom County Manure Ordinance
- Whatcom Conservation District
- Washington State Dairy Nutrient Management Act

Silviculture

On-Reservation:

- Lummi Title 10 Natural Resources Ordinance
- BIA Forest Management Program

Off-Reservation:

- State Forest Practices Rules and Regulations, including the Forests and Fish Report/Plan
- State Forest Land Management Program
- 1987 Timber, Fish, and Wildlife Agreement
  - Watershed Analysis
- Northwest Forest Plan (USFS)

Hydromodification

On-Reservation:

- Nooksack Estuary Recovery Project (LNR)
- Lummi Coastal Zone Management Plan
- Lummi Title 13 Tidelands Code: Tidelands Management
- Lummi Title 15A Flood Damage Prevention Code
- Lummi Flood Damage Reduction Plan
- Hazard Mitigation Grant Program (FEMA)
- Clean Water Act Section 404, Corps of Engineers Dredge and Fill Permit Program
- River and Harbors Act Section 10 Permit Process (Corps)
- Clean Water Act Section 10 (EPA)
- Wetlands Protection Development Grants (EPA)
- Endangered Species Act (NMFS, USFWS)
- U.S. Fish and Wildlife Service Grants (U.S. Department of the Interior)

Off-Reservation:

- South Fork Nooksack River Engineered Log Jam Project (LNR)
- South Fork Nooksack Dike Removal Project
- Whatcom County Comprehensive Flood Hazard Management Plan
- State Shoreline Management Act (Ecology)
- Hydraulic Project Approval Program (WDFW)
- Washington Conservation Corps (Ecology)
- Jobs for the Environment Program

Urban Runoff

On-Reservation:

- Environmental Justice to Small Community Groups (EPA)

Off-Reservation:

- Municipal Storm-Water Management Plans
- Disposal of Toxics Program (Whatcom County)
- Small Business Hazardous Waste Reduction Program (Whatcom County Public Health Department)
- Model Litter Control and Recycling Act (Ecology)
- Hazardous Waste Management Program (Ecology)

Resource Extraction

Off-Reservation:

- Sand and Gravel General Permit Program (Ecology)
- State Surface Mining Act

Atmospheric Deposition

On-Reservation:

- Northwest Air Pollution Control Authority
- Air Quality Program (EPA)

Highway Maintenance and Runoff

On-Reservation:

- Federal Intermodal Surface Transportation Act of 1991

Off-Reservation:

- Road maintenance (Whatcom County Public Works Department)

Land Disposal

On-Reservation:

- Inspections of on-site septic systems (Lummi Sewer District)

Off-Reservation:

- Inspections of on-site septic systems (Whatcom County Public Health Department)

Ground-Water Withdrawal

On-Reservation:

- Lummi Ground Water Monitoring Program

Off-Reservation:

- State Water Right Permit Process

The NPS categories that are not listed above are largely addressed by the NPS programs listed in the "all categories" section. Most of these NPS control programs are described elsewhere (Ecology 1989; CTCR 1992; FPAST 1993; EPA 1997c; Ecology 2000c; LWRD 2000a); the remaining programs are described in Section 7 or are self-explanatory.

5. SUMMARY/CONCLUSIONS

Analysis of available water-quality data and potential sources of NPS pollution shows that surface waters on and flowing onto the Reservation are currently or potentially affected by all classes of NPS pollutants. These pollutants include bacteria/pathogens, fine sediment, nutrients, oxygen-demanding substances (low dissolved oxygen), pH, temperature, metals, pesticides, household and industrial chemicals, and oil and grease. The four major waterbodies (Nooksack River, Portage Bay/Bellingham Bay, Lummi River, and Lummi Bay/Strait of Georgia) and the ground water on the Reservation are currently and/or potentially impaired by NPS pollution. The three current impairments of greatest concern to the Lummi Nation are the closure of large portions of Portage Bay to commercial harvest of shellfish, the degradation of salmonid habitat in the Nooksack River watershed and estuary, and saltwater intrusion into Reservation aquifers. The potential impairments of most concern are the threat of commercial shellfish closures in Lummi Bay (and in the remaining approved areas of Portage Bay) and the contamination of Reservation ground water by various pollutants. These waters require NPS control measures to restore or maintain desired water uses and to meet or maintain Draft Lummi Water-Quality Standards.

The NPS categories primarily responsible for the current and potential impairments of surface and ground water in the Reservation watersheds are agriculture, hydromodification/habitat modification, silviculture, urban runoff, and ground-water withdrawal. Although construction, atmospheric deposition, highway/road runoff, and land disposal may be significant contributors to the impairment of Reservation waters, these four sources and the remaining source categories listed in Table 2.3 do not appear to be major sources at this time. However, control of each NPS category should contribute to the improvement and the preservation of water quality and aquatic habitats both on and off the Reservation. The primary and potentially significant sources of impairment will be the high priority targets for NPS management.

To reduce the impacts of NPS pollution on surface and ground water and achieve the NPS management goals, appropriate BMPs must be effectively applied. Effective use of BMPs, coupled with land-use zoning, should minimize the effects of NPS pollution on the Reservation. Fourteen LIBC environmental programs, as well as specific LNR activities aimed at the five current and potential primary impairments, already address, or will address, NPS pollution on the Reservation. The NPSMP will support and complement these current programs and activities.

6. REFERENCES

Cline, D.R. 1974. A ground water investigation of the Lummi Indian Reservation area, Washington. Tacoma, U.S. Geological Survey, Open-File Report. 66 p.

Confederated Tribes of the Colville Reservation (CTCR). 1992. Report: nonpoint-source pollution assessment and management program. Environmental Trust Department, Colville Environmental Quality Commission, CTCR. December.

Fort Peck Assiniboine and Sioux Tribes (FPAST). 1993. Fort Peck Tribes nonpoint source management plan. Poplar, Montana.

Idaho Department of Health and Welfare (IDHW). 1996. A landowner and contractor's best management practices guide for the control and treatment of storm water, erosion, and sedimentation.

Lummi Indian Business Council (LIBC). 1996. Lummi Nation comprehensive environmental land use plan: background document. Lummi Reservation, Washington.

Lummi Water Resources Division (LWRD). 1997. Lummi Nation Wellhead Protection Program --Phase I. Prepared for Lummi Indian Business Council. Lummi Reservation, Washington. November.

Lummi Water Resources Division (LWRD). 1998a. Lummi Reservation Storm Water Management Program Technical Background Document. Prepared for Lummi Indian Business Council. Lummi Reservation, Washington. December.

Lummi Water Resources Division (LWRD). 1998b. Lummi Nation Water Reclamation and Reuse. Prepared for Lummi Indian Business Council. Lummi Reservation, Washington.

Lummi Water Resources Division (LWRD). 1998c. Lummi Nation Wellhead Protection Program -- Phase II. Prepared for Lummi Indian Business Council. Lummi Reservation, Washington. May.

Lummi Water Resources Division (LWRD). 1999a. Water Quality Summary. Prepared for Lummi Indian Business Council. Lummi Reservation, Washington.

Lummi Water Resources Division (LWRD). 1999b. Preliminary characterization of fecal coliform contributions to Portage Bay from the Hermosa Beach area. Prepared for Lummi Indian Business Council. Lummi Reservation, Washington.

Lummi Water Resources Division (LWRD). 2000a. Lummi Indian Reservation Wetland Management Program Technical Background Document. Prepared for Lummi Indian Business Council. Lummi Reservation, Washington. March.

Lummi Water Resources Division (LWRD). 2001. Lummi Nation Nonpoint-Source Assessment Report. Prepared for Lummi Indian Business Council. Lummi Reservation, Washington. December.

Metropolitan Washington Council of Governments (MWCOG). 1992. A Current Assessment of Urban Best Management Practices: Techniques for Reducing Nonpoint Source Pollution in Coastal Areas. Pub. No. 92705, 127 p.

Northwest Air Pollution Authority (NWAPA). 1999. Class "A" and Air Operating Permit Source Emission Inventory for Island, Skagit, and Whatcom Counties of Washington State. Mt. Vernon, Washington.

U.S. Environmental Protection Agency (EPA). 1992. Storm water management for construction activities: developing pollution prevention plans and best management practices. Office of Water, Washington, DC. EPA/832/R-92/005.

U.S. Environmental Protection Agency (EPA). 1993. Guidance specifying management measures for sources of nonpoint pollution in coastal waters. Office of Water, Washington, D.C. EPA/840/B/92/002. January.

U.S. Environmental Protection Agency (EPA). 1996. Protecting natural wetlands: a guide to stormwater best management practices. Office of Water, Washington, D.C. EPA/843/B-96/001.

U.S. Environmental Protection Agency (EPA). 1997a. Guidelines for Preparation of the Comprehensive State Water Quality Assessments [305(b) Reports] and Electronic Updates: Supplement. Office of Water, Washington, D.C. EPA-841-B-97-002B.

U.S. Environmental Protection Agency (EPA). 1997b. Monitoring guidance for determining the effectiveness of nonpoint source controls. Office of Water, Washington, D.C. EPA/841/B/96/004. September.

U.S. Environmental Protection Agency (EPA). 1997c. Tribal nonpoint source workshop handbook. Region 10, Seattle, Washington. October.

U. S. Geological Survey (USGS). 1999. The Quality of Our Nation's Waters -- Nutrients and Pesticides. USGS Circular 1225. U.S. Department of the Interior. Reston, Virginia. 82 p.

Washington State Department of Ecology (Ecology). 1989. Nonpoint Source Assessment and Management Program. Pub. #88-17. Olympia, Washington. October.

Washington State Department of Ecology (Ecology). 1992. Stormwater Management Manual for the Puget Sound Basin. Volume 1 (Pub. No. 92-32) and Volume 2 (Pub. No. 92-33).

Washington State Department of Ecology (Ecology). 2000a. 1998 Section 303(d) List. Olympia, Washington.

Washington State Department of Ecology (Ecology). 2000b. Lower Nooksack River Basin Bacteria Total Maximum Daily Load Evaluation. Pub. #00-03-006. Olympia, WA. January.

Washington State Department of Ecology (Ecology). 2000c. Washington's Water Quality Management Plan to Control Nonpoint Source Pollution. Pub. #99-26. Olympia, Washington. April.

Washington State Department of Health (DOH). 1997. Report: Sanitary Survey of Portage Bay. Office of Shellfish Programs, Olympia, Washington. August. 30 p.

Whatcom Conservation District (WCD). 1998. Portage Bay Initial Closure Response Strategy: A Community Effort to Reclaim Lost Shellfish Resource. Portage Bay Closure Response Team, Whatcom Conservation District, Lynden, Washington. February. 12 p.

7. LIST OF ACRONYMS AND ABBREVIATIONS

Programs and Terms:	
BMP	Best-Management Practice
CWA	Clean Water Act
CWRMP	Comprehensive Water Resources Management Program
CZMP	Coastal Zone Management Plan
DLWQS	Draft Lummi Water Quality Standards
ESA	Endangered Species Act
FDRP	Flood Damage Reduction Plan
GAP	General Assistance Program
GLUP	General Land Use Plan
GWMP	Ground Water Monitoring Program
MOA	Memorandum of Agreement
NERP	Nooksack Estuary Recovery Project
NPS	Nonpoint Source
NPSAR	Nonpoint-Source Assessment Report
NPSMP	Nonpoint-Source Management Program
NSSP	National Shellfish Sanitation Program
QA/QC	Quality Assurance/Quality Control
SWMP	Storm Water Management Program
SWQMP	Surface Water Quality Monitoring Program
TEPA	Tribal Environmental Policy Act
TMDL	Total Maximum Daily Load
TRC	Technical Review Committee
WMP	Wetland Management Program
WPP	Wellhead Protection Program
WQS	Water Quality Standards
WRIA	Water Resource Inventory Area

Agencies and Organizations (Parent Organization):	
BIA	Bureau of Indian Affairs
Corps	U.S. Army Corps of Engineers
CTCR	Confederated Tribes of the Colville Reservation
DNR	Department of Natural Resources, Washington State
DOH	Department of Health, Washington State
Ecology	Department of Ecology, Washington State
FEMA	Federal Emergency Management Agency
FPAST	Fort Peck Assiniboine and Sioux Tribes
IDHW	Idaho Department of Health and Welfare
LIBC	Lummi Indian Business Council
LNR	Lummi Natural Resources Department
LPD	Lummi Planning Department

LWRD/WRD	Lummi Water Resources Division (LNR)
MWCOG	Metropolitan Washington Council of Governments
NMFS	National Marine Fisheries Service (NOAA)
NOAA	National Oceanic and Atmospheric Administration
NRCS	Natural Resources Conservation Service (USDA)
NWAPA	Northwest Air Pollution Authority
NWIC	Northwest Indian College
USDA	US Department of Agriculture
USDI	US Department of the Interior
USEPA/EPA	US Environmental Protection Agency
USFS	US Forest Service
USFWS	US Fish and Wildlife Service (USDI)
USGS	US Geological Survey (USDI)
WCD	Whatcom Conservation District
WDFW	Washington State Department of Fish and Wildlife
WSDC	Washington State Department of Conservation
WSU	Washington State University

Appendix A:

Comprehensive Water Resources Management Program fact sheets

FACT SHEET
COMPREHENSIVE WATER RESOURCES MANAGEMENT PROGRAM (CWRMP)

Frequently Asked Questions	Response
Why is the Water Resources Division Developing a Comprehensive Water Resources Management Program (CWRMP)?	The Comprehensive Water Resources Management Program (CWRMP) is being developed in response to Lummi Indian Business Council (LIBC) resolutions 90-88 and 92-43. These resolutions directed the development of a CWRMP to ensure that the planning and development of Reservation water and land resources are safeguarded against surface and ground water degradation.
What is the CWRMP?	The Comprehensive Water Resources Management Program (CWRMP) is: • Based on field data, literature reviews, community involvement, and scientific investigations; • Includes a wellhead protection program, a storm water management program, a wetlands management program, water quality standards, and administrative procedures; and • Includes revision of the Lummi Nation water code to incorporate the best management practices identified during the program development and to better reflect the policies, priorities, and guidelines of the LIBC.
How is the CWRMP being Developed?	The CWRMP is being developed in stages: • Initially, background documents are being developed for the technical components (e.g., wellhead protection, storm water management, wetland management, water quality standards). These documents will be the technical foundation of the water code. • Draft ordinances are then developed for each component based on the technical background document and literature reviews of similar ordinances in other jurisdictions (federal, tribal, states, counties, and cities). • Presentation of draft ordinances to LIBC commissions and public education efforts occur to provide information and receive comments on draft ordinances. • Refinement of draft ordinances based on comments and the holding of a public hearing on each ordinance. • Refinement of ordinances based on the public hearing and adoption of final ordinance into Title 17 of the Lummi Code of Laws.

FACT SHEET
COMPREHENSIVE WATER RESOURCES MANAGEMENT PROGRAM (CWRMP)

Frequently Asked Questions	Response
What is the Current Status of the CWRMP Development Effort?	The current status of the CWRMP development efforts is: • Technical background documents have been completed for the wellhead protection program, the storm water management program, and the wetland management program. • Literature reviews of similar ordinances in other jurisdictions have been completed for the wellhead protection program, the storm water management program, the wetland management program, and the water quality standards program. Administrative procedures have also been reviewed. • Draft ordinances for the wellhead protection program and the storm water management program have been developed. • Development of a draft ordinance for the wetlands management program is scheduled for completion by Winter 2002. • Presentations of the draft wellhead protection, storm water management, wetland management, and water quality standards ordinances as well as the administrative procedures to LIBC commissions, the public education efforts, and the public hearings are scheduled to occur during Winter 2002. • Refinement of these ordinances and procedures based on the public hearing and adoption of final ordinances into Title 17 of the Lummi Code of Laws during Winter/Spring 2002.
What can I do to Help?	You can help in the CWRMP development effort if you: • Become informed about the different water resources management programs under development and provide feedback to the Water Resources Division to ensure that Title 17 meets your needs.

FACT SHEET
LUMMI NATION WELLHEAD PROTECTION PROGRAM

Frequently Asked Questions	Response
What is a Wellhead?	A wellhead is an opening in the ground (e.g., well, spring) that allows access to underground water supplies (aquifers).
Why is Wellhead Protection Important on the Lummi Reservation?	Wellhead Protection is important because: • Over 95% of Reservation residential water supply is pumped from local aquifers. • Due to the location of the Reservation, ground water resources are particularly vulnerable to contamination from sea water intrusion. • Alternative water sources are expensive. • The on-Reservation Salmon Hatchery program is dependent upon ground water. • An ample supply of good quality ground water is essential to serve the purposes of the Reservation as the permanent homeland of the Lummi people.
What is the Purpose of the Lummi Nation Wellhead Protection Program?	The purpose of the Lummi Nation Wellhead Protection Program is to protect the on-Reservation ground water supply (aquifers) from contamination.
What is being Done to Protect Our Ground Water	The Water Resources Division of the Lummi Natural Resources Department is: • Developing a wellhead protection ordinance. • Developing storm water and wetland management ordinances. • Monitoring water in wells. • Supporting federal water rights negotiations. • Conducting spill response planning.
What Actions are Planned for Reservation Wellhead Protection Program?	• Distribution of Information about Wellhead Protection to the Lummi Community (ongoing) • Public Hearing(s) and adoption of a Wellhead Protection Ordinance (Winter 2002)

WELLHEAD PROTECTION ON THE LUMMI RESERVATION

The overall purpose of the Lummi Nation Wellhead Protection Program is to protect the ground water resources of the Lummi Reservation (Reservation) from contaminants which may have an adverse effect on the health of persons or the integrity of the ground water resources of the Lummi Nation. The Wellhead Protection Program is a proactive approach by the Lummi Nation to prevent contamination of ground water resources by pollution and reduce risks that the Lummi Nation's ground water resources will become impaired or otherwise unusable as the primary water supply for the Lummi Nation and residents of the Reservation (LIBC 1997).

Similar to the storm water management and wetland management program, the Wellhead Protection Program is being developed in three phases. Phase I of the wellhead protection program is comprised of a susceptibility assessment and the development of contingency and public involvement plans. The first phase was completed in November 1997 and is documented in the Lummi Nation Wellhead Protection Program Phase I report (LIBC 1997). The Phase II report documents the implementation of the community involvement plan, the spill response planning effort, the development of wellhead protective measures, and an action plan through the year 2000. Phase III will include developing and implementing the protective measures and the public education measures identified during Phase II of the program.

The Lummi Nation Wellhead Protection Program will inform and involve the community through a variety of methods including:

- A Wellhead Protection Committee
- Slide Presentations
- Squol Quol News Articles
- Posters, Flyers, and Brochures
- Presentations at Schools and Northwest Indian College
- Community Meetings

References

Wellhead Protection Program, Lummi Indian Business Council (1997).

FACT SHEET
LUMMI NATION
STORM WATER MANAGEMENT PROGRAM

Frequently Asked Questions	Response
What is Storm Water?	Storm Water is surface water runoff that results from rain or snowmelt.
Why is Storm Water Management Important on the Lummi Reservation?	Managing Storm Water is important to: • Minimize opportunities for storm water to carry pollutants into aquifer recharge areas, as well as resource rich estuaries and tidelands of the Reservation. Contaminated storm water can adversely impact ground water and shellfish habitat. • Minimize the downstream impacts of new development on existing development and property owners (e.g. not flooding your neighbor). • Maximize the opportunities for infiltration and aquifer recharge. Storm water recharges Reservation aquifers, and over 95% of Reservation residential water supply is pumped from local aquifers
What is the Purpose of the Reservation Storm Water Management Program?	The purpose of the Storm Water Management Program is to: • Protect the on-Reservation ground water supply (aquifers) from contamination. • Protect Reservation surface water from contamination. • Protect tribal tideland resources from contamination. • Protect downstream property owners from new development.
What Actions are Planned for the Reservation Storm Water Management Program?	• Distribution of Information about Storm Water to Lummi Community (ongoing) • Public Hearing(s) and adoption of a Lummi Storm Water Management Ordinance (Winter 2002)

STORM WATER MANAGEMENT ON THE LUMMI RESERVATION

Contaminated storm water can adversely impact the tidelands, estuaries, ground water, and surface waters of the Lummi Reservation. The potential impacts of contaminated storm water threaten the health and welfare of the Lummi Nation, its members, and all person present on the Reservation. Accordingly, the Lummi Natural Resources Department, in conjunction with the Lummi Planning Department, is developing a storm water management program for the Reservation based on the potential impacts and the following considerations:

- With the exception of water discharged into Washington State aquatic lands from the two wastewater treatment plants, all water that falls onto or passes through the Lummi Reservation discharges to resource rich tidelands and/or estuaries of the Lummi Nation. These resources, which are culturally and economically important to the Lummi Nation and its members, surround the Reservation uplands. Tideland resources include salmon, shellfish, extensive eelgrass beds, herring spawning grounds, surf smelt, sand lance, wildlife, and water supply intakes for a salmon and shellfish hatchery.
- The Lummi Nation goal is for waters of the Reservation to comply with the federal Clean Water Act.
- Population projections, planned economic and institutional growth on the Reservation, and the small percentage of Reservation land that has been developed all suggest that portions of existing forested and agricultural lands will be converted to residential, commercial, or community uses in the coming years. Land use changes where forested or agricultural lands are converted to residential, commercial or community uses can be expected to affect storm water quantity and quality.
- In general, development impacts vegetation and soil properties in a manner that results in greater amounts of storm water, higher peak discharges, and lower water quality. Minimizing these adverse impacts from development and maximizing the protection of sensitive and important natural resources is necessary to protect the political integrity, economic security, and the health and welfare of the Lummi Nation, its members, and all persons present on the Reservation.
- As a finite resource, ground water is one of the most important and critical of the Lummi Nation's resources. Storm water is an important source of ground water recharge and a potentially significant source of ground water contamination. Ample supplies of ground water of good quality are essential to serve the purposes of the Reservation as the permanent homeland of the Lummi Nation and its members.

FACT SHEET
LUMMI NATION
WETLAND MANAGEMENT PROGRAM

Frequently Asked Questions	Response
What is a Wetland?	For an area to be classified as a wetland, it must exhibit three characteristics: hydrophytic (water loving) vegetation, hydric (saturated or water logged) soils, and hydrologic processes that support wetland functions. In general, a wetland is an area that is seasonally inundated (submerged under water) or has saturated soils for 23 days of the growing season (April – September).
Why is a Wetland Management Program Important on the Lummi Reservation?	A Reservation Wetland Management Program is important to: • To protect the functions and values of Reservation wetlands from the impacts of residential and commercial development; • To encourage residential development by and for tribal members as well as commercial and business growth on the Reservation for tribal employment opportunities by providing defined wetland management standards, requirements, and mitigation alternatives for effective project planning; • To protect and enhance fish and shellfish resources, wildlife resources, cultural resources, and the quantity and quality of Reservation ground water; and • To protect surface water quality and enhance storm water management.
What is the Purpose of the Reservation Wetland Management Program?	The purpose of the Wetland Management Program is to: • Protect the on-Reservation ground water supply. • Protect surface water resources including tidelands and estuaries. • Protect both wetland functions and property owners.
What is Wetland Mitigation?	Generally speaking, when development is proposed on a wetland it usually results in the loss of all or a portion of the wetland area. Mitigation replaces that wetland loss by creating more wetland than was destroyed. There are four types of Wetland Mitigation: • Creation of new wetlands, Ratio 2 or 3 : 1 • Enhancement of existing wetlands, Ratio 6 : 1 • Restoration of degraded wetlands, Ratio 1.5 : 1 • Preservation of existing wetlands, Ratio 10 : 1
What Actions are Planned for the Reservation Wetland Management Program?	• Distribution of Information about the Wetland Management Program to the Lummi Community (ongoing) • Literature Review of Wetland Ordinances (completed) • Draft Wetlands Ordinance (Winter 2002) • Public Hearing(s) and adoption of Wetland Ordinance (Winter 2002)

WETLAND MANAGEMENT ON THE LUMMI INDIAN RESERVATION

Wetlands are legally defined as, "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas" (U.S. Army Corps of Engineers [Corps] 1987).

Wetlands perform important functions including: ground water recharge/discharge; flood flow storage (reduction in peak discharge); maintaining base stream flow; shoreline stabilization; food chain support by providing habitat for a variety of terrestrial and aquatic organisms; microbial control; and removal or reduction of sediment, nutrient and toxicants from waters (Brinson 1993b, Granger et al. 1996, Gersib 1997). Wetlands also provide areas of cultural significance, recreation opportunities, and outdoor education opportunities.

The goals of the Lummi Nation Wetland Management Program are to: 1) develop technical background information for a Lummi wetland management ordinance consistent with land use and resource management comprehensive plans, and 2) increase public awareness of the importance of Reservation wetlands to promote compliance with the ordinance once it is enacted.

To effectively manage Reservation wetlands, the location, extent, and function of wetlands must be known. In the early 1970s, Reservation wetlands were inventoried as part of the U.S. Fish and Wildlife Service National Wetlands Inventory (USFWS 1987). This initial inventory, which was not field verified on the Reservation, has been improved as wetland inventories have been conducted on select areas of the Reservation for various projects. To support the Lummi Reservation Wetland Management Program, during 1999 a comprehensive inventory of Reservation wetlands was contracted to a private consulting firm specializing in wetlands. As part of the contract, wetland function assessments were conducted on twelve selected Reservation wetlands.

The Comprehensive Wetlands Inventory on the Reservation classified wetlands using both the Cowardin Classification System (Cowardin et. al. 1979) and the Hydrogeomorphic Classification System (Brinson 1993b). The results of the comprehensive wetland inventory and the function assessments provide direction for long-term planning. Wetland function assessments are important for understanding what functions a wetland performs and how well those functions are performed (Brinson 1993b, Cooke 1996, Gersib 1997, Granger et. al. 1996, Roth et. al. 1993, Ecology 1998a). With this information, planners and managers can understand where wetlands should be preserved, where development will least impact wetlands, and where wetland restoration efforts should be directed.

The 1999 comprehensive inventory of wetlands on the Lummi Reservation indicated that approximately 43 percent of the Reservation upland areas are either wetlands or wetland complexes. Of these Reservation wetlands, about 60 percent are located in the flood plains of the Lummi and Nooksack rivers. Wetland complexes are areas where wetlands formed a highly interspersed mosaic with upland hummocks. During the wetland inventory, boundaries were drawn around the outer edges of the mosaic and the entire area labeled a "wetland complex". As a result, the estimated wetland area identified in the inventory generally represents more wetland area than actually exists. All wetland boundaries mapped during the comprehensive wetland inventory are general boundaries based on interpretation of color and infrared aerial photographs with some field verification. Specific wetland boundaries will be delineated on the ground as needed for specific activities.

FACT SHEET
LUMMI NATION WATER QUALITY STANDARDS PROGRAM

Frequently Asked Questions	Response
What are Water Quality Standards?	Water Quality Standards (WQS) are rules or laws that are adopted to protect the public health and welfare, enhance the quality of water, and serve the purposes of the Clean Water Act (CWA) by providing, wherever attainable, for the protection and propagation of fish, shellfish, and wildlife, and for recreation in and on the water. These uses are commonly referred to as the "fishable/swimmable" goals of the CWA.
What is the Lummi Nation Water Quality Standards Program?	The Lummi Nation works in close cooperation with federal, state, and local agencies to address water quality issues. As part of this effort, the Lummi Nation has applied to the U.S. Environmental Protection Agency (EPA) for eligibility to administer the water quality standards program under Section 518 of the Federal Clean Water Act (CWA). Approval of the application would allow the Lummi Nation to adopt, review, and revise water quality standards pursuant to Section 303(c) of the CWA, and to certify that discharges comply with the adopted water quality standards pursuant to Section 401 of the CWA. The water quality standards would apply to all surface waters within the exterior boundaries of the Lummi Indian Reservation (Reservation).
What is the Goal of the Lummi Water Quality Standards Program?	The overall goal of adoption of water quality standards is to attain fishable and swimmable waters within the Reservation.
Why is the Lummi Nation Seeking Eligibility to Administer the Water Quality Standards Program?	• To protect the quality of surface waters of the Reservation. • The Lummi Nation is governed by the Lummi Indian Business Council (LIBC) which carries out substantial duties and powers, including the protection of the natural resources, health, welfare, and safety of tribal members and other residents of the Reservation. This program is fundamental to why governments exist--protection of public health and welfare. • Implementation of water quality standards is a well-recognized tool authorized under the CWA. The Lummi Nation needs this tool to help address water quality problems that exist on the Reservation such as protecting Tribal tidelands and sensitive shellfish growing areas. • The state cannot address on-Reservation pollution sources.

FACT SHEET
LUMMI NATION WATER QUALITY STANDARDS PROGRAM

Frequently Asked Questions	Response
What does "Eligibility to Administer the Water Quality Standards Program" mean?	The EPA is responsible for administering and ensuring that the goals of the CWA are attained. If a state or tribe apply for eligibility and the EPA determines that the state or tribe has the capability to administer the water quality standards (WQS) program, the EPA delegates their authority to the state or tribe. This is a two-part process. The first part is a determination by the EPA that a state or tribe is eligible to administer the program. The second part is the adoption of the actual water quality standards. The application process to administer the WQS program is rigorous. It is anticipated that the EPA will make a decision on the Lummi Nation's eligibility in 2002. • States have been administering WQS as part of the CWA since the 1970s. Tribal administration of the WQS program is a result of Section 518 of the CWA added in 1987. • This process was formerly referred to as "Treatment as a State," and "Treatment in a manner similar to a State." The acronym "TAS" is commonly used to refer to this program. • Washington State, Puyallup Tribe, Tulalip, and the Chehalis Tribe have already been delegated this authority by the EPA. The Puyallup and Chehalis Tribes also have approved WQS. The Colville Tribe had the federal government promulgate WQS for the Colville Reservation. • The WQS will require EPA approval and a public hearing prior to implementation. Adoption of WQS is anticipated to occur in Winter 2002.
What is the Current Status of the Water Quality Standards Program?	• The initial public comment period for the Lummi Application occurred during the summer of 1999. • Nearly 500 comment letters were submitted in opposition to the application. Most of the comment letters were from fee landowners that have chosen to live on the Reservation. • If the EPA authorizes the Lummi Nation to administer the program, there will be a second comment period on the decision. • Public hearings will be held on the water quality standards. The criteria in the Lummi Nation's draft WQS are the same as those in the Washington State WQS.

Appendix B:

Unified Watershed Assessment for Watersheds within the Boundaries of the Lummi Nation

LUMMI INDIAN BUSINESS COUNCIL
2616 KWINA ROAD • BELLINGHAM, WASHINGTON 98226-9298 • (360) 384-1489
DEPARTMENT _____ EXT._____

September 24, 1998

The Unified Watershed Assessment Working Group (4503F)
U.S. Environmental Protection Agency
401 M. Street, S. W.
Washington, D.C. 20460

Subject: Unified Watershed Assessment for the Lummi Indian Nation

Dear Working Group Members,

Enclosed for your use, please find the unified watershed assessment completed for watersheds within the boundaries of the Lummi Nation. Both of the watersheds (HUC 17110002 and 17110004) were classified as Category I watersheds. The classification assigned to these two watersheds by the Lummi Nation is consistent with the watershed classifications assigned by the State of Washington in their parallel process.

Lummi Nation staff has coordinated our efforts with the Washington State Department of Ecology (lead agency for the Clean Water Action Plan in Washington State), the local Natural Resources Conservation Services office, and the Whatcom County Water Resources Manager.

Please do not hesitate to call Leroy Deardorff, Lummi Nation Environmental Protection Program Director (360-384-2272), if you would like additional information regarding the enclosed assessment.

Sincerely,

Merle Jefferson

Merle Jefferson, Executive Director
Lummi Natural Resources Department

cc Christine Hempleman, Department of Ecology
John Gillies, Natural Resources Conservation Service
Sue Blake, Whatcom County Water Resources Manager

Unified Watershed Assessment For
Watersheds Within the Boundaries of the Lummi Nation

Final September 1998

Introduction

The U.S. Environmental Protection Agency (EPA) and the U.S. Department of Agriculture (USDA) issued the Clean Water Action Plan (CWAP) in February 1998. The CWAP calls for tribal and state governments to work with appropriate agencies, governments, and the public to assess the conditions of water resources in their areas and to classify watersheds within their boundaries into one of four categories. The four categories are:

- **Category I.** Category I watersheds are in need of restoration. These watershed do not now meet, or face imminent threat of not meeting, clean water and other natural resource goals.
- **Category II.** Category II watersheds are meeting clean water and other natural resource goals and standards and support healthy aquatic systems. All such watersheds need the continuing implementation of core clean water and natural resource programs to maintain water quality and conserve natural resources.
- **Category III.** Category III watersheds have exceptionally pristine water quality, other sensitive aquatic system conditions, and drinking water sources. These areas include currently designated and potential candidate Wilderness Areas, Outstanding Natural Resource Waters, and Wild and Scenic Rivers.
- **Category IV.** Category IV watersheds lack significant information, critical data elements, or the data density needed to make a reasonable assessment at this time.

Although watersheds can be evaluated at various geographic scales (e.g., lake, wetland, stream, river, small bay), a common scale is needed for the national objectives of the CWAP. As defined in the CWAP, watershed boundaries for the purposes of the CWAP are defined by the U.S. Geological Survey (USGS) 8-digit hydrologic unit code. In western Washington State, tribal lands can be generally characterized as having small reservations and large usual and accustomed (U&A) fishing, hunting, and gathering areas where the tribal governments are co-managers of the natural resources with state and federal governments. Because of the large size of the U&A areas and work load/staffing constraints, the Lummi Nation has focused its natural resources management efforts throughout the Nooksack River watershed and Georgia Strait. A similar limited geographic area approach is being used to conduct the unified watershed assessments called for in the CWAP. The two 8-digit hydrologic unit code watersheds that will be addressed in the Lummi Nation unified watershed assessments are:

- 17110002 (Strait of Georgia - 955 square miles) and
- 17110004 (Nooksack River - 795 square miles).

The remainder of this document will describe the process, participants, rationale, and information used to classify these two watersheds into one of the four categories identified in the CWAP. As will be described further below, both of these watersheds were classified as Category I watersheds.

Classification Process

The selection factors identified in the CWAP were used as the basis for categorizing watersheds 17110002 and 17110004. The selection factors, the criteria associated with each selection factor, and the applicability of each of the criteria to the two subject watersheds are summarized in Table 1. As shown in Table 1, all of the identified selection factors and criteria applied to both of the subject watersheds. Consequently, both watersheds were classified as Category I watersheds in this unified watershed assessment.

Although all of the selection factors and criteria were applicable to both watersheds, it is important to note that the geographic scale of the assessment is large. Consequently, these watersheds have areas that meet clean water and other natural resource goals and, at a smaller scale, would result in a Category II classification for some of the subbasins that comprise the larger watershed. Similarly, each of the watersheds contain areas of pristine lands that would be classified as Category III.

Participants

Due to a lack of available staff time, development of the unified watershed assessment did not begin until early August 1998. This unified watershed assessment for tribal lands was developed primarily by the Water Resources Division of the Lummi Natural Resources Department. Staff and time limitations prevented implementation of a public review process for this assessment by the Lummi Nation.

Although a public review process was not conducted by the Lummi Nation for this unified watershed assessment, the information used to conduct the analysis was derived from scientific reports and other public documents that have included public review processes. The Lummi Water Resources Division has also worked with the Washington State Department of Ecology in the development of the draft Unified Watershed Assessment for Washington State. The two subject watersheds (17110002 and 17110004) were classified as Category I watersheds in the Washington State process. In addition, the Lummi Water Resources Division contacted the local Natural Resources Conservation Service office and the Water Resources Manager for Whatcom County to ensure that development of the unified watershed assessment did not overlap their efforts.

Rationale

The rationale for classifying watersheds 17110002 and 17110004 as Category I watersheds is summarized in Table 1.

Table 1. Classification system used by the Lummi Nation to categorize watersheds for the Clean Water Action Plan

Selection Factor	Criteria	Watershed 17110002	Watershed 17110004
1. Nonattainment of national clean water goals.	a) Watershed with a waterbody on the 1996 303(d) list.	Yes	Yes
	b) Watershed with shellfish beds that are, or continue to be, threatened with downgrade in accordance with National Shellfish Sanitation Program criteria or where shellfish areas are closed to harvesting and a closure response plan is in place.	Yes	Yes
	c) Watersheds with concerns related to nitrates in the drinking water, pesticides, and/or heavy metals.	Yes	Yes
2. Nonattainment of natural resource goals related to aquatic systems, including goals related to habitat, ecosystem health, and living resources.	a) Watershed with a waterbody that does not meet the minimum instream flows established by Washington State in 1986 as part of the Instream Resources Protection Program.	Yes	Yes
3. Other appropriate measures and indicators of degraded aquatic system conditions (e.g., wetland condition and current and historical loss rates, percent impervious surface, and other measures of aquatic habitat).	a) Watershed with a waterbody where loss of wetland areas along streams and rivers and/or in estuaries have been reported.	Yes	Yes
	b) Watershed rated above "3" on the EPA Index of Watershed Indicators	Yes	Yes
4. Decline in the condition of living and natural resources that are part of the aquatic system in the watershed (e.g., decline in the populations of rate and endangered aquatic species, decline in healthy populations of fish and shellfish, etc.)	a) Watershed with a waterbody where there is a proposed listing of spring Chinook salmon as "threatened" under the Endangered Species Act	Yes	Yes

Information Used

Bortleson, G.C., M.J. Chrzastowski, and A.K. Helgerson. 1980. Historical Changes of Shoreline and Wetland at Eleven Major Deltas in the Puget Sound Region, Washington. U.S. Geological Survey. Hydrologic Investigations Atlas HA-617.

Clean Water Action Plan: Restoring and Protecting America's Waters. February 14, 1998.

Deardorff, L. 1992. A Brief History of the Nooksack River's Delta Distributaries. Lummi Nation Fisheries Department. 33 p.

Environmental Protection Agency. October 1997. Index of Watershed Indicators. Available at http://www.epa.gov/surf/iwi/

Meriwether Frank. November 3, 1994. Sanitary Survey of Drayton Harbor. Washington State Department of Health, Office of Shellfish Programs.

Millam, Philip. May 27, 1997. Personal Communication. Letter to Henry Cagey, LIBC Chairman Transmitting the final 1996 Section 303(d) List for the State of Washington.

Portage Bay Closure Response Team. February 10, 1998. Portage Bay Initial Closure Response Strategy.

Washington Department of Ecology. October 1995. State of the Nooksack Watershed Report.

Appendix C:

Memorandum of Agreement between the Lummi Nation, Whatcom County, City of Bellingham, and Whatcom County Public Utility District No. 1 regarding a watershed management plan for Water Resources Inventory Area (WRIA) 1

MEMORANDUM OF AGREEMENT

Between

Lummi Nation, Whatcom County, City of Bellingham, and
Whatcom County Public Utility District No. 1

PURPOSE: The purpose of this agreement is to establish the local decision making group to develop and implement a watershed management plan that fulfills all of the requirements (water quantity assessment) and options (water quality, instream flow, and habitat assessments) authorized by ESHB 2514. The goal of the watershed plan is to ensure that the water resources in Water Resources Inventory Area (WRIA) 1 are managed to balance the competing resource demands for the WRIA in a manner that combines and coordinates data collection efforts, is consistent with Endangered Species Act (ESA) recovery actions, ensures that the water quality standards for the designated uses of each water body are achieved, and does not conflict with existing state statutes, federal laws, tribal laws, and tribal treaty rights.

INITIATING GOVERNMENTS: The initiating governments are the Lummi Nation, the Nooksack Tribe, Whatcom County, City of Bellingham, and the Whatcom County Public Utility District No. 1. The Nooksack Tribe was invited to be a signatory to this agreement, but has elected at this time to participate in the planning process without signing this agreement.

PLANNING UNIT: Whatcom County will be the Lead Agency in the planning effort. The first task of the initiating governments will be to fully define the Planning Unit. The Planning Unit will include, but is not limited to: Whatcom County, City of Bellingham, Whatcom County Public Utility District No. 1, Lummi Nation, and the Nooksack Tribe. The following governmental entities will be invited to participate: Washington State departments of Ecology, Fish and Wildlife, Natural Resources, Health, and Transportation; United States Bureau of Indian Affairs, Geological Survey, Bureau of Reclamation, Environmental Protection Agency, Fish and Wildlife Service, Natural Resources Conservation Service, Forest Service, and the National Marine Fisheries Service; and the other local governments within Whatcom County.

OBJECTIVES:

- Use the best available science to make reliable estimates of the total amount of available water in the WRIA (undepleted condition).
- Use the best available science to make reliable estimates of the tribal water rights for both instream and out-of-stream uses.
- Use the best available science to make reliable estimates of the amount of water available for allocation to junior users and for further appropriation.
- Use the best available science to make reliable estimates of the total maximum daily loading (TMDL) of contaminants throughout the WRIA to ensure that the water quality standards for the designated uses of each water body are achieved.
- Coordinate water resource management efforts with salmon recovery actions.

TASKS:

- Identify funding sources and contract with the U.S. Geological Survey to collect streamflow data throughout the WRIA for a 10-year period.
- Identify funding sources and collect climate data at representative locations within the WRIA to allow the precipitation and evapotranspiration components of the water budget to be accurately estimated for each month.
- Evaluate the accuracy of existing land use/land cover data; collect additional land use/land cover data if necessary.
- Identify funding sources and conduct a depletion analysis to accurately estimate the spatial and temporal uses of water in the WRIA throughout the year.
- Estimate undepleted streamflow based on collected streamflow data and the depletion analysis results.
- Identify funding sources and conduct an analysis to estimate optimal instream flows for the fisheries resources in the WRIA throughout the year.
- Estimate the most senior instream and out-of-stream water rights in the WRIA.
- Estimate the next most senior water rights in turn based on the priority date of existing water right holders.
- Estimate the amount of water remaining and thus available for allocation to new appropriators.
- Conduct necessary data collection and analysis to estimate TMDLs for fecal coliform (in progress), temperature, biochemical oxygen demand (BOD), sediment, and other water quality attributes of concern.
- Coordinate work with fish habitat team created under ESHB 2496.

DECISION MAKING:

- Decisions will be based on the best available science. For the purposes of this agreement, the best available science is defined as objective and repeatable analyses based on adequate empirical data collected with appropriate quality assurance/quality control procedures in place.
- Decisions will be made by unanimous vote with each member of the initiating governments having one vote. The parties agree that the term "consensus" as used in ESHB 2514 and this agreement means "unanimous agreement", and further agree to use this definition throughout their planning effort notwithstanding any contrary interpretation or definition of the term which may be placed on it by any other person or entity, including the courts or the legislature.

TERMINATION AND PRESERVATION OF RIGHTS:

- Any parties to this agreement may terminate their participation with written notice of intent to terminate followed by a formal termination letter.
- The parties recognize that ESHB 2514 provides that the planning process shall not contain provisions which conflict with tribal treaty rights or which impose an obligation on any participating government. They therefore agree that tribal participation in this process shall not constitute an admission or agreement by the participating tribe that any estimate of tribal treaty rights are binding on it, unless the affected tribe expressly so agrees in writing at the conclusion of the process, and such tribal agreement is approved in writing by the United States.
- The parties agree that any estimate of tribal treaty rights are not binding on the initiating governments unless the affected parties expressly so agree in writing at the conclusion of the process.
- The parties recognize that final agreement is more likely if the parties can freely discuss alternatives and hypotheticals without prejudice to positions they may take in legal proceedings. Therefore, no discussion, proposal, plan, agreement, (other than a formally adopted plan or agreement) offer of compromise, proposed agreement, concession, statement, material, or documents whether oral, written, or in electronic or other format (herein the "protected material"), made or prepared by the parties or their authorized agents in furtherance of the planning process envisioned by this agreement shall be offered into evidence against the party providing the "protected material" in any legal or administrative proceeding. Protected material originating from the Lummi

Nation shall not be offered into evidence in any legal or administrative proceeding, regardless of whether the Lummi Nation is a party to that proceeding. Reports and data from original studies conducted by or on behalf of the planning unit are public information.

- No amendment or alteration of this agreement shall arise by implication, course of conduct, or change in state law. This agreement may be altered only by a subsequent written document, signed by the parties, expressly stating the parties' intention to amend their agreement.

Lummi Nation

Date: 10/29/98
Henry Cagey, Chairman
Lummi Indian Business Council

Whatcom County

Date: 10-29-98
Pete Kremen, Executive
Whatcom County

City of Bellingham

Date: 10/29/98
Mark Asmundson, Mayor
City of Bellingham

Whatcom County Public Utility District No. 1

Date: 10/29/98
James Roberts, Commissioner
Whatcom County PUD No. 1

Appendix D:

Memorandum of Agreement Between the U.S. Environmental Protection Agency, Lummi Nation, Washington State Department of Ecology, and Washington State Department of Health Regarding the Portage Bay Shellfish Closure

MEMORANDUM OF AGREEMENT

Between

United States Environmental Protection Agency, Lummi Nation,
Washington Department of Ecology, and Washington Department of Health

PURPOSE: The purpose of this agreement is to define the roles and responsibilities of federal, tribal, and state agencies in the effort to reclassify the shellfish beds within and adjacent to Portage Bay on the Lummi Indian Reservation as "Approved" for commercial harvest.

TERM OF AGREEMENT: From date of execution until terminated as provided herein.

OBJECTIVE: The objective of this cooperative effort is to achieve an "Approved" classification status for shellfish beds within and adjacent to Portage Bay by December 31, 2001. An Approved classification will have been achieved if the water quality bacterial standard defined under the National Shellfish Sanitation Program (NSSP) are achieved and the results of a sanitary survey show that the area is not subject to fecal contamination from human or animal sources at levels that present a public health hazard.

In addition to routine communication necessary to accomplish the purpose of this agreement, the parties will participate in a management level meeting at a time near the above target date to discuss the status of this joint effort and/or other actions necessary to fully restore and protect Portage Bay shellfish beds.

PARTIES: The federal, tribal, and state agencies with regulatory authority to ensure that the objectives of this effort are achieved or have direct authority to classify commercial shellfish growing areas are the parties to this agreement. The parties to this agreement are the United States Environmental Protection Agency (EPA), the Lummi Natural Resources Department, the Washington Department of Ecology, and the Washington Department of Health. The parties to this agreement will work with political subdivisions of the state including the Initiating Governments conducting watershed planning under RCW 90.82 and the Portage Bay Shellfish Protection District to achieve the objective.

ROLES AND RESPONSIBILITIES: The roles and responsibilities of each of the parties to this agreement are the following:

U.S. Environmental Protection Agency

The EPA will, subject to existing resource constraints and the availability of appropriated funds:

1. Continue to provide financial support for the surface water quality monitoring programs currently underway in response to the shellfish bed closure. The Lummi Nation, Washington Department of Health, and other institutions and private contractors are implementing these monitoring programs.
2. Maintain a lead contact with the responsibility and authority necessary to interact effectively with the other parties of this agreement. Continue to provide technical

support in the review and approval of quality assurance/quality control plans of the surface water quality monitoring programs.

3. Provide financial and technical support in the design and implementation of dye studies to define the travel time and dilution of Nooksack River waters from the estuary to Portage Bay as well as from Nooksack River tributaries to Portage Bay.
4. Provide technical support for research directed toward understanding the response of fecal coliform populations to salinity, temperature, and sediment. The research will also include an examination of fecal coliform survival in sediments.
5. Continue to conduct compliance and enforcement inspections of the Gooseberry Point wastewater treatment plant, dairy farms, and other potential sources of fecal contamination throughout the watershed.
6. Continue to conduct source-specific monitoring of streams and other waters of the United States to determine the spatial and temporal distribution of fecal contamination in the Nooksack River basin.
7. Pursue legal actions against concentrated animal feeding operations whose operations are in violation of the Clean Water Act, as deemed appropriate by EPA in consultation and coordination with the Washington Department of Ecology.
8. Continue to actively monitor the development and implementation of the fecal coliform total maximum daily load (TMDL) for the Nooksack River basin and ensure effective implementation of the TMDL.
9. Continue to assist the Lummi Nation in developing a water quality standards program that meets the requirements of the Clean Water Act.
10. Continue to coordinate actions in the Nooksack and certain adjacent watersheds with the other parties to this agreement.

Lummi Natural Resources Department

The Lummi Natural Resources Department will:

1. Continue to implement the surface water quality monitoring program on-Reservation with particular focus on the uplands adjacent to Portage Bay and the marine waters within and adjacent to Portage Bay.
2. Collect monthly samples of the Gooseberry Point wastewater treatment plant effluent to provide an independent review of plant operations. Samples will be collected and analyzed pursuant to the EPA/Lummi Nation Water Quality Monitoring Quality Assurance Plan.
3. Improve coordination with the Lummi Sewer District to ensure that all overflows or spills from the collection and/or treatment system are reported to the Lummi Natural Resources Department within one hour after their occurrence. Appropriate Lummi Natural Resources staff members will ensure that water quality samples are collected at the site of the overflow/spill, upstream and downstream from the spill location, and from any adjacent waters where shellfish beds could be impacted. Pursuant to the Shellfish Consent Decree (Order Regarding Shellfish Sanitation, *United States v. Washington [Shellfish]*, Civil Number 9213, Subproceeding 89-3, Western District of Washington, 1994), the Lummi Natural Resources Department will notify the Washington Department of Health Office of Shellfish Programs if it is determined that the spill discharges to shellfish beds.

4. Provide necessary coordination and support to implement dye studies designed to evaluate fecal coliform dilution and travel time from potential pollutant sources.
5. Conduct a literature review on the survival of fecal coliform in fresh and saline waters.
6. Continue to support the fecal coliform TMDL development and implementation in the Nooksack River basin.
7. Continue to develop water quality standards for the Reservation.
8. Continue to coordinate actions in the watershed with the other parties to this agreement.

Washington Department of Ecology

The Washington Department of Ecology will:

1. Continue to conduct compliance inspections of dairy farms and other potential sources of fecal contamination throughout the watershed. Timely and appropriate formal enforcement action will be initiated against operators determined to be discharging illegally.
2. Pursue as a top priority of the Bellingham Field Office the development and implementation of the fecal coliform TMDL for the Nooksack River basin.
3. Pursue enforcement against operations not implementing farm plans in accordance with the timeframes established in RCW 90.64.026.
4. Take corrective action(s) where it is demonstrated that nutrient management plans are either not effective and/or not being effectively implemented.
5. Continue to coordinate actions in the watershed with the other parties to this agreement.

Washington Department of Health

The Washington Department of Health will:

1. In consultation with the Lummi Nation and under the Shellfish Consent Decree (Order Regarding Shellfish Sanitation, *United States v. Washington [Shellfish]*, Civil Number 9213, Subproceeding 89-3, Western District of Washington, 1994), continue to be responsible to the federal Food and Drug Administration (FDA) to ensure that the National Shellfish Sanitation Program (NSSP) standards for certification of shellfish growing waters are met on the Reservation.
2. Conduct a dye study of the Gooseberry Point Wastewater Treatment Plant outfall during pertinent tidal conditions with at least one event when the tidal elevation at Portage Point is +9 MLLW.
3. Continue to coordinate actions in the watershed with the other parties to this agreement.

TERMINATION:

- Any parties to this agreement may terminate their participation with 30 days written notice of intent to terminate to each participant followed by a formal termination letter.
- No amendment or alteration of this agreement shall arise by implication, course of conduct, or change in state law. This agreement may be altered only by a subsequent

written document, signed by the parties, expressly stating the parties' intention to amend their agreement.

Lummi Nation

Merle Jefferson Date: 8/18/00
Merle Jefferson, Executive Director
Lummi Natural Resources Department

Environmental Protection Agency

Charles Findley Date: 8-31-00
Charles E. Findley, Acting Regional Administrator, Region 10

Washington Department of Ecology

Tom Fitzsimmons Date: 8/23/00
Tom Fitzsimmons, Director
Washington Department of Ecology

Washington Department of Health

Mary Selecky Date: 8/28/00
Mary Selecky, Secretary
Washington Department of Health