Skokomish Indian Tribe
Non-point Assessment Report and Preliminary Management Plan
2006

Prepared By
Skokomish Natural Resources 2006

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Skokomish Reservation
Non-point Source Pollution Assessment Report and Preliminary Management Plan

1.0 INTRODUCTION

1.1 Overview

In 1987, the Federal Clean Water Act established a new direction for the control of water pollution. Non-point source pollution (NPS) from diffuse sources was recognized as a serious impediment to meeting the goals of the Clean Water Act. Under Section 101 sub-section 7 the Act states:

> *"it is the national policy that programs for the control non-point sources pollution be developed and implemented in an expeditious manner so as to enable the goals of this Act to be met through the control of both point and non-point sources of pollution."*

In keeping with this policy, the Clean Water Act was amended to include Section 319 titled Non-point Source Management Programs and Section 518, which allows the administrator to reserve up to one-third of one percent of appropriations for sections 319 (j), (h) and (i) for Indian Tribes treated as States. These sections of the Act provide the legal basis for implementing non-point source programs and sets forth certain requirements that Indian Tribes must meet to qualify for assistance under the Act. Section 319 includes two items, which must be completed by Indian Tribes in order to be considered for Section 319 and Section 518(f) grants to control non-point source problems. These are:

1) Indian Tribe assessment report
2) Indian Tribe management program

The assessment report is intended to be an analysis of non-point source water quality problems. The management program sets forth a process for correcting these problems. For the Skokomish Tribe of the Skokomish Reservation, Washington, these two items will be produced separately, but will be considered together as the basis for non-point source decision-making. The first part of this report will be devoted to the non-point source assessment, while the second part of the report will cover a preliminary management planning process, based in part on the findings of the assessment section.

1.2 Required Contents of Indian Tribes Assessment Report

"Section 319 (a) of the Clean Water Act is very specific in describing what needs to be included in assessment reports:

(A) Indian Tribes Assessment Reports

(1) Contents -- Each Indian Tribe shall prepare and submit to the administrator for approval, a report which;

(a) Identifies those navigable waters within the Reservation, which, without additional action to control sources of pollution, cannot be reasonably by expected to attain or maintain applicable water quality standards or the goals and requirements of this Act:

(b) Identifies those categories and subcategories of non-point sources or, where appropriate, particular non-point sources which add significant pollution to each portion of the navigable waters identified under subparagraph (A) in amounts which contribute to such portions not meeting such water quality standards or such goals and requirements.

(c) Describes the process, including intergovernmental coordination, for identifying best management practices and measures to control each category and subcategory of non-point sources and where appropriate particular non-point sources identified under subparagraph (3) and to reduce, to the maximum extent practicable, the level of pollution resulting from such category, subcategory or source; and

(d) Identifies and describes Indian Tribal, State and local programs for controlling pollution added from non-point sources to, and approving the quality of, each portion of the navigable waters, including but not limited to those programs which are receiving Federal assistance under sections (h) and (i).

This report identifies waters on the Skokomish Reservation which cannot or will not meet water quality standards, are not supporting beneficial uses, will not support these uses due to pollution from non-point sources; and the types of activities or specific sources which cause these problems. The report describes the Skokomish Tribe's process for identifying best management practices and programs and sources of funding for controlling NPS pollution. The Tribe will use the National Resources Conservation Service (NRCS) "Best Management Practices" (BMP's) as the model for conservation practice standards, and the Washington State's Water Quality Standards[1] for assessing impacts to water quality from NPS pollution. This assessment will list existing funding from the EPA, other federal, state, and local funding sources which are in place or pending to control NPS pollution.

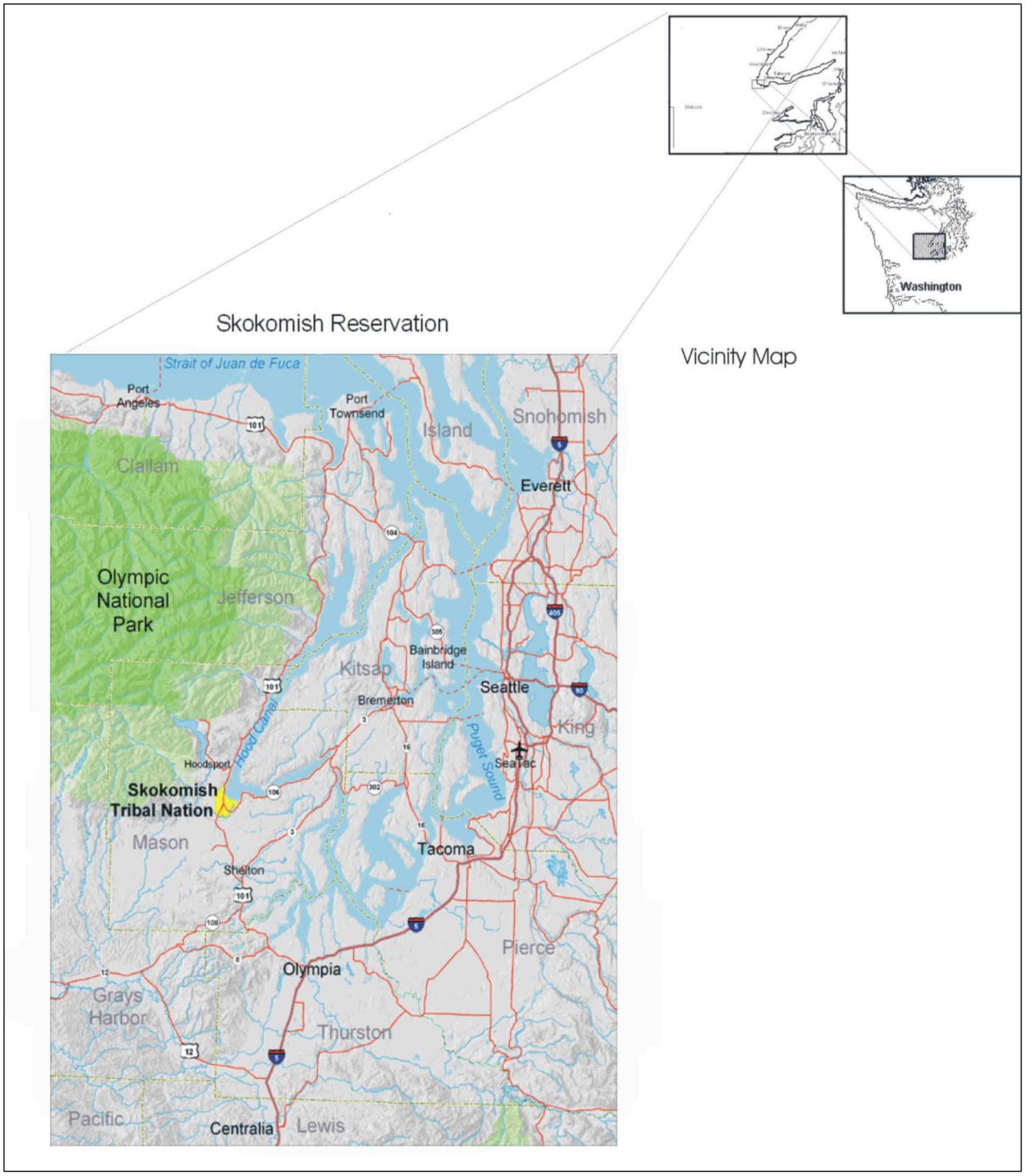
[1] In 2003 the Washington Department of Ecology submitted to the EPA a new water quality standard based on beneficial use instead of their former "class' (numeric value based criteria)—EPA in reviewing the State's request has not approved "in total" the changes in water quality criteria based on the new standards. Since Washington's new standards have not been approved "in total" by the EPA the Skokomish Tribe will use current "class" criteria as the measure for water quality standards.

2.0 ASSESSMENT METHODOLOGY

2.1 General Setting

The Skokomish Indian Reservation is located in the southwest Washington glaciated lowlands and is bound by the Skokomish River on the south, the Olympic Mountains to the west, Puget Lowlands on the east, and on the north by the Hood Canal.

Figure 1. Skokomish Reservation Location



The major waterbody associated with the Reservation is the Skokomish River, which drains into Hood Canal. Its headwaters are to the west in the Olympic Mountains. The Skokomish River drains a basin of about 247 square miles (Seiders et al., 2001). It comprises three sub-basins, the South Fork Skokomish (104 square miles), the North Fork Skokomish (118 square miles), and the Vance Creek drainage (25 square miles). The upper watershed is steeply sloped and contains federal, state and private forestlands, and includes portions of the Olympic National Park. The lower section of the watershed (the last 10 miles) is a low gradient floodplain that has extensive wetlands and spring fed seeps. Agricultural activities and residential developments are associated with the lower sections of the Skokomish River basin.

Streams located within the Reservation and streams directly influencing the lower Skokomish River are assessed in this report, and include: the lower Skokomish River which borders the Skokomish Reservation, Enetai Creek, Potlatch Creek, Purdy Creek, Skobob Creek, No Name Creek, Weaver Creek, 10 Acre Creek and Hunter Creek. Hunter Creek although not as closely tied to the Reservation boundary as the other streams, does influence the lower Skokomish near the southern Reservation boundary. It will be included in this assessment due to its importance to water quality in the lower Skokomish River.

Of the streams, which will be assessed, Enetai and Purdy Creek have point source discharges as well as NSP pollution sources. Enetai Creek has a fish hatchery near the mouth and Purdy Creek has an associated fish hatchery near its headwaters. An additional point source discharge comes from the North Fork Skokomish River hydro power diversion near Potlatch. This water diversion deposits 70% of the North Fork Skokomish River directly into fee[2] land within the Reservation boundary and into Hood Canal. This site is noted as a point source but is not included in the NPS analysis.

The Tribe has acquired large parcels of land associated with the southern and northern Reservation boundary. The southern acquisition (165 acres) is particularly important to NPS pollution in the lower Skokomish River. High fecal coliform bacteria and low dissolved oxygen readings are associated with the streams flowing through this parcel and include Weaver Creek, 10 Acre Creek, and Purdy Creek. This land is being formally petitioned through the Bureau of Indian Affairs (BIA), to be converted to Trust status[3]. In addition, Total Maximum Daily Load (TMDL) requirements are established for Weaver Creek and Purdy Creek by the Washington Department of Ecology (WDOE)[4]. The Tribe was a partner in the development of the TMDL's and is now collecting samples associated with the monitoring effort.

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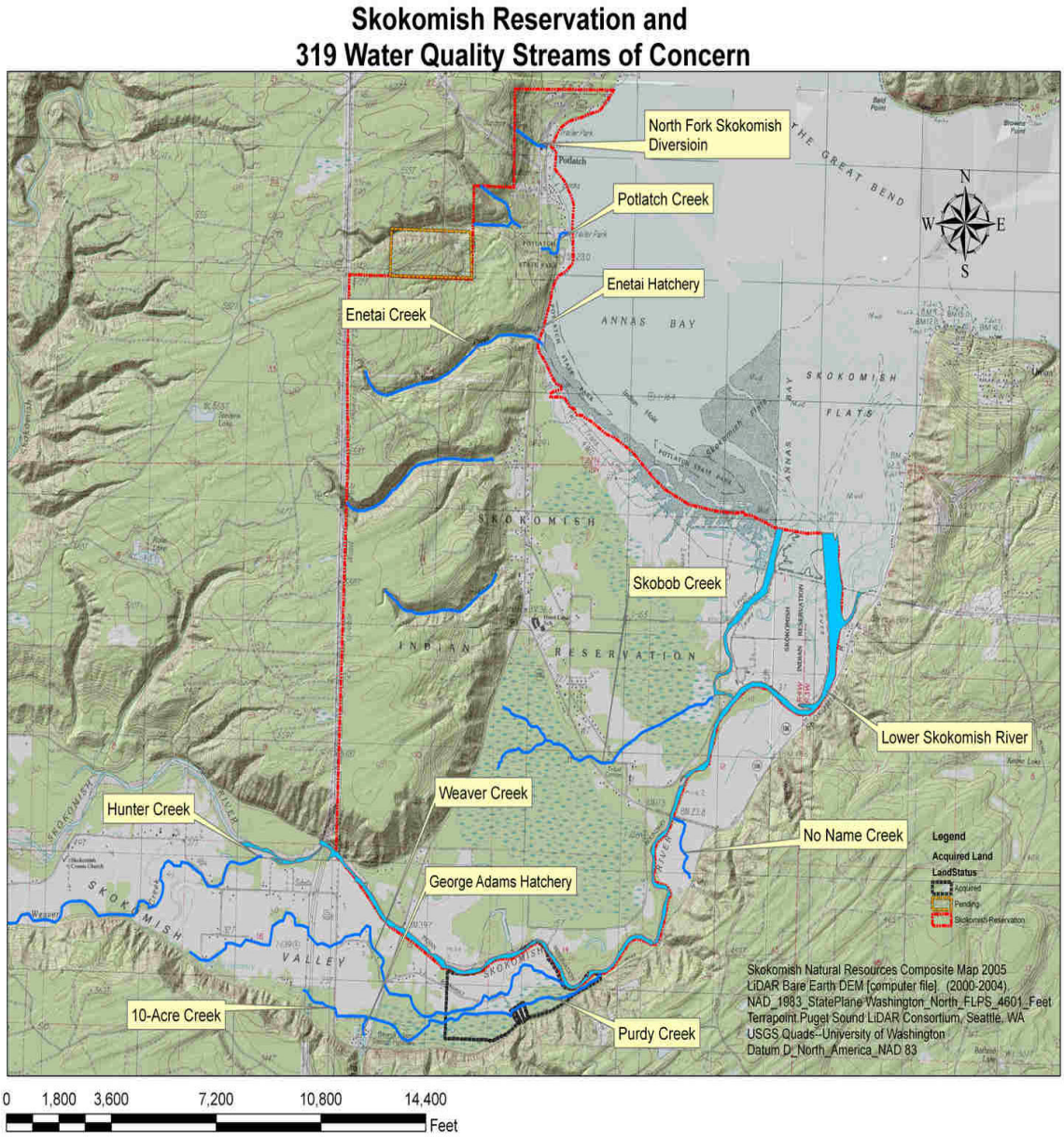
[2] Original allotted trust lands that were transferred to fee status (land that is not held in trust by the United States of America) by the allottee or the BIA.

[3] Tribal Trusts are a result of The Indian Reorganization Act of 1934 (IRA). It authorizes the Secretary of the Interior to hold land for Indian Tribes and individual Indians in trust, thereby securing Indian lands for economic development, housing, and related purposes. It also allows the tribe to benefit from the housing and other federal programs, which can only be used on land, which has been placed in trust.

[4] Skokomish River Basin Fecal Coliform Bacteria Total Maximum Daily Load Study. Washington State Department of Ecology, Environmental Assessment Program. Olympia, WA. April 2001. Pub. No. 01-03-014.

Figure 2. Water Quality Assessment Streams



2.1a Current Condition Overview

The Skokomish River mainstem, as well as its tributaries, are Class AA waterbodies and as such are to be maintained as the highest quality of water that can support all uses of the water. Indications suggest that the Skokomish River is not attaining Class AA quality. Tests and studies document NPS pollution affecting the lower Skokomish River and the Reservation include:

- Humans
- Domestic and wild animals.
- Commercial and noncommercial agricultural activities
    - Livestock culture
    - Hay Production
    - Christmas Tree production
    - Vegetable cropping
    - Silviculture harvesting
    - Treated Biosolids Applications

As of 2006, the domestic livestock population in the lower valley is estimated to include about 600 cattle, and a smaller number of horses, llamas, goats, and chickens (S. Kirby personnel communication Mason County Conservation Service June 2006). This is an increase of an estimated 500 cattle in 2001 (MCD 2001). Wild animal populations (e.g. elk, deer, beaver, waterfowl, and other warm-blooded animals) have not been documented (MCD, 2001). Silviculture harvesting within National Forest Service and privately owned timberlands dominate the upper basins of the South Fork of the Skokomish River, while the upper reaches of the North Fork Skokomish River lie within the Olympic National Park. The North Fork Skokomish River includes Lake Cushman and Lake Kokanee, which have residential developments. These lakes are also used for recreation (Seiders et al., 2001).

The Skokomish River empties into Annas Bay at the Great Bend of the Hood Canal. River water quality of the river directly influences water quality in the Bay, including nearby shellfish beds (WDOE 2001). Tribal, commercial, and recreational harvesters use the Annas Bay shellfish resources. Shellfish beds are located within, and to the south of Potlatch State Park and to the east near the town of Union. Commercial shellfish beds near the mouth of the Skokomish River recently closed due to fecal contamination (Washington Department of Health News Release August 16, 2005).

Potlatch State Park, a Skokomish culturally significant area, is also a center of primary contact recreation, being used by boaters, swimmers, and scuba divers. Swimmers and waders, also use the mainstem Skokomish River and lower Vance Creek during the summer months.

Recent concerns regarding low dissolved oxygen in Hood Canal and significant fish kills in 2002-2003 and a smaller event in 2004 have prompted major initiatives including enhanced monitoring of the Skokomish River (Preliminary Assessment and Corrective Action Plan (PACA), May, 6 2004). The Sound Partnership (Office of the Governor News Release December, 19, 2005) is an initiative organized by Washington State Governor Christine Gregoire to protect water quality throughout Puget Sound including the Hood Canal.

In general, human activities have altered the entire natural hydrologic regime in the Skokomish basin. For example, according to research, (Barreca, 1998), forest practices, road building, dikes, levies, and other land use practices have caused filling of the lower river channel with aggregate to over five times background levels. This has increased the frequency and intensity of flood events, increased basin groundwater

levels, and caused septic system failures. In addition, tidal fluctuations affect the lower Skokomish River to approximately river mile 1.8 (Seiders et al., 2001) which exacerbates ground water concerns during high tide and high flood flows events.

Hydroelectric power generation influences the lower Skokomish system and the Reservation. Ninety (90%) percent of the North Fork Skokomish river flow is diverted through the Cushman Dam project, causing a forty-five (45%) percent reduction of the mainstem Skokomish River flow (KCM, 1997). The flow in the lower North Fork Skokomish River is limited to the non-impounded 60 cubic feet per second (cfs)[5], and the drainage of adjacent slopes, and infrequent releases or spills from the lower dam (EPA, 2004; Golder, 2002). It is believed that this reduction in flow is one of the factors, which has caused a filling of the lower Skokomish River and increased flooding throughout the lower Skokomish basin. One effect of increased flooding is inundation of fields associated with livestock operations and transporting fecal contamination into the lower mainstem Skokomish River and associated streams. Fecal contamination is one of the leading NPS pollution factors in the lower Skokomish River causing it to be listed on the Washington State 303(d) list triggering the development of TMDL's for the lower Skokomish and associated streams.

As mentioned in the previous paragraph, the North Fork Skokomish River has been directed through a spillway to a power generating facility. This point source discharge is inside the Reservation boundary and empties into Hood Canal in an area identified as having low dissolved oxygen levels and large fish kills. This discharge is regulated by the Washington State Department of Ecology under stipulations of the Federal Clean Water Act and the National Pollution Discharge Elimination System (NPDES) federal permitting program.

The Cushman Hydroelectric spillway is not the only point source associated with the Skokomish basin. Three salmon hatcheries are additional point sources of pollution. All of these facilities are located along the southern valley wall and are spring fed. Pollutant discharges from these hatchery facilities are managed under the Upland Fin-Fish Hatching and Rearing National Pollutant Discharge Elimination System Waste Discharge General Permit (Seiders et al., 2001). Pollutants monitored under this permit generally relate to settleable and suspended solids.

The Skokomish River system is home for important species of fish such as Chinook, coho, and chum salmon; steelhead; and various trout (Williams et al., 1975). Chinook salmon and summer chum are listed as threatened species under the Endangered Species Act (ESA). Bull trout reside in the South and North Forks of the Skokomish River and are listed as threatened under the ESA (Seiders et al., 2001). Furthermore, the Puget Sound Steelhead has been proposed for listing as threatened under the ESA (Federal Register: April 5, 2005 (Volume 70, Number 64)) and will include the Skokomish River steelhead (Skokomish Natural Resources Director personal communication K. Dublanica May, 2006).

[5] Recent legal findings and Federal Energy Regulatory Commission (FERC) licensing requirements may require 240 CFS be put back into the North Fork Skokomish River. United states of America FERC 107 61,288 June 21, 2004

2.1.1 Landbase

Approximately 5,000 acres, currently about **11%** of the Reservation's land is in trust and owned by the Tribe, or in the process of being transferred from fee to trust. Fifty-five percent (**55%)** of the Reservation's land base is individually owned trust allotments in multi-heirship and owned by numerous Tribal members. The remaining **34%** of the land within the boundaries of the Reservation is in fee status (land on the Reservation that was once in trust but is currently not in trust status but still within the Reservation's boundaries). Fee lands were previously sold and primarily owned by non-Indians or in some cases by Tribal members taking it out of trust to use as collateral for loans (See Table 1) (Binder, 2002--2003).

The Skokomish River basin is sparsely populated, rural in nature, and relatively free of urban areas. The Skokomish Indian Reservation is located at the mouth of the basin. Land-use and many other regulations within the Reservation are under the jurisdiction of the Skokomish Tribe. Fee land is taxed under State and County regulatory authority but in general any lands within the exterior boundaries of the Reservation are under Tribal authority.

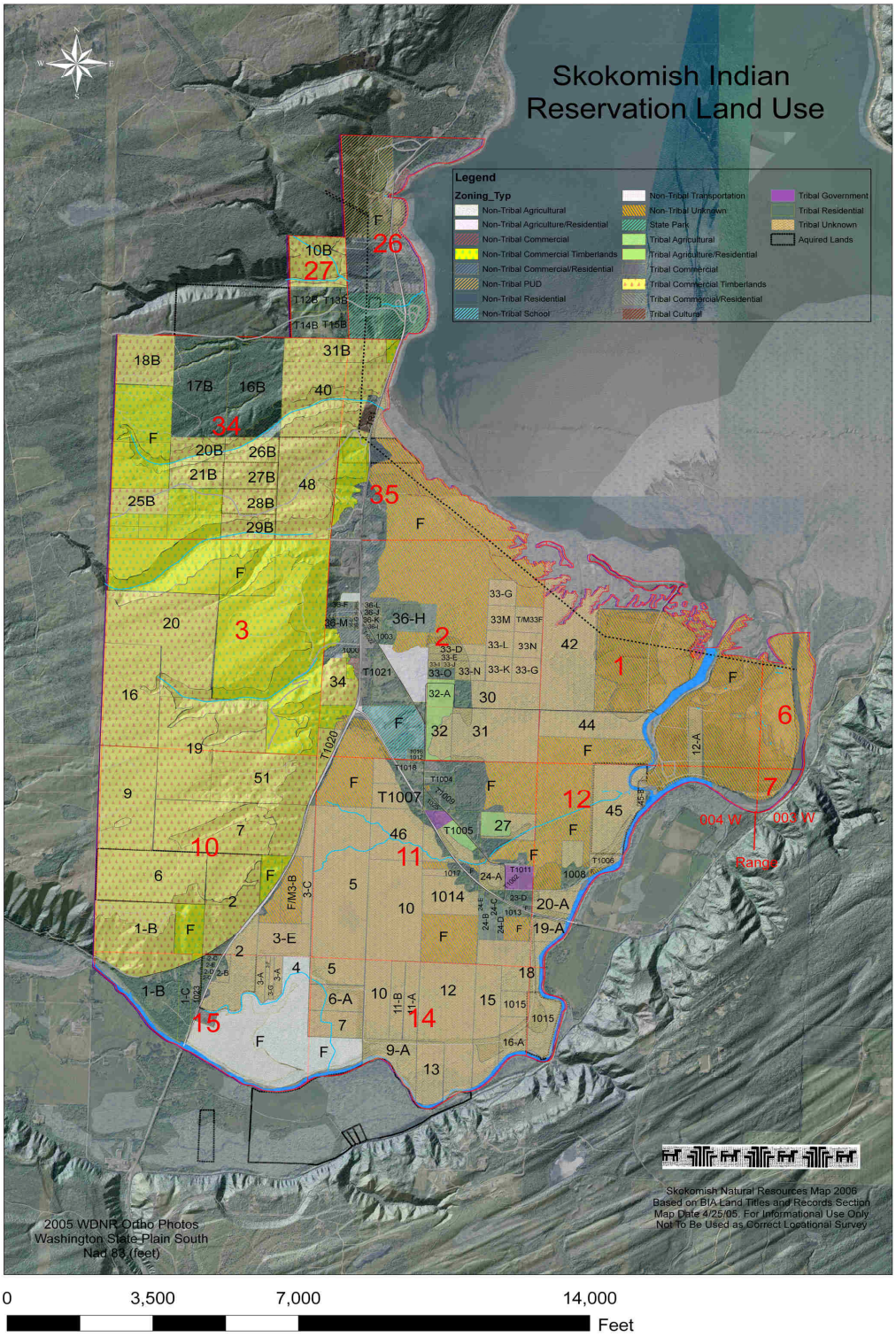
Table 1:

Ownership Status of Land on Skokomish Reservation

Land Status_Acres	**1979**	**2004/05**	**Per Cent**
Tribal Trust Land	134	525.78	11 %
Allotted Trust Land	2,817	2,796.7	55 %
Alienated or Fee Lands	2,047	1,675.52	34 %
On Reservation Total	**4,998**	**4,998**	
Tribal Land Purchased off Reservation		360 acres	
Total		**5,358**	

Prior to 1972, the Skokomish Tribal government owned approximately sixteen acres of land. Since then, the Tribe has undertaken the daunting task to locate environmentally compatible lands for future community facilities, housing and infrastructure to address the many needs of the community. While retaining much of its rural nature, the Skokomish Tribe has experienced considerable growth during the past 30 years. Families have returned to the Reservation to live on their ancestral lands and be with family members. The growth of the Tribal government and self-employment opportunities created by the reaffirmation of treaty-rights for fishing and shellfish harvesting has also contributed to this growth.

Figure 3 Skokomish Reservation Land Base Uses



Uplands on the Skokomish Reservation is dominated by agriculture, specifically forestry (silviculture) activities. Lowland agricultural land is primarily cattle grazing and irrigated cropland is associated within the Skokomish Valley (MCD, 2001). The Reservation core area has a small base of rural and commercial development but is expanding (Binder, 2002--2003).

Figure 3 and Table 2 lists and shows the land base and uses for the Skokomish Reservation. The intensity of land use and its proximity to water significantly influences the potential for non-point source pollution. For example, irrigated agricultural land, which requires water, fertilizer, and pesticides, has greater potential for surface and groundwater pollution than does rangeland, which has few of these inputs. However, livestock grazing near water bodies can introduce contaminates into that water. In addition, the location of housing developments and economic infrastructure can and does create the potential for non-point pollution. Silvicultural activities in upland areas can produce increase sediment loads and herbicide and pesticide pollution, which can degrade stream habitat and water quality. Transportation corridors can create hydrocarbon NPS pollution during storm events and can be a potential hazardous waste source due to the accidental release of hazardous substances from automobile accidents.

Table 2: Skokomish Reservation's Land Base and Use.
(Bureau of Indian Affairs Land Status Reports and percentage based on Skokomish GIS Land Use Analysis Project 2006)[6]

Land Base	Acres	Land Use	Percentage
Trust and Allotted	3,323	Commercial Timberland Agricultural/Residential[7] Commercial/Residential[8] Unknown (Limiting Factors)[9] Transportation[10]	24% <1% 9% 24% Not Factored
Fee land	1,675	Commercial Timberland Agricultural/Residential Commercial/Residential Unknown (Limiting Factors) Transportation	11% 3% 7% 18.6% <1%
Totals	**4,998**	Commercial Timberland Agricultural/Residential Commercial/Residential Unknown (Limiting Factors)[11] Transportation	36% 4% 16% 43% <1%

[6] Does not include newly acquired land
[7] Residential in close proximity to agricultural land use
[8] Mixed Commercial and Residential land use
[9] Due to limiting factors such as steep slopes or associated wetlands
[10] Does not include all Tribal roads only State Highway's
[11] Wetlands and Steep Slopes

2.1.2 Social and Economic Conditions

Natural resources protection is not just a category to the Tribe; it is a major driving factor for the Skokomish Tribe's cultural heritage. Clean water represents spawning salmon, shellfish harvests and Tribal drinking water. Without clean water the quality of life for the Skokomish Tribe would be degraded.

Fishing, shellfish harvesting, logging and forest-related activities have historically provided the employment base for the Skokomish Reservation and surrounding Mason County areas. However, starting in the late 1970s, decreasing timber and marine resources, in association with fluctuating markets and recessions in the forest products and seafood industries occurred. This economic downturn shifted employment opportunities to the services, retail, tourism, and government sectors yet, the natural resource base still provides many self-employment opportunities for the Tribe's labor force. Tourism, residential construction and recreation industries have not, historically, provided many employment opportunities or adequate wages for Tribal members to support a family. The Tribe remains the principal employer for the Reservation. Community, Federal, and state grants, self-determination contracts, and two Tribal businesses (Lucky Dog Casino and Twin Totem Store/Deli) provide the most consistent source of income for Tribal members.

In summary, self-employment and treaty rights (fishing, shellfish harvesting and fireworks) constitute important sources of Community income that are often limited. Treaty fishing and shellfish harvesting primarily provide seasonal employment opportunities.

Demographic Trends

The total ***service area*** population for the Skokomish Tribe is **1,395,** and includes enrolled Skokomish Indians as well as their spouses and other family members, or other Indian or non-Indian living within and near the Reservation's boundaries. Approximately, **850** or **61%** of the total ***service area*** population of **1,395** individuals live in the Mason County area. Those Tribal members living outside the Tribe's designated service area live in other parts of Washington State and the United States.

Table 3: Demographic and Workforce Analysis of the Skokomish Indian Tribe

Tribal Demographic Type	
Total Service Population	1,395
Tribal Enrollment	745
Number of Tribal Households	238[12]
Median Income for Family of Four	$13,300
Average Unemployment Rate	37%
Percentage of Population under 16	30%

(Percent of total service area population)

[12] 2000 U.S census

Data obtained and reported by the Tribe in April of 2002 to the Bureau of Indian Affairs documents the current unemployment rate for all Tribal members able to work at 37%. For comparison, Mason County's unemployment rate was 7.4 percent in 2004. The Tribal estimates do not adequately reflect Tribal members whose employment is seasonal or part-time; or who are unable to work full-time.[13] There currently is an estimated **745** (as of February 1, 2003) ***enrolled*** Skokomish Indians. Based on 2000 U.S. Census Redistricting Data, there are an estimated **510** enrolled. The remaining **235** enrolled Skokomish Tribal members live off the Reservation in Mason County or in other states. They are not documented by the Census for on Reservation data.

Over the past thirty plus years, Skokomish Tribal enrollment has grown (Table 4). The growth rate from 1970 to 1980 was **21.2%;** from 1980 to 1990, it was **31%.** The enrollment of Tribal members from 1990 to 2000 continued to grow at a rate of **21.3%** for the ten-year period as of 2003. The average growth rate for the three decades was **24.4%.**

Table 4:

Enrolled Skokomish				
Year	**1970**	**1980**	**1990**	**2004**
	386	468	614	745

Employment and Income

Thirty–seven percent **(37%)** of employable people in the Skokomish Tribe's service area population are unemployed and an additional 23 percent **(23%)** are under-employed (working but still living below the federal poverty level). The Skokomish Indian Tribe's governmental/service organization with approximately **120 to 130** employees is one of the top employers in Mason County, providing employment opportunities for a diverse mix of paraprofessional, technical, administrative and skilled staff members.

Data from the Tribal/TDHE[14] 2000 Indian Housing Block Grant states that the median income for Skokomish households has hovered around $13,300 for a family of four since 1994, well below the *Mason County FY 2002 median income* of **$41,715** for a family of four. This report states that the Tribal Service Population is 1,392 and that, out of the 416 Indian families, 350 families are considered low or very low income. This translates to 84% of Skokomish families being of low to very low income.

In addition, a survey conducted by the Tribe for its 2002 Skokomish Head Start and Childcare Program indicated the real median income was **$12,000** and the average income was **$12,375**. This data included forty families with the average family size being 4.6 individuals per family. This data translates to 100% of Head Start families living below the poverty level. The 1999 Skokomish Head Start and Childcare Program survey, which included Head Start families, only (not childcare families) assessed median family income at **$6,552**. This data included forty families with the average family size being 4.3 individuals per family. Based on this information, we estimate that over 85% of Skokomish Families are of low to moderate income. Finally, the *"Office of*

[13] Fish and Shellfish are the primary seasonal employment activities for the Skokomish Indian Tribe.
[14] Tribally Designated Housing Entity

Superintendent of Pubic Education - 2002 Public Schools Free and Reduced Price Applications" documented that the Hood Canal School District, which is located on the Skokomish Reservation and has a student body that is 33.5% Skokomish, documented that 70.2% of the families were eligible for a free and reduced lunch.

The following demographic data and information has been submitted to illustrate the current employment and income trends of Skokomish Tribal members living on and adjacent to Tribal lands and includes the following:

- *1999 & 2000 Skokomish Head Start and Childcare Program Population & Income Data.*
- *Office of Superintendent of Pubic Education - 2002 Public Schools Free and Reduced - Price Applications.*
- *2003 Income Data for Tribal Members on Housing "Waiting List"- SPSITHA.*
- *2001 BIA Labor Force Report.*
- *Tribal/TDHE 2000 Indian Housing Block Grant – SPSITHA.*

In 2000, the Skokomish Tribe cooperated with FEMA and CTED to purchase homes and property located on the Reservation within the 100-year floodplain. Because a number of Tribal member occupants were either unwilling or unable to relocate, the Tribe undertook a difficult and costly project designed to raise the foundations two feet above the established 100-year flood elevation. This "flood-elevation project" raised eleven homes, but was a short-term and costly solution to an ongoing safety concern. Further development within the 100-year flood plain is limited.

2.1.3 Reservation Waters

The Skokomish Indian Reservation is located in the lower Skokomish River basin (Figure 2). Several streams traverse the Reservation in a northwesterly to southeasterly direction, and all streams ultimately drain into the Hood Canal. Several spring fed seeps are associated with the lower basin and substantial riverine and estuarine wetlands are located on the Reservation.

For purposes of the assessment, the Skokomish Tribal Council directed the Skokomish Natural Resources Department to use a stream-by-stream approach to gain an understanding of the non-point source water quality problems influencing the Reservation. The streams that are directly associated with the Reservation and will be assessed are: Enetai Creek, lower Mainstem Skokomish River, Potlatch Creek, Purdy Creek, and Skobob Creek. Additionally, streams directly related to the lower Skokomish River that bound the Reservation include: No Name Creek, Weaver Creek, Ten Acre Creek and Hunter Creek. Three of these streams, Enetai Creek, Purdy Creek and Weaver Creek have point source discharge as well as non-point sources due to associated fish hatcheries. The North Fork Skokomish River diversion is an additional concern for the Tribe but will not be analyzed in the assessment since it is a point source discharge.

2.1.4 Non-point Source Programs

Currently, no Tribal programs exist to deal exclusively with non-point source pollution (NPS) problems. The Tribe does utilize the EPA's Performance Partnership Grants (PPG) process to monitor and gain an understanding of NPS pollution on the Reservation. Currently the Skokomish Tribe's PPG includes the General Assistance Program (GAP) and a Clean Water 106 grant. Funding from these sources support the Skokomish Natural Resources Department and associated land use and water quality monitoring and environmental oversight, but not specifically NPS pollution.

The Washington Department of Ecology (WDOE), in partnership with the Skokomish Tribe is executing a Total Maximum Daily Load (TMDL) plan for the lower Skokomish River (Batts, 2005). This program seeks to control elevated fecal coliform bacteria levels identified in the lower Skokomish basin. The Skokomish Tribe also partners with Mason County, the Mason County Conservation District, and the WDOE in collecting data for the TMDL work, including funding for lab analysis of sampling sites. It is anticipated that the management plan developed from this assessment will include and support the ongoing TMDL process. Many ongoing water quality concerns are already identified by the TMDL study and include, the South Fork Skokomish River (106 Bridge), Purdy Creek, Weaver Creek, Ten Acre Creek, and Hunter Creek. The 1998 303(d) list for Washington State includes Purdy Creek, Weaver Creek, Ten Acre Creek, Hunter Creek and the Skokomish River for fecal coliform bacteria.

The Skokomish Tribe, working in conjunction with the Mason Environmental Health and Water Quality programs provide coverage for surface water quality monitoring through much of Mason County. The Tribe works with the University of Washington and the Hood Canal Dissolved Oxygen Program to monitor the Skokomish River and many streams and rivers associated within the Hood Canal. The benefits and uses of this long-term monitoring program include the following:

- A long-term, consistent baseline of data for streams, lakes, and rivers.
- Data that is used to track water quality and quantity trends over time and identify problems areas where corrective actions should be taken.
- A broad analysis of the data with the capacity for comparison between areas.
- Monitoring equipment available for routine monitoring and emergency response.
- Easy access to information/data by jurisdictions, agencies, and citizens.
- Complement Washington State Departments of Health and Ecology marine and freshwater monitoring programs as well as the University of Washington.
- Provide models to predict future environmental conditions.

With increasing development pressure in the Skokomish Valley, and increasing housing on the upland areas surrounding the Reservation, the Tribe needs to establish a funded non-point source management program. This program will monitor and protect the Tribal resources associated with non-point pollution concerns.

2.2 Problem Statement

2.2.1 Objectives

The objective of Section 319 is to improve water quality and restore impaired uses in waters affected by non-point source pollution. In order to insure consistency among the Indian Tribes, the Environmental Protection Agency (EPA) has provided the following definition of non-point source pollution.

> *"Non-point Source (NPS) Pollution: NPS pollution is caused by diffused sources that are not regulated as point sources and normally is associated with agricultural, silvicultural and urban runoff, runoff from construction activities, etc. Such pollution results in the human-made or human-induced alteration of the chemical, physical, biological, and radiological integrity of water. In practical terms, non-point source pollution does not result from a discharge at a specific, single location (such as single pipe) but generally results from land runoff, precipitation, atmospheric deposition or percolation. Pollution from non-point sources occurs when the rate at which pollutant materials entering waterbody exceeds natural levels."*

2.2.2 Categories and Subcategories of Non-point Source

The Skokomish Tribe has assembled existing information on water quality impacts caused by pollution sources. Table 5 summarizes the potential non-point source impacts to the Reservation's surface waters. Agricultural sources impact 83% of the Reservation streams. Bank erosion contributes 5%. Rural sources contribute 12%.

Careful interpretation of Table 5 is necessary to understand the estimated relative contributions of each source category to the overall Reservation non-point source impacts.

It should be noted a stream mile does not reflect the actual volume of water impaired due to variations in stream channel morphology, volumes, and velocity. When the total land area devoted to a particular use is contrasted with the impacted waters on those lands, the relative impacts by source category can be more accurately compared. However, in the case of the Skokomish Reservation, land use within the total watershed cannot be accurately compared since this assessment is restricted to the Reservation and boundary streams. This especially affects sediment transport or chemical usage from forest practice operations in the upper watershed. In addition, impacts from farm practices in the upper Skokomish watershed are not fully investigated or values determined due to the restriction of only analyzing Reservation waters.

An impacted stream segment might have 98% agricultural land associated with it, oil and gas impact of 1.5% (transportation corridor). There may be no "land disposal" 0%, but dikes may have affected 0.25% (hydro-modification). Silvicultural activity has directly influenced 0%, and communities and septic systems have an impact of 0.25%. Although subjective in nature, these matrixes give an overall view of potential sources of non-point pollution along a stream. Again, this type of analysis does not show the

impacts of non-point pollution such as silvicultural activity in the upper watershed west of the Reservation boundary.

Table 5. Estimated summary of source categories adjoining streams[15] (Skokomish Tribe DNR GIS Mapping 2006).

Source	Category	Miles Effected	Acres Effected	Acres Percentage
Agriculture				
	Cattle and other livestock	3.75	455	13%
	Hay/Christmas Tree production	0.13	16.2	<1%
	Vegetable copping	6.44	781	23%
	Silviculture	1.28	158	5%
	Hydro-modification	7.54	915	27%
	Hatcheries	3.9	476	14%
Forestry				
	Access Roads	?	?	?
	Bank Erosion	1.53	186	5%
Mineral Extraction				
	Gravel Removal	?	?	?
Rural				
	Septic Systems	2.07	252	7%
	Storm Water Runoff	1.11	135	4%
	Land Disposal (Solid Waste)	.19	23	<1%
	Construction	0	0	0
Totals		27.97	3397.2	100%

2.2.3 Method for Conducting Non-point Source Assessment

This assessment draws upon the experience and expertise of many agencies, Tribal staff, local residence, and programs. As a result, many different levels of information have been used in the preparation of this report. The sources of information may vary, from ambient water quality monitoring data to "best professional judgment", and are identified as such in the text as both monitored and/or evaluated.

In its guidance for preparing the non-point source assessment report, EPA recognizes this situation and defines two levels of assessment:

[15] Source: Category: Streams (miles) and 500 ft buffer associated with stream corridor (Acres)

> *"two levels of assessment reflecting conclusions based on ambient monitoring data and conclusions based on other information. One level is "monitored" water in which the assessment is based on current site-specific ambient data. The other level is "evaluated" waters in which the assessment is based on information other than current site-specific ambient data, such as data on sources of pollution, predictive modeling, fishery surveys, and ambient data which is older than five years. In the NPS area, best professional judgment and various evaluation techniques will play an important role."*

2.3 Goals and Objectives

The goal of this process is to establish a 319 program on the Skokomish Reservation, which requires an assessment and a management plan.

The objective of this assessment is to identify water bodies that have been or are likely to be impaired (threatened) by non-point sources of pollution without implementing alternate management practices. The Skokomish Tribal Council considers beneficial use of water, as those defined and which are protected by the State of Washington adopted water law.[16] These uses include classifications and water quality standards. If these standards are exceeded, it is assumed that beneficial uses are impaired. However, the Tribal Council also stipulates protection of the Treaty defined resources as well.

2.4 Assessment Process

This report has been produced by assembling data from many sources including Tribal reports, State and Federal Government reports, and individuals knowledgeable about local water quality conditions. Included are, water quality assessment (305b) reports, (303d) lists, and supporting records for the Skokomish Reservation (Ecology 2004), including TMDL management plans. In addition, the professional judgments of water quality and land management professionals are included in our assessment. Tribal elder stories about the history of the Skokomish Tribe and their Twana predecessors are an additional source of historical information.

Methods used to determine water quality include laboratory, field data collection, historic research projects, and Tribal history.

All data is collected according to the Skokomish Quality Assurance Project Plan (QAPP), which has been approved by EPA in 2005. This QAPP assures that data collected will adhere to the data quality objectives delineated by the Tribes water quality program. Prior to March 2005 sample collection done by Skokomish staff was certified

[16] In 2003 the Washington Department of Ecology submitted to the EPA a new water quality standard based on beneficial use instead of their former "class' (numeric value based criteria)—EPA in reviewing the State's request has not approved "in total" the changes in water quality criteria based on the new standards. Since Washington's new standards have not been approved "in total" by the EPA the Skokomish Tribe will use current "class" criteria as the measure for water quality standards.

by Washington Department of Ecology and Mason County following state QA/QC procedures[17]. All biological, physical, and chemical water quality parameters discussed in this document are cited.

The Tribe did not include the entire Skokomish basin in this assessment. Only waters associated as boundary streams or waters inside the Reservation and closely related streams are included. Data shows 12.3 miles of streams and impairment from NPS pollution are on or near the Skokomish Reservation. This includes nine streams (monitored segments), which were found to have moderate or severe impairment. Approximately 11.3 miles were considered severely impaired. 1.1 miles were listed as moderately impaired. Evaluative techniques included monitoring, fishery surveys, citizen complaints, professional judgment, and ambient data less than and more than five years old.

Information generated in this manner reveals the magnitude of water quality problems caused by non-point sources. This data is entered into a developing Tribal waterbody tracking system in Excel and NCSS spreadsheet, and then incorporated into an Access database. Data is tracked on individual stream reach basis, and is updated. Individual streams and stream reaches can be compared and evaluated. Priorities can be set for stream improvement projects and additional monitoring data. **This report will be updated every four years.**

Waters with ambient data have been compared with a water quality criteria matrix (Table 6 and Table 7) to help determine whether beneficial uses are impaired. This matrix includes criteria values for pollutants which there are no numerical standards. Where neither numerical standards nor criteria or water quality data exist, the assessment must be subjective and based on the judgment of water quality management professionals.

[17] Tribal staff followed water quality policies and procedures analysis methods of the Thurston County Public Health Surface and Ground Water program and the water quality policies and procedures of the Mason County Department of Health Services as well as Washington Department of Ecology field sampling training.

Table 6. State of Washington water quality criteria matrix (criteria values in milligrams per liter unless otherwise noted)[18].

Parameter	Freshwater	Marine
Fecal coliforms	Shall Not Exceed a geometric mean of 50/100 colonies/100 mL and shell not have more than 10 percent of all samples obtained for calculating geometric mean value exceeding 100 colonies/100mL	Shall Not Exceed a geometric mean of 14/100 colonies/100 mL and shall not have more than 10 percent of all samples obtained for calculating geometric mean value exceeding 43 colonies/100mL
Dissolved oxygen	Dissolved oxygen shall exceed 9.5	Dissolved oxygen shall exceed 7.0. When natural conditions, such as upwelling, occur, causing the dissolved oxygen levels to be depressed near or below 7.0—natural dissolved levels may be degraded by up to 0.2 by human-caused activities.
Total Dissolved Gas	Shall Not Exceed 110 percent of saturation at any point of sample collection	
Temperature[19]	Shall Not Exceed 16.0°C—When natural conditions exceed 16.0°C no temperature increases will be allowed which will raise the receiving water temperature greater than 0.3°C. Incremental temperature increases resulting from point sources activities shall not, at any time, exceed t=23/(T+5). Incremental temperature increases resulting from non-point source activities shall not exceed 2.8°C.	Shall Not Exceed 13.0°C—When natural conditions exceed 13.0°C no temperature increases will be allowed which will raise the receiving water temperature greater than 0.3°C. Incremental temperature increases resulting from point sources activities shall not, at any time, exceed t=8/(T+5). Incremental temperature increases resulting from non-point source activities shall not exceed 2.8°C
PH	Shall be in the range of 6.5 to 8.5 with human caused variation within the above range of less than 0.2 units.	Shall be in the range of 7.0 to 8.5 with human caused variation within the above range of less than 0.2 units.
Turbidity	Shall not exceed 5 NTU over background when background is 50 NTU or less or have more than a 10 percent increase in turbidity when the background is more than 50 NTU	
Toxic, Radioactive, or Deleterious Material	Concentrations shall be below those that have the potential either singularly or cumulatively to adversely affect characteristic water use, cause acute or chronic conditions to the moist sensitive biota dependent upon those waters, or adversely affect public health, as determined by the department (see WAC 173-201-A-040 and 173-201A-050.	

[18] The State of Washington has submitted to the EPA new Surface Water Quality Standards in July 2003, which are still being reviewed. For this report the 1997 Washington State Surface water criteria will be used as criteria standards until there is approval of the new standards by the EPA.

[19] "t" represents the maximum permissible temperature increase measured at a mixing zone boundary; and "T" represents the background temperature as measured at a point unaffected by the discharge and representative of the highest ambient water temperature in the vicinity of the discharge.

Toxic substances Criteria

Table 7[20]

Substance	Freshwater		Marine Water	
	Acute	Chronic	Acute	Chronic
Aldrin/Dieldrin e	2.5a	0.0019b	0.7 la	0.0019b
Ammonia	f,c	g,d	0.23 3h,c	0.035h,d
(un-ionized NH3) hh				
Arsenic dd	360.0c	190.0d	69.0c,ll	36.0d,cc,ll
Cadmium dd	i,c	J,d	42.0c	9.3d
Chlordane	2.4a	0.0043b	0.09a	0.004b
Chloride (Dissolved) k	860.0h,c	230.0h,d	-	-
Chlorine (Total Residual)	19.0c	11.Od	13.0c	7.5d
Chlorpyrifos	0.083c	0.041 d	O.Ollc	0.0056d
Chromium (Hex) dd	15.0c,l,ii	lO.OdJj	l,100.0c,l,ll	50.0d,ll
Chromium (Tri) gg	m,c	n,d	-	-
Copper dd	o,c	P,d	4.8c,U	3.1d,ll
Cyanide ee	22.0c	5.2d	l.Oc.mm	d,mm
DDT (and metabolites)	l.la	O.OOlb	0.13a	O.OOlb
Dieldrin/Aldrin e	2.5a	0.0019b	0.7 la	0.0019b
Endosulfan	0.22a	0.056b	0.034a	0.0087b
Endrin	0.18a	0.0023b	0.037a	0.0023b
Heptachlor	0.52a	0.0038b	0.053a	0.0036b
Hexachlorocyclohexane (Lindane)	2.0a	0.08b	0.16a	-
Lead dd	q,c	r,d	210.0c,ll	8.1d,ll
Mercury s	2.1c,kk,dd	0.012d,ff	1.8c,ll,dd	0.025d,ff
Nickel dd	t,c	u,d	74.0c,U	8.2d,ll
Parathion	0.065c	0.013d	-	-
Pentachlorophenol (PCP)	w,c	v,d	13.0c	7.9d
Polychlorinated Biphenyls (PCBs)	2.0b	0.014b	lO.Ob	0.030b
Selenium	20.0c,ff	5.0d,ff	290c,U,dd	71.0d,x,ll,dd
Silver dd	y,a	-	1.9a,ll	-
Toxaphene	0.73c,z	0.0002d	0.21 c,z	0.0002d
Zinc dd	aa,c	bb,d	90.0c,ll	81.0d,ll

Because the Tribe has not adopted water quality standards for the Reservation, the Washington Water Quality standards were used to determine water quality impairment. Washington has classified waters on the Reservation, but does not enforce the standards within the exterior boundaries. The EPA and Tribe have Clean Water Act jurisdiction for the Reservation.

For this assessment the Tribe has reviewed the classifications of Washington State and generally agrees with the classifications. The Washington Water Quality Criteria Matrix allowed the Tribe to evaluate chemical and physical data collected over the past five years to see if there were violations of Washington's water quality standards. All waters associated with the Skokomish Reservation are considered Class AA (extraordinary).

[20] See Notes 6.3 for Table 6 in Appendix.

In general, the following tables starting on page 22 show water quality monitoring results compared to water quality standards associated with streams on the Reservation. If any violation has occurred it has been noted as exceeding standards. Seasonal variations and discharge values have been noted, but have not been incorporated in the analysis since Class AA streams are to be maintained as the highest quality of water that can support all uses of the water throughout the year. If there are exceedances of standards we consider that a violation.

The most numerous data collected for these streams include fecal coliform, temperature and dissolved oxygen. A small amount of biological data is available for the Skokomish River mainstem just above the Highway 101 Bridge. Historic and observed conditions using "professional judgment" are cited where appropriate.

3.0 DISCUSSION OF RESULTS

3.1 Reporting Format

The assessment information is organized by thirteen monitoring sites, which represent nine separate streams identified as affecting the Skokomish Reservation. For each site the assessment information is presented in tabular fashion. The tables list the following information: name of stream, miles of stream, water quality sampling averages, suggested pollutant or cause of impairment, source category, source subcategory, specific source (if known), problem severity and method of assessment, biological information, habitat assessment, or observed condition.

Only water bodies with moderate (M) or severe (S) impairment are listed with the exception of Enetai Creek which is used as a reference stream. Only those water bodies are listed which have impacts that are predominantly man-caused and not natural[21].

"Method," ("M") stands for "Monitored" and an ("E") stands for "Evaluated" (See Section 2.2.3 Method for Conducting Non-point Source Assessment). When information is not known a space in the tables will be left blank.

Water quality parameters such as fecal coliform, water temperature, dissolved oxygen, and ph values will be reported in appropriate values with exceedances noted.

Limited biological data is presented from two research projects conducted in the Skokomish basin. Where biological information is available, a summary of the conclusions and source of data will be presented. For example, Biological Data (Yes/No) ---Impairment noted (Yes/No).

Habitat assessment, or observed condition, will be presented where applicable. With type of assessment, conclusion and source cited, for example, "Hankin and Reeves Stream Protocol Collected by US Forest Service 1989" or Tribal staff observation.

[21] In general, all of the lower Skokomish River basin has been affected by man made impacts and as such natural conditions are not known.

3.2 Reservation Waters Impacted By Non-point Sources

3.2.1

Name of stream Lower Mainstem Skokomish River (101 Bridge)
The Lower Mainstem Skokomish River (101) Bridge is located on the south side of the Reservation. The existing land uses upstream from this site are predominantly agriculture with limited irrigated lands and includes some rural development.
Method (M/E)=M/E
Miles of stream= .62 (does not include all of upstream basin—only from western Tribal boundary to 101 bridge).
Table 3.2.1a: Recorded Water Quality Monitoring Results

Parameter	Agency	Years Sampled	Results			Sampling Location		No. Violations/No. measurements	Exceed Standards (Yes/NO)
			High	Geometric Mean Value	Low	Latitude North	Longitude West		
Fecal Coliform FCmpn/100 ml	WDOE	1999-2000 (n=23)	130	11.6	1.8	47.353890	123.232333	2/23	Yes
Fecal Coliform FCmpn/100 ml	Skokomish Tribe	2002-2005 (n=35)	51	8.4	1.0	47.353890	123.232333	1/35	Yes
Temperature Degree C	KCM	1977-1978 (n=12)	17.5	10.9	6.0	47.18'36"	123.10'33"	3/12	Yes
Temperature Degree C	WDOE	1999-2000 (n=26)	14.2	7.6	4.9	47.353890	123.232333	0/26	No
Temperature Degree C	Skokomish Tribe	2002-2005 (n=25)	22.0	10.3	6.0	47.353890	123.232333	3/25	Yes
Dissolved Oxygen mg/l	KCM	1977-1978 (n=12)	12.8	10.7	9.4	47.18'36"	123.10'33"	2/12	Yes
Dissolved Oxygen mg/l	WDOE	1999-2000 (n=24)	12.0	11.1	10.0	47.353890	123.232333	0/24	No
Dissolved Oxygen mg/l	Skokomish Tribe	2002-2005 (n=25)	13.5	11.1	8	47.353890	123.232333	2/25	Yes
pH Units	KCM	1977-1978 (n=12)	7.4	7.0	6.9	47.18'36"	123.10'33"	0/12	No
Biological Data (Yes) --- (No-Impairment noted) Abundance of Mayflies, stoneflies,caddisflies, trueflies, and beetles—seasonal fluctuations in populations (WDF,1957), (KCM, 1979).									

Suggested Pollutant or cause of impairment: High water temperature and low dissolved oxygen during summer low flows. Elevated riverbed due to filling of lower river channel by aggregate (estimated to be five times background levels). Fecal Coliform bacteria contamination due to septic systems, cattle and farming activities.
Source category = Agriculture/Rural
Source subcategory = Cattle and other livestock/Hydro-modification/Septic
Specific source (if known) = Cattle Raising, Diking, Forest Practices, Water Impoundment
Problem severity=Severe
Method of assessment=Ambient water quality monitoring surveys and hydrologic studies—Under TMDL Plan

3.2.2

Name of stream Lower Mainstem Skokomish River (106 Bridge)

The Lower Mainstem Skokomish River (106) Bridge is located on the southeast side of the Reservation. The existing land uses above this site are predominantly agricultural and includes HWY 106 transportation corridor.

Method (M/E)=M/E

Miles of stream= 2.7 (101 Bridge to 106 tide flats)

Table 3.2.2a: Recorded Water Quality Monitoring Results

Parameter	Agency	Years Sampled	Results			Sampling Location		No. Violations/No. measurements	Exceed Standards (Yes/NO)
			High	Geometric Mean Value	Low	Latitude North	Longitude West		
Fecal Coliform FCmpn/100 ml	WDOE	1999-2000 (n=18)	540	32.48	7.8	47.316807	123.141953	5/18	Yes
Fecal Coliform FCmpn/100 ml	Skokomish Tribe	1995-2006 (n=102)	688	19.92	1.0	47.316807	123.141953	20/102	Yes
Temperature Degree C	WDOE	1999-2000 (n=23)	11.2	7.4	5.0	47.316807	123.141953	0/23	No
Temperature Degree C	Skokomish Tribe	2002-2005 (n=25)	14	9.5	6.0	47.316807	123.141953	0/25	No
Dissolved Oxygen mg/l	WDOE	1999-2000 (n=16)	12	10.7	9.5	47.316807	123.141953	0/16	No
Dissolved Oxygen mg/l	Skokomish Tribe	2002-2005 (n=29)	12.5	10.1	6.0	47.316807	123.141953	0/29	No
Biological Data (NO)									

Suggested Pollutant or cause of impairment: Fecal Coliform (FC) contamination due to cattle and farming activities. In addition, The Skokomish River Basin Fecal Coliform Bacteria Total Maximum Daily Load Study suggests some of FC contamination is from fishermen that heavily use the river during salmon migrations. NPS inputs from Purdy Cutoff road not known.

Source category = Agriculture/Rural

Source subcategory = Cattle and other livestock/Storm Water Runoff

Specific source (if known)= Agricultural cattle

Problem severity= Severe

Method of assessment=Ambient water quality monitoring surveys

Under TMDL Plan

3.2.3a

Name of stream Lower Potlatch Creek

The Potlatch Creek Drainage is contained within the northwest portion of the Reservation. Potlatch Creek is a Class AA classification. This stream is within State Park Boundary and has additional private ownership.

Method (M/E)=M/E

Miles of stream=0.08

Table 3.2.3a: Recorded Water Quality Monitoring Results

Parameter	Agency	Years Sampled	Results			Sampling Location		No. Violations/No. measurements	Exceed Standards (Yes/NO)
			High	Geometric Mean Value	Low	Latitude North	Longitude West		
Fecal Coliform FCmpn/100 ml	Skokomish Tribe	1996-2005 (n=30)	1252	31.3	1.0	47.21790	123.9367	12/30	Yes
Temperature Degree C	Skokomish Tribe	2003-2005 (n=25)	13	9.54	7.0	47.21790	123.9367	0/25	No
Dissolved Oxygen mg/l	Skokomish Tribe	2003-2005 (n=27)	13.5	10.7	3.0	47.21790	123.9367	5/27	Yes

Suggested Pollutant or cause of impairment: Fecal Coliform (FC) contamination due to septic systems.

Source category = Rural

Source subcategory = Septic/Storm Water Runoff

Specific source (if known)= Minerva Beach Trailer Park and Potlatch State Park camping (RV septic hookup)

Problem severity= Severe

Method of assessment=Ambient water quality monitoring surveys

3.2.3b
Name of stream Upper Potlatch Creek.
The Potlatch Creek Drainage is contained within the northwest portion of the Reservation. Potlatch Creek is a Class AA classification. This stream is within State Park Boundary.
Method (M/E)=M/E
Miles of stream=.10
Table 3.2.3a: Recorded Water Quality Monitoring Results

Parameter	Agency	Years Sampled	Results			Sampling Location		No. Violations/No. measurements	Exceed Standards (Yes/NO)
			High	Geometric Mean Value	Low	Latitude North	Longitude West		
Fecal Coliform FCmpn/100 ml	Skokomish Tribe	1995-2006 (n=22)	392	16.2	1	47.3624	123.1590	7/22	Yes
Temperature Degree C	Skokomish Tribe	1995-2006 (n=19)	10	9.1	8	47.3624	123.1590	0/19	No
Dissolved Oxygen mg/l	Skokomish Tribe	1995-2006 (n=19)	13	10.4	8	47.3624	123.1590	5/19	Yes

Suggested Pollutant or cause of impairment: Fecal Coliform (FC) contamination due to septic infiltration.
Source category = Rural
Source subcategory = Septic/Storm Water Runoff
Specific source (if known)= Potlatch State Park camping (RV septic hookup??)
Problem severity= Severe
Method of assessment=Ambient water quality monitoring surveys

3.2.4

Name of stream Enetai Creek (Data is A Combination of Upstream/Downstream Sites) The Enetai Creek Drainage, classified as Class AA water, is contained within the northwest portion of the reservation. The upper watershed is timberland; the last 650 ft of the stream is associated with the Enetai Hatchery. This stream will be used as a reference for Skokomish Reservation streams.

Method (M/E)= M/E

Miles of stream=1.3

Table 3.2.4a: Recorded Water Quality Monitoring Results

Parameter	Agency	Years Sampled	Results			Sampling Location		No. Violations/No. measurements	Exceed Standards (Yes/NO)
			High	Geometric Mean Value	Low	Latitude North	Longitude West		
Temperature Degree C	Skokomish Tribe	2006 (n=10)	8.8	8.50	8.4	47.3529	123.1609	0/10	NO
Dissolved Oxygen mg/l	Skokomish Tribe	2006 (n=10)	13.57	11.55	10.85	47.3529	123.1609	0/10	NO
pH Units	Skokomish Tribe	2006 (n=10)	7.41	7.35	7.26	47.3529	123.1609	0/6	NO
Biological Data () ---									

Suggested Pollutant or cause of impairment—None Noted----Early In Sampling
Source category = Agriculture
Source subcategory =Hatchery
Specific source (if known)=Enetai Creek Hatchery
Problem severity=None
Method of assessment= Ambient water quality monitoring surveys

3.2.5

Name of stream Mid Skobob Creek

The Skobob Creek Drainage is in the central portion of the Reservation. The Skobob Creek drainage waters are Class AA waters. Skobob Creek above the monitoring site is associated with a 500 acre wetland area.

Method (M/E)=M/E

Miles of stream=1.1

Table 3.2.5a: Recorded Water Quality Monitoring Results

Parameter	Agency	Years Sampled	Results			Sampling Location		No. Violations/No. measurements	Exceed Standards (Yes/NO)
			High	Geometric Mean Value	Low	Latitude North	Longitude West		
Fecal Coliform FCmpn/100 ml	Skokomish Tribe	1996-2005 (n=96)	360	16.4	1.0	47.32189	123.14657	20/96	Yes
Temperature Degree C	Skokomish Tribe	2002-2005 (n=33)	21	10.0	4.0	47.32189	123.14657	1/33	Yes
Dissolved Oxygen mg/l	Skokomish Tribe	2002-2005 (n=33)	11.1	5.4	2.0	47.32189	123.14657	29/33	Yes
Biological Data () ---									

Suggested Pollutant or cause of impairment: Creek drains a wetland area—and is a bypass channel during flood events for the main Skokomish River at Highway106 Bridge. Water flows directly through cattle pasture and into wetland then into Mid Skobob Creek during flood events. In addition, the highway 106 bridge which crosses the creek has the potential of storm water runoff problems.

Source category = **Agriculture/Rural**

Source subcategory = Cattle and other livestock/Storm Water Runoff

Specific source (if known)= Bougault Ranch—cattle and Highway 106

Problem severity= Moderate --Severe during high water events

Method of assessment=Ambient water quality monitoring surveys

3.2.6a

Name of stream Purdy Creek Mouth

Purdy Creek Drainage is on the south side of the Reservation and begins upstream of the George Adam Salmon Hatchery. The creek flows through a wetland complex from the hatchery area until it empties into the Skokomish River.

Method (M/E)=M/E

Miles of stream=.8

Table 3.2.6a: Recorded Water Quality Monitoring Results

Parameter	Agency	Years Sampled	Results			Sampling Location		No. Violations/No. measurements	Exceed Standards (Yes/NO)
			High	Geometric Mean Value	Low	Latitude North	Longitude West		
Fecal Coliform FCmpn/100 ml	Skokomish Tribe	1995-2005 (n=94)	1320	25.9	19.9	47.30552	123.1478	26/94	Yes
Temperature Degree C	Skokomish Tribe	1999-2005 (n=32)	19	10.3	7	47.30552	123.1478	1/32	Yes
Dissolved Oxygen mg/l	Skokomish Tribe	1999-2005 (n=32)	10	6.8	5.0	47.30552	123.1478	30/32	Yes

Suggested Pollutant or cause of impairment: Creek flows out of a wetland area—and is associated with an active hatchery operation above the wetland. Dissolved oxygen depletion is consistent as well as high Fecal Coliform bacteria contamination. During high flood water events runoff from Highway 101 could influence water quality.

Source category = Agriculture/Rural

Source subcategory = Hatcheries/Storm Water Runoff

Specific source (if known)= George Adam Salmon Hatchery and Highway 101

Problem severity= Severe

Method of assessment=Ambient water quality monitoring surveys

Under TMDL Plan

3.2.6b
Name of stream Purdy Creek (Bour)
Purdy Creek Drainage is on the south side of the Reservation and begins at the George Adam Salmon Hatchery. The creek flows through a wetland complex from the hatchery area.
Method (M/E)=M/E
Miles of stream=1.0
Table 3.2.6a: Recorded Water Quality Monitoring Results

Parameter	Agency	Years Sampled	Results			Sampling Location		No. Violations/No. measurements	Exceed Standards (Yes/NO)
			High	Geometric Mean Value	Low	Latitude North	Longitude West		
Fecal Coliform FCmpn/100 ml	WDOE	1999-2000 (n=14)	240	46.0	13	47.299126	123.180754	4/14	Yes
Fecal Coliform FCmpn/100 ml	Skokomish Tribe	1995-2005 (n=94)	3900	28.0	4.0	47.299126	123.180754	22/94	Yes
Temperature Degree C	WDOE	1999-2000 (n=18)	11.2	8.14	5.2	47.299126	123.180754	0/18	No
Dissolved Oxygen mg/l	WDOE	1999-2000 (n=11)	10.6	8.94	7.0	47.299126	123.180754	6/11	Yes

Suggested Pollutant or cause of impairment: Creek flows out of an associated wetland area—and is associated with an active hatchery operation and downstream of an active cattle farm. Dissolved oxygen depletion is consistent as well as high Fecal Coliform bacteria contamination.
Source category = Agriculture
Source subcategory = Cattle and other livestock/Hatcheries
Specific source (if known)= George Adam Salmon Hatchery, Paul Hunters Farm, McKerren Salmon Hatchery
Problem severity= Severe
Method of assessment=Ambient water quality monitoring surveys
Under TMDL Plan

3.2.7

Name of stream No Name Creek.

This is a small creek that is located on the south east side and off of the Reservation. It joins the mainstem Skokomish on the right bank at the 106 bridge. This Creek is associated with the Purdy Cutoff Road and crop planting.

Method (M/E)=M/E

Miles of stream=.41

Table 3.2.7a: Recorded Water Quality Monitoring Results

Parameter	Agency	Years Sampled	Results			Sampling Location		No. Violations/No. measurements	Exceed Standards (Yes/NO)
			High	Geometric Mean Value	Low	Latitude North	Longitude West		
Fecal Coliform FCmpn/100 ml	Skokomish Tribe	2002-2005 (n=41)	219	17.0	1	47.3175	123.13815	10/41	Yes
Fecal Coliform FCmpn/100 ml	WDOE	1999-2000 (n=4)	46	21.8	4.5	47.3175	123.13815	0/4	No
Temperature Degree C	Skokomish Tribe	2002-2005 (n=30)	14.0	10.0	7.0	47.3175	123.13815	0/30	No
Temperature Degree C	WDOE	1999-2000 (n=8)	9.5	7.9	6.2	47.3175	123.13815	0/8	No
Dissolved Oxygen mg/l	Skokomish Tribe	2002-2005 (n=30)	12.2	6.8	0	47.3175	123.13815	26/30	Yes
Dissolved Oxygen mg/l	WDOE	1999-2000 (n=4)	8.9	7.6	4.9	47.3175	123.13815	4/4	Yes
Biological Data () ---									

Suggested Pollutant or cause of impairment Fecal Coliform bacteria contamination and low dissolved oxygen due to farming activity. Potential concern from storm water runoff from Purdy Creek Cutoff Road.

Source category = Agriculture/Rural

Source subcategory = Vegetable Cropping/Hydro-modification

Specific source (if known)=Pasture and Crop Activity

Problem severity= Severe

Method of assessment=Ambient water quality monitoring surveys and hydrologic studies

3.2.8a.
Name of stream Weaver Creek Weaver Cr. Vly. Rd. Br.
The Weaver Creek Drainage is in the southern area of the Reservation. The Weaver Creek drainage waters are a Class AA waters.
Method (M/E)= M/E
Miles of stream=2.0
Table 3.2.8a: Recorded Water Quality Monitoring Results

Parameter	Agency	Years Sampled	Results			Sampling Location		No. Violations/No. measurements	Exceed Standards (Yes/NO)
			High	Geometric Mean Value	Low	Latitude North	Longitude West		
Fecal Coliform FCmpn/100 ml	WDOE	1999-2000 (n=15)	1100	34.5	2	47.312172	123.240751	5/15	Yes
Fecal Coliform FCmpn/100 ml	Skokomish Tribe	2002-2005 (n=94)	16000	36.8	1	47.312172	123.240751	36/94	Yes
Temperature Degree C	WDOE	1999-2000 (n=18)	11.2	8.8	7.4	47.312172	123.240751	0/18	No
Temperature Degree C	Skokomish Tribe	2002-2005 (n=27)	12	10.0	9	47.312172	123.240751	0/27	No
Dissolved Oxygen mg/l	WDOE	1999-2000 (n=10)	10.3	9.6	8.7	47.312172	123.240751	4/10	Yes
Dissolved Oxygen mg/l	Skokomish Tribe	2002-2005 (n=27)	9.6	6.6	0	47.312172	123.240751	23/27	Yes
Biological Data () ---									

Suggested Pollutant or cause of impairment Fecal Coliform bacteria contamination due to septic systems, cattle and farming activities.
Source category = Agriculture/Rural
Source subcategory = Cattle and other livestock/Hatcheries/Vegetable Cropping/Hydro-modification
Specific source (if known)=Paul Hunters Farm and Toyiers Farm, Pasture and Hay Crop Activity
Problem severity= Severe
Method of assessment=Ambient water quality monitoring surveys and hydrologic studies
Under TMDL Plan

3.2.8b.
Name of stream Weaver Creek Weaver Cr. Lw. Br..
The Weaver Creek Drainage is a right bank tributary in the southern area of the Reservation. The Weaver Creek drainage waters are a Class AA waters. This site drains Tribal owned lands south of the river.
Method (M/E)= M/E
Miles of stream=0.60
Table 3.2.8a: Recorded Water Quality Monitoring Results

Parameter									
	Agency	Years Sampled	Results			Sampling Location		No. Violations/No. measurements	Exceed Standards (Yes/NO)
			High	Geometric Mean Value	Low	Latitude North	Longitude West		
Fecal Coliform FCmpn/100 ml	WDOE	1999-2000 (n=5)	110	44.9	13	47.305333	123.184585	2/5	Yes
Fecal Coliform FCmpn/100 ml	Skokomish Tribe	1995-2005 (n=61)	840	12.2	1	47.305333	123.184585	9/61	Yes
Temperature Degree C	WDOE	1999-2000 (n=9)	9.8	8.3	7.2	47.305333	123.184585	0/9	No
Temperature Degree C	Skokomish Tribe	2003-2005 (n=27)	15	10.0	6	47.305333	123.184585	0/27	No
Dissolved Oxygen mg/l	WDOE	1999-2000 (n=5)	10.0	9.2	7.8	47.305333	123.184585	2/5	Yes
Dissolved Oxygen mg/l	Skokomish Tribe	2002-2005 (n=27)	11.0	3.2	0	47.305333	123.184585	25/27	Yes
Biological Data () ---									

Suggested Pollutant or cause of impairment Fecal Coliform bacteria contamination due to septic systems, cattle and farming activities.
Source category = Agriculture/Rural
Source subcategory = Cattle and other livestock/Hatcheries/Vegetable Cropping/Hydro-modification
Specific source (if known)= Paul Hunters Farm and Toyiers Farm/Pasture and Hay Crop Activity
Problem severity= Severe
Method of assessment=Ambient water quality monitoring surveys and hydrologic studies
Under TMDL Plan

3.2.9.

Name of stream 10 Acre Creek

The 10 Acre Creek Drainage is off the Reservation but affects the southern area of the Reservation. The 10 Acre Creek drainage waters are a Class AA waters.

Method (M/E)= M/E

Miles of stream=0.56

Table 3.2.8a: Recorded Water Quality Monitoring Results

Parameter									
	Agency	Years Sampled	Results			Sampling Location		No. Violations/No. measurements	Exceed Standards (Yes/NO)
			High	Geometric Mean Value	Low	Latitude North	Longitude West		
Fecal Coliform FCmpn/100 ml	WDOE	1999-2000 (n=14)	130	25.0	2	47.314438	123.140808	3/14	Yes
Fecal Coliform FCmpn/100 ml	Skokomish Tribe	1995-2005 (n=93)	27000	29.1	1	47.314438	123.140808	30/93	Yes
Temperature Degree C	WDOE	1999-2000 (n=17)	9.8	8.6	6.8	47.314438	123.140808	0/17	No
Temperature Degree C	Skokomish Tribe	2002-2005 (n=27)	11	9.7	8	47.314438	123.140808	0/27	No
Dissolved Oxygen mg/l	WDOE	1999-2000 (n=13)	8.7	7.7	6.1	47.314438	123.140808	13/13	Yes
Dissolved Oxygen mg/l	Skokomish Tribe	2002-2005 (n=27)	10.2	7.0	5	47.314438	123.140808	23/27	Yes
Biological Data () ---									

Suggested Pollutant or cause of impairment Fecal Coliform bacteria contamination due to septic systems, cattle and farming activities.

Source category = Agriculture/Rural

Source subcategory = Cattle and other livestock/Hatcheries/Vegetable Cropping/Hydro-modification

Specific source (if known)=Pasture

Problem severity= Severe

Method of assessment=Ambient water quality monitoring surveys and hydrologic studies

3.2.10

Name of Stream Hunter Creek

The Hunter Creek Drainage, classified as Class AA water, is northwest of the southern portion of the Reservation. This creek flows though pastureland associated with large farms and supplies the George Adams Hatchery.

Method (M/E)=M/E

Miles of stream=2.4

Table 3.2.4a: Recorded Water Quality Monitoring Results

Parameter	Agency	Years Sampled	Results			Sampling Location		No. Violations/No. measurements	Exceed Standards (Yes/NO)
			High	Geometric Mean Value	Low	Latitude North	Longitude West		
Fecal Coliform FCmpn/100 ml	WDOE	1999-2000 (n=14)	79	14.43	1.8	47.18764	123.12209	1/14	Yes
Fecal Coliform FCmpn/100 ml	Skokomish Tribe	1996-2005 (n=82)	1500	21.3	1	47.18764	123.12209	22/82	Yes
Temperature Degree C	WDOE	1999-2000 (n=14)	10.8	8.8	7.5	47.18764	123.12209	0/17	No
Temperature Degree C	Skokomish Tribe	2002-2005 (n=19)	11	9.8	9	47.18764	123.12209	0/19	No
Dissolved Oxygen mg/l	WDOE	1999-2000 (n=9)	10.8	9.69	7.8	47.18764	123.12209	0/9	No
Dissolved Oxygen mg/l	Skokomish Tribe	2002-2005 (n=19)	12.4	8.1	5	47.18764	123.12209	8/19	Yes
Biological Data () ---									

Suggested Pollutant or cause of impairment Fecal Coliform bacteria contamination due to septic systems, cattle and farming activities.

Source category = Agriculture/Rural

Source subcategory = Vegetable Cropping/Hydro-modification

Specific source (if known)=Richards Ranch, Paul Hunters Farm Pasture and Crop Activity

Problem severity= Severe

Method of assessment=Ambient water quality monitoring surveys and hydrologic studies

Under TMDL Plan

3.3 Effects of Non-point Source Pollutants

3.3.1 Fecal Coliform Bacteria

Fecal Coliform bacteria are found in the intestines of warm blooded animals. Their presence in waters indicates that pathogenic organisms may also be present. They are most commonly associated with failing septic tanks and drain fields from individual sewage disposal systems, agricultural feedlots, and grazing animals. Grazing areas generally follow surface water sources near the Reservation and it is assumed that fecal coliform bacteria contamination of the lower Skokomish River is associated with this source.

3.3.2 Nutrients

The potential non-point source nutrients of concern on Skokomish Reservation are nitrogen and phosphorus. Although these pollutants have not been specifically monitored they are a pollutant that will be monitored in the future. They originate from fertilizers, animal and human wastes, rural runoff, and natural sources. Nutrients may stimulate excessive growth of algae in rivers or nuisance aquatic weeds in lakes and reservoirs, rendering water aesthetically unattractive or unsuitable for recreation. Excessive nitrate levels in drinking water may cause methemoglobinemia or "blue baby syndrome" in infants. The Skokomish drinking water supply is monitored for this pollutant and so far no contamination has been recorded. However, low dissolved oxygen, which can be a direct result of nutrient input, has been recorded throughout the lower basin and is a concern for all aquatic life. Biosolids applications can also introduce nutrients into water bodies —active applications of biosoilds occur on the east side of the Reservation and may influence No Name Creek and the lower Skokomish River.

3.3.3 Total Dissolved Solids

Total dissolved solids (salts or salinity) are usually a concern in semi-arid areas when water is used consumptively (evapotranspired). However, in the Skokomish drainage, tidal fluctuation can affect both the water table and surface water. Application of irrigation water to saline soils can leach salts back to rivers, thereby increasing salinity. The Skokomish Tribal monitoring program has not monitored increases in salinity, but with increased use of the lower watershed for farming, this will be monitored in the future.

3.3.4 Sediment

Human activity, including tilling, diking, irrigation, grazing, construction, urbanization, and forestry practices accelerate natural sediment production. Excess sedimentation interferes with water treatment, irrigation, fish spawning and rearing, and the production of fish food organisms in streams. Other pollutants, such as nutrients and heavy metals, may be absorbed on sediment particles and transported into and through out aquatic systems. Sediment affects spawning salmon and other aquatic life.

3.3.5 Natural

In general, natural conditions in the lower Skokomish Valley have been altered substantially. Normal background of NPS pollution can only be summarized from glacially derived outwash. In the geological past, glacial ice sheets inundated Skokomish Reservation. These massive glaciers created 1) Glacial Till in the upper and lower reaches of the Skokomish basin. Glacial till is a mixture of silt, sand, gravel, cobbles and boulders cemented together in layers that are mostly impermeable to water, 2) Glacial Outwash: Glacial outwash deposits form from glacier meltwater runoff from glaciers and were deposited in former lakes and river channels. Two types of glacial outwash form sedimentary layers in the Skokomish Valley: A) Fine-Grained Sediments that were deposited as layers of silt and clay on former lake bottoms and are not very porous and are mostly impermeable to water; and B) Coarse-Grained Sediments that were common to river channels and deltas. These sediments contain sand, gravel, and cobble-sized rock and are very porous and very permeable to water. The porous sediments can form large underground aquifers and may be the source of the Skokomish drinking water wells. Coarse-grained sediments create excellent reservoirs for groundwater and generally provide high-yield water supplies for local wells with relatively quick water recharge rates, despite most drawdown demands. 3) Non-Glacial Sediments contain well-sorted layers of fine- and medium-grained materials (or alluvium), including sand, silt, clay and organic materials. Fine-grained, non-glacial sediments often slow or impede water permeation, lowering yields from wells and slowing recharge rates. However, the advantage to these fine-grained, non-glacial sediments is that they are excellent for filtering contaminants from water before it reaches the aquifer (Dave's Digital Outcrop 1999-2000). It is assumed that the water of the Reservation were of a very high quality after the glacial period 12,000 years ago.

3.3.6 Other

Toxic chemicals and metals may cause problems in Skokomish Reservation waters and for off-stream water users. These include arsenic, lead, creosote, pentachlorophenol, and pesticides.

Water temperatures that are too high for fish and aquatic life are often associated with partially dewatered streams in summer or streams from where riparian bank vegetation has been removed. Stream bank and channel alterations and flow alterations (dewatering) also reduce the amount of habitat available to fish and aquatic life. Streams associated with this assessment flow all year.

Organic compounds, such as sewage sludge sometimes collect on stream bottoms and contribute to depletion of dissolved oxygen in the water.

3.4 Formulation of Best Management Practices

Tribal Council procedures provide public participation and public comment. A resolution (See Appendix A) authorizes submittal of the Assessment Plan to other Federal agencies. Section 319 of the Federal Clean Water Act requires each tribe to describe tribal and local programs for controlling pollution from non-point sources. The first and foremost management non-point control program for the Skokomish Tribe is the Skokomish Environmental Policy Act (SKEPA). This Tribal administrative oversight addresses cumulative impacts of potentially degrading development projects. SKEPA provides "conditioned" permits and mitigation when appropriate.

In addition to the Tribe's anticipated non-point program, there are numerous programs, administered by a variety of agencies that aim to control non-point source pollution. Mason County Conservation Districts is the designated the non-point source management agencies for non-federal lands. The program is intended to encourage adoption and implementation of best management practices (BMPs). Technical assistance, education, demonstration projects, and financial assistance are used to implement BMPs. In addition, the Washington State University extension service provides technical assistance when needed.

The U.S. Department of Agriculture's cost-share programs offer financial incentives for implementation of BMPs on agricultural lands, on and near the Skokomish Reservation. In addition, the Corps of Engineers 404 Dredge and Fill Permit Program, controls non-point source pollution resulting from hydromodification activities. The Brownfields program administered by the Environmental Protection Agency offers the potential for correcting non-point pollution problems related to toxic and hazardous waste sites. The Tribe participates in all of these programs.

The Skokomish Tribe Natural Resources Department conducts water quality monitoring, assesses and prioritizes non-point and point source problems, develops solutions, and will provide management of these problems. A priority list is kept of stream segments that have assessed man-caused water quality problems. The list is used to focus and conserve limited management resources.

The following categories and subcategories of non-point sources have been designated by EPA and used in this report. All have to some extent caused impairment of Skokomish Reservation waters.

3.4.1 Agriculture

Non-irrigated crop production
Irrigated crop production
Specialty crop production (e.g., truck farming, or orchards)
Pasture land (Grazing)
Feedlots - all types
Aquaculture
Animal holding/management areas
Streambank erosion
Silviculture

3.4.2 Construction

Highway/road/bridge
Land Development
Streambank erosion
Diking

3.4.3 Urban (Rural) Runoff

Storm sewers
Combined sewers
Surface runoff
Streambank erosion

3.4.4 Resource Extraction/ Exploration/ Development

Streambank erosion

3.4.5 Land Disposal (runoff/leachate from permitted areas)

Sludge
Wastewater
Landfills
Industrial land treatment
On-site wastewater systems (septic tanks, etc)
Hazardous waste
Treated biosolids

3.4.6 Hydromodification

Channelization
Dredging
Dam construction/operation
Flow regulation/modification
Streambank erosion
Removal of riparian vegetation
Bridge construction
Streambank modification/destabilization

3.4.7 Other

Atmospheric deposition
Waste storage/storage tank leaks
Highway maintenance and runoff
Gas/Oil Spills
Natural erosion processes

4.0 CONCLUSIONS

4.1 How This Report Will Be Used

The Skokomish Indian Tribe is working to correct and prevent non-point source problems on and near the Reservation, however, much more needs to be done. Solutions are often complex and difficult to develop and expensive to implement. Improved landowner cooperation, agency coordination, additional funding and technical assistance are needed to correct the priority non-point source problems.

A much more detailed description of non-point source control programs on the Reservation will be included in the Skokomish Reservation's non-point source management plan, which is also required under Section 319 of the Federal Clean Water Act and is started here in this document. This plan is a work in progress. The first steps in the development of the Skokomish non-point source management plan are listed below. Our management plan will start with identifying Best Management Practices (BMP) per category of identified NSP. These BMP's will be used as the key element in our planning process. Realistic goals, objectives, action items and timelines will be established to correct problems where found. It should be noted the Skokomish Tribe has implemented management planning in many of the identified areas listed. Ongoing and updating of those plans are now underway and include, land use mapping and rulemaking, master planning, solid waste planning, forest practice planning, water resources planning, active participation in the Skokomish River TMDL plan, water resource inventory planning, and environmental permitting. All of these planning processes will be incorporated into the finished NPS management planning document.

4.2 Best Management Practices

Categories, subcategories and specific sources of non-point pollution on the Skokomish Reservation are listed below, Section 319 of the Federal Clean Water Act requires each Tribe to describe its process for identifying the measures it will use to control these categories, subcategories and sources.

Four non-point source categories are responsible for a significant fraction of the threatened or impaired water bodies on the reservation and include: agricultural activities (cattle and other livestock--- vegetable cropping), hydromodification, and hatcheries.

The Skokomish Section 319 program will emphasize agriculture activities as the number one source of water impairment; however, Rural (septic systems, storm water runoff), and Forest Practices (bank erosion and silviculture activities) will also be monitored. Although solid waste has been identified as a low impact to Reservation waters ---the development of a management plan for solid waste is now underway on the Reservation and this plan will be incorporated into the 319 management plan.

Hydromodification, and land disposal activities are regulated under Skokomish Environmental Protection Act (SKEPA) which is administered by the Skokomish Natural Resources Department. Best Management Practices (BMPs) are being developed and

are identified in this report but in general will follow the National Soil Conservation Service guidelines.

The process for identifying BMPs for the agricultural category will consist of working with the Mason Conservation District, Washington Department of Health, County Commissioners, and the Washington Department of Ecology to reduce agricultural impacts to Skokomish Reservation water bodies.

4.2.1 Agriculture Activities

The BMPs selected from the National Soil Conservation Service (SCS) standards and specifications are currently in use by a majority of the farms near the Reservation. Additional BMPs addressing pesticide application, fertilizer management, grazing, and streambank stabilization may need to be added for land on the Reservation.

One or more BMPs will be selected for each land use within a targeted water segment. We believe proper application of a resource management system for this segment will insure the NPS pollution is minimized. Cooperating agencies including Mason County, and the Washington Department of Ecology will help the Skokomish Tribe develop new BMPs if appropriate ones do not exist to solve a specific problem.

Utilizating agricultural BMPs for non-point source water pollution control on Skokomish is voluntary. Success in solving non-point source pollution problems has been limited primarily to smaller streams and projects. However, the Tribe's activities in the Water Resources Planning Area (WRIA 16)[22] planning process will enable a comprehensive approach to the protection of water resources in the Skokomish watershed.

Cost-share programs are available to help pay the cost of applying BMPs, but in most cases ranchers and farmers are unable to provide matching funds. The 319 program provides incentives to help farmers and ranchers implement BMP's. In cases of need, Tribal resources may be used to augment implementation of BMP's.

4.2.2 Hydromodification

BMP's for hydrologic and habitat modification often relate directly to other categories of non-point source pollution. For example, grazing practices may impact stream hydrology by changing seasonal flow patterns and water yield. Agricultural activities may involve placement of irrigation diversions in streams. The majority of hydromodification activities on Skokomish Reservation are regulated under SKEPA and administered by the Skokomish Natural Resources Department, and/or Section 404 permits. The Tribe will continue to work with watershed groups to develop ways to reduce the modification of the Skokomish waters and where possible will restore hydrologic function where it has been impacted from hydromodification.

[22] WRIA 16 Action Plan ftp://ftp.cascadiaconsulting.com/incoming/WRIA16

4.2.3 Rural

BMP's will be used to site, design and maintain onsite wastewater treatment (septic) systems, pet wastes, lawn and garden fertilizers and pesticides, household chemicals that are improperly disposed of, automobile fluids, road deicing/anti-icing chemicals, and vehicle emissions. The Skokomish SKEPA process is currently the regulatory authority used to control Rural NSP pollution. In addition to septic issues, BMP will also be used to mange uncontrolled or treated runoff from the Rural environment and from construction activities which can run off the landscape into surface waters. This runoff can include such pollutants as sediments, pathogens, fertilizers/nutrients, hydrocarbons, and metals.

4.2.4 Forest Practices

Laying out, constructing and using BMP in forest harvesting and in the development of trails and landings will be used to minimizing onsite and offsite damage to resources. In addition, treating areas to encourage natural regeneration of desirable trees and shrubs or permit artificial regeneration by planting or direct seeding will be controlled as to not contaminate soil or waterbodies. Care will be observed when manipulating species composition and stocking by cutting or killing selected trees and understory vegetation. The Skokomish Tribe Forest Management plan will be incorporated into the 319 management process.

4.2.5 Land Disposal.

BMP's for Land Disposal often relate directly to other categories of non-point source pollution. Illegal dumping of junk cars, abandoned drug labs, and appliances pose a threat to surface and ground water from leaking hydrocarbons or other metal or chemical contaminates Land disposal activities on Skokomish are regulated under SKEPA administered by the Skokomish Natural Resources Department. The Tribe is proactive in addressing solid waste issues. Many areas have been cleaned up and roads have been gated to prevent illegal dumping. In addition, a new soiled waste assessment is underway with a management plan in development by Ridolfi Inc due 10/01/06. The Tribe is currently providing site clean-up through EPA.

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6.0 Appendix

6.1 Tribal Government Resolution

Skokomish Indian Tribe
Tribal Center (360) 426-4232
N. 80 Tribal Center Road **FAX (360) 877-5943** **Skokomish Nation, WA 98584**

SKOKOMISH TRIBAL COUNCIL
RESOLUTION NO. 06-82

A RESOLUTION AUTHORIZING THE SUBMISSION OF A PROPOSED SKOKOMISH TRIBE ASSESSMENT AND MANAGEMENT PLAN TO THE ENVIRONMENTAL PROTECTION AGENCY

WHEREAS, the Skokomish Indian Tribe is a federally recognized Indian tribe organized under its Constitution and by-laws first adopted on April 2, 1938 and approved by the Secretary of the Interior May 3, 1938, amended January 15, 1980 as approved by the Secretary of the Interior March 17, 1980; and

WHEREAS, the Skokomish Indian Tribe entered into the 1855 Treaty of Point No Point with the United States of America, reserving a homeland for the Tribe and securing for the Tribe the right of taking fish at its usual and accustomed grounds and stations and the privilege of hunting and gathering roots and berries in open and unclaimed lands; and

WHEREAS, pursuant to Article IV, Section 1 and Article V, Sections 1(h) and (m) of the Constitution, the Skokomish Tribal Council is the governing body of the Skokomish Indian Tribe which has the authority to manage, develop, protect, and regulate the use of water, fish and wildlife, minerals, timber, and all other natural resources within the Skokomish Tribe's jurisdiction and to consult, negotiate, and contract with agencies and officers of Federal, state, local, and tribal governments and with private persons and organizations; and

WHEREAS, the Skokomish Tribe is developing a Non Point Source Control program which will serve to protect surface and ground water from non point sources of pollution; and

WHEREAS, the Non Point Source program is required to compile a management and assessment plan under the approved work plan and submit it to the Environmental Protection Agency (EPA) for review and comment; and

WHEREAS, the Skokomish Tribe must incorporate the comments into the documents and approve the documents in final form,

NOW THEREFORE BE IT RESOLVED, that the Skokomish Tribal Council hereby authorizes the submission of the Proposed Skokomish Tribe Assessment and Management Plan to the Environmental Protection Agency for their comments and the incorporation of these comments into the final Assessment and Management Plans.

* * * CERTIFICATION***

I, Denese LaClair, Chair of the Skokomish Tribal Council, hereby certify that the foregoing Resolution No. 06-82 was adopted by a phone poll of the Skokomish Tribal Council, held on August 10, 2006 by a vote of 4 FOR, 0 AGAINST, and 2 ABSTAINING.

Denese LaClair

Denese LaClair, Chair
Skokomish Tribal Council

Charles Miller

Charles Miller, Secretary
Skokomish Tribal Council

6.2 Best Management Practices Reference Guide

Agriculture

DOE

Irrigation Management Practices to Protect Ground Water and Surface Water Quality, State of Washington, Peter Canessa, Washington Department of Ecology and WSU, 1994.

NRCS Publications

Tips for small acreages in Oregon:

Fact Sheet 2, January 1999, Protecting Your Watershed
Fact Sheet 4, January 1999, Protecting Streambanks from Erosion
Fact Sheet 5, January 1999, Managing Streamside Areas with Buffers
Fact Sheet 7, January 1999, Managing Pastures
Fact Sheet 8, January 1999, Managing Weeds in Pasture
Fact Sheet 9, January 1999, Providing Stockwater in Fields and Near Streams
Fact Sheet 10, January 1999, Designing a Fence
Fact Sheet 11, January 1999, Managing Manure and Mud in Oregon
Fact Sheet 12, January 1999, Fertilizing for profit
Fact Sheet 13, January 1999, Protecting Your Land from Erosion
Fact Sheet 14, January 1999, Planning and Managing Irrigation

WSU Publications
1990 Rotation Crop Budgets for Northwest Washington, EB 1587
Dryland Farming in the Northwestern United States; Non-technical Overview
Concepts of Integrated Pest Management in Washington, EB0753
Integrated Pest Management; Effective Options for Farmers, EB1786
Controlling Cropland Wind Erosion and Off-site Impact in the PNW, MISC0177, 1994
Current Nutrient Status of Soils, PHW076, 1985
Exchange Cations, Cation Exchange Capacity, and Base Saturation, Soil Iron, EM2894, 1980
Nitrogen Uptake and Utilization by Pacific Northwest Crops, PNW0513, 1998
Determining the Gross Amount of Water Applied-Surface Irrigation, CO912, 1996
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Tips for small acreages in Oregon:
Fact Sheet 15, January 1999, Managing Sustainable Forests
Fact Sheet 16, January 1999, Enhancing Wildlife Habitat
Fact Sheet 17, January 1999, Constructing a Pond
Small landowner

NRCS & NACD Backyard Conservation Series Includes:
Backyard Conservation
Composting
Pest Management
Nutrient Management
Wildlife Habitat
Mulching
Water Conservation
Terracing
Backyard Pond
Wetland
Tree Planting

Stormwater runoff

DOE
Water Quality Guide; Recommended Pollution Control Practices for Homeowners and Small Farm Operators

NRCS Publications
Tips for small acreages in Oregon:
Fact Sheet 15, January 1999, Managing Sustainable Forests
Fact Sheet 16, January 1999, Enhancing Wildlife Habitat
Fact Sheet 17, January 1999, Constructing a Pond
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Natural Resource Conservation Service

BEST MANAGEMENT PRACTICES

Best Management Practices (BMP's) consist of sustainable approaches to land planning and management that protect soil and water resources against degradation. Resource management agencies, groups and educators identify and promote BMP's in varying ways. This appendix provides information on BMP's recommended by the Natural Resource Conservation Service (NRCS). The NRCS defines Best Management Practices in their Field Office Technical Guides according to the following criteria:

Conservation Practice -- A structural measure, a vegetative measure or a management activity used to protect, enhance or manage, soil, water, air, plant or animal resources

Conservation Practice Standard -- A set of statements that defines a practice; identifies the purposes and applicability of the practice; establishes criteria to support each purpose; lists special concerns useful in planning, designing, and constructing the practice; and establishes installation, operation and maintenance requirements.

Conservation Practice Specifications -- Site specific documents that establish the technical details and workmanship required to install the practices in accordance with the requirements of the practice standard.

The following is a partial list of current NRCS practices that apply to the Skokomish Reservation. The definitions given are summaries taken from the Conservation Practice Standard pages for each practice in Field Office Technical Guide 4. In creating conservation plans, planners recommend that combinations of these practices be implemented in concert to achieve desired results and improve water quality.

Brush Management (314) -- Removal, reduction, or manipulation of non-herbaceous plants to restore natural plant community balance; create a desired plant community; reduce competition for space, moisture, and sunlight between desired and unwanted

plants; manage woody plants; restore vegetation cover to protect soils, control erosion, reduce sediment, improve water quality and enhance stream flow, maintain or enhance wildlife habitat, protect from wildfire hazards, and improve visibility and access for handling livestock.

Channel Vegetation (AC) (322) -- Establishment and maintenance of plants on channel banks, berms, spoils, and associated areas to stabilize channel banks and adjacent areas and reduce erosion and sedimentation.

Chiseling and Subsoiling (324) -- Loosening the soil, without inverting and with a minimum of mixing of the surface soil, to shatter restrictive layers below the normal plow depth that inhibit water movement or root development.

Commercial Fishponds (397) -- A water impoundment constructed and managed for commercial aquaculture production to provide a favorable water environment for producing, growing, harvesting and marketing aquaculture crops and to control water quality.

Composting Facility (317) -- A facility for the biological stabilization of waste organic material to treat waste biologically by producing a hums-like material that can be recycled as a soil amendment and fertilizer substitute or otherwise utilized in compliance with all laws, rules and regulations.

Conservation Cover (327) -- Establishing and maintaining perennial vegetative cover to protect soil and water resources on land retired from agricultural production to reduce soil erosion and sedimentation, improve water quality, and create or enhance wildlife habitat.

Conservation Crop Rotation (328) -- Growing crops in a re-occurring sequence on the same field to reduce sheet and rill erosion, reduce irrigation induced erosion, maintain or improve soil organic content, manage plant nutrients, improve water use efficiency, manage saline seeps, manage plant pests, provide food for domestic livestock and provide food and cover for wildlife.

Constructed Wetland (656) -- A wetland that has been constructed for the primary purpose of water quality improvement.

Contour Farming (AC) (330) --Farming sloping land in such a way that preparing land, planting, and cultivating are done on the contours to reduce erosion and control water.

Contour Orchard and Other Fruit Area (331) -- Planting orchards, vineyards, or small fruits so that all cultural operations are done on the contour to reduce soil and water loss, better control and use water, and operate farm equipment more easily.

Controlled Drainage (335) -- The control of surface and subsurface water through the use of drainage facilities and water control structures to conserve water and maintain optimum soil moisture, optimize infiltration, increase plant root zone depth, improve surface water quality, reduce nitrates in drainage water, reduce subsidence and wind erosion, and provide water for wildlife.

Cover Crop (340) - A crop of close-growing grasses, legumes, or small grains grown primarily for seasonal protection and soil improvement. This crop is usually grown for 1 year or less, except where there is permanent cover as in orchards.

Critical Area Planting (342) -- Planting vegetation, such as trees, shrubs, vines, grasses, or legumes, on highly erodible or critically eroding areas to stabilize the soil, reduce damage from sediment and runoff to downstream areas, and improve wildlife habitat and visual resources.

Fence (382) -- Enclosing or dividing an area of land with a suitable permanent structure that acts as a barrier to livestock, big game, or people to protect areas from grazing, regulate access and protect new seedlings.

Field Border (386) -- A strip of permanent vegetation established at the edge or around the perimeter of a field to reduce erosion from wind and water, protect soil and water quality, manage harmful insect populations and provide wildlife food and cover.
Filter Strip (393) -- A strip or area of vegetation for removing sediment, organic matter, and other pollutants from runoff and wastewater.
Fish Stream Improvement (395) -- Improving a stream channel to make a new fish habitat or to enhance an existing habitat to increase the production of desired species of fish.
Floodwater Diversion (400) -- A graded channel with a supporting embankment or dike on the lower side constructed on lowland subject to flood damage to improve the crop-growing environment of lowlands and improve water quality.
Forage Harvest Management (511) -- The timely cutting and removal of forages from the field as hay, green-chop, or ensilage to optimize economic yield, promote vigorous plant regrowth, maintain desired species composition, control insects and disease and improve wildlife habitat.
Forest Harvest Trails and Landings (655) -- Laying out, constructing and using forest harvest trails and landings to allow for removal of a forest product while minimizing onsite and offsite damage to resources.
Forest Site Preparation (490)- Treating areas to encourage natural regeneration of desirable trees and shrubs or to permit artificial regeneration by planting or direct seeding.
Forest Stand Improvement (666) -- To manipulate species composition and stocking by cutting or killing selected trees and understory vegetation.
Grazing Land Mechanical Treatment (548) -- Modifying physical soil and/or plant conditions with mechanical tools by treatments such as; pitting, contour furrowing, and ripping or subsoiling to fracture compacted soil layers and improve soil permeability, reduce water runoff and increase infiltration, increase plant vigor and produce greater yields.
Heavy Use Area Protection (561) -- Protecting heavily used areas by establishing vegetative cover, by surfacing with suitable materials, or by installing needed structures.
Hedgerow Planting (422) -- Establishing a living fence of shrubs or trees in, across, or around a field to delineate field boundaries, serve as fences, establish contour guidelines, provide wildlife food and cover, provide screens, or improve the landscape.
Hillside Ditch (423) -- A channel that has a supporting ridge on the lower side constructed across the slope at definite vertical intervals and gradients, with or without a vegetative barrier, to control water flow in non-cultivated sloping areas by diverting runoff to a protected outlet, thus minimizing erosion, conserving water and improving water quality.
Irrigation Field Ditch (388) -- A permanent irrigation ditch constructed to convey water from the source of supply to a field or fields in a farm distribution system to prevent erosion or loss of water quality or damage to land.
Land Clearing (460) -- Removal of trees, stumps, and other vegetation from wooded areas to achieve needed land use adjustments and to provide improvements in the interest of soil and water conservation.
Land Smoothing (466) -- Removing irregularities on the land surface by use of special equipment to improve surface drainage, obtain more uniform planting depths and facilitate contour cultivation.

Mole Drain (482) -- An underground conduit constructed by pulling a bullet shaped cylinder through the soil to establish a system of subsurface channels for removal of trapped surface and shallow subsurface water from low gradient land.
Mulching (484) -- Applying plant residues or other suitable materials not produced on the site to the soil surface to conserve moisture, prevent surface compaction and crusting, reduce runoff and erosion, control weeds and help establish plant cover.
Nutrient Management (590) -- Managing the amount, form, placement, and timing of applications of plant nutrients to optimize forage and crop yields, minimize entry of nutrients to surface and groundwater, and maintain or improve chemical and biological conditions of the soil.
Obstruction Removal (500) -- Removal and disposal of unwanted, unsightly or hazardous buildings, structures, vegetation, landscape features, trash, and other materials.
Pasture and Hay Planting (512) -- Establishing and reestablishing long-term stands of adapted species of perennial, biennial, or reseeding forage plants to reduce erosion, produce high quality forage, and to adjust land use.
Pest Management (595A) -- Managing agricultural pest infestations to reduce adverse effects on plant growth, crop production and environmental resources in order to develop a pest management system that is both consistent with selected crop production goals and is environmentally acceptable.
Pond (378) -- A water impoundment made by constructing a dam or an embankment or by excavating a pit or dugout to provide water for livestock, fish and wildlife, recreation, fire control, crop and orchard spraying, and other related uses and to maintain or improve water quality.
Pond Sealing or Lining (521) -- Installing a fixed lining of impervious material or treating the soil in a pond mechanically or chemically to impede or prevent excessive water loss.
Precision Land Forming (462)-Reshaping the surface of land to planned grades to improve surface drainage, provide land forming operations for drainage and erosion control, improve moisture conservation, help leaching uniformity, and improve water quality.
Prescribed Burning (338) -- Applying controlled fire to predetermined areas to control undesirable vegetation, prepare sites for planting or seeding, control plant disease, reduce wildfire habitat, improve forage production quantity or quality, remove slash and debris, enhance seed and seedling production and facilitate the distribution of grazing and browsing animals.
Prescribed Grazing (528A) -- The controlled harvest of vegetation with grazing or browsing animals managed to improve or maintain the health and vigor of selected plants and to maintain a stable and desired plant community, provide or maintain food, cover and shelter for animals of concern, improve or maintain animal health and productivity, maintain or improve water quality and quantity and reduce accelerated soil erosion and maintain or improve soil condition for sustainability of the resource.
Range Planting (550) -- Establishment of adapted perennial vegetation such as grasses, forbs, legumes, shrubs, and trees to restore a plant community similar to its historic climax, provide or improve forage for livestock, provide or improve habitat for wildlife, reduce erosion and improve water quality and quantity.
Recreation Area Improvement (562) -- Establishing grasses, legumes, vines, shrubs, trees, or other plants or selectively reducing stand density and trimming woody plants to improve an areas attractiveness and usefulness for recreation and to protect soil and plant resources.

Recreation Land Grading and Shaping (566) -- Altering the surface of the land to meet the requirements of recreation facilities to permit effective uses of the land area for recreation, improve surface drainage for recreation use and obtain more uniform soil depths.
Recreation Trail and Walkway (568) -- A pathway prepared especially for pedestrian, equestrian, and cycle travel to provide users of recreation areas with travel routed for such activities, prevent erosion on or along pathways, and to preserve and protect soil, plant, animal, and visual resources.
Regulating Water in Drainage Systems (554) -- Controlling the removal of surface or subsurface runoff, primarily through the operation of water control structures to establish and encourage the growth of desired field or forest plants, reduce soil subsidence and erosion and provide water for wildlife.
Residue Management, (329) -- Managing the amount, orientation, and distribution of crop and other plant residue on the soil surface year-round, while growing crops where the entire field surface is tilled prior to planting to reduce erosion, conserve soil moisture and provide food and escape cover for wildlife.
Restoration and Management of Declining Habitats (643) -- Restoring and conserving rare or declining native vegetated communities and associated wildlife species.
Riparian Forest Buffer (391A) -- An area of trees and/or shrubs located adjacent to and up-gradient from water bodies to create shade, lower water temperatures, improve habitat for aquatic organisms, provide a source of detritus and large woody debris for aquatic organisms and habitat for wildlife and reduce excess mounts of sediment, organic material, nutrients and pesticides in surface water.
Roof Runoff Management (558) -- A facility for collecting, controlling, and disposing of runoff water from roofs to prevent roof runoff water from flowing across concentrated waste areas, barnyards, roads and alleys, and to reduce pollution and erosion, improve water quality, prevent flooding, improve drainage and protect the environment.
Row Arrangement (557) -- Establishing a system of crop rows on planned grades and lengths primarily for erosion control and water management.
Runoff Management System (570) -- A system for controlling excess runoff caused by construction operations at development sites, changes in land use, or other land disturbances to regulate the rate and amount of runoff and sediment from development sites.
Soil Salinity Management-Non Irrigated (571) -- Management of land, water, and plants to control harmful accumulations of salts on the soil surface or in the root zones on non-irrigated areas.
Streambank and Shoreline Protection (580) -- Treatments (vegetative and erosion control) used to stabilized and protect banks of streams or constructed channels and shorelines of lakes, reservoirs, or estuaries.
Stripcropping, Contour (585) -- Growing crops in a systematic arrangement of strips or bands on the contour to reduce water erosion. The crops are arranged so that a strip of grass or a close-growing crop is alternated with a strip of clean-tilled crop or fallow or a strip of grass is alternated with a close-growing crop.
Stripcropping, Field (586) -- Growing crops in a systematic arrangement of strips or bands across the general slope (not on the contour) to reduce water erosion. The crops are arranged so that a strip of grass or a close-growing crop is alternated with a clean tilled crop or fallow.

Surface Drainage, Field Ditch (607)- A graded ditch for collecting excess water in a field to drain surface depressions, collect or intercept excess surface water from natural or graded land surfaces, and convey excess water to an outlet.
Surface Roughening (609) -- Roughening the soil surface by ridge or clod-forming tillage to reduce wind erosion on cultivated land.
Tree/Shrub Establishment (612) -- to establish woody plants by planting or seeding to provide forest products, control erosion, reduce air pollution, beautify an area, protect a watershed and provide wildlife habitat.
Tree/Shrub Pruning (660A) -- Removing all or parts of selected branches from trees and shrubs to improve the intended function of the plant, improve appearance of trees and shrubs, improve the quality of the wood product and reduce a safety hazard.
Underground Outlet (620) -- A conduit installed beneath the surface of the ground to collect surface water and convey it to a suitable outlet, to dispose of excess water from terraces, diversions, subsurface drains or other concentrations without causing damage by erosion or flooding.
Upland Wildlife Habitat Management (645) -- Creating, restoring, maintaining or enhancing areas for food, cover, and water for upland wildlife and species which use upland habitat for a portion of their lifecycle.
Use Exclusion (472) - Excluding animals, people, or vehicles from an area to protect, maintain, or improve the quantity and quality of the plant, animal, soil, air, water and aesthetic resources and human health and safety.
Waste Management System (312) -- A planned system in which all necessary components are installed for managing liquid and solid waste, including runoff from concentrated waste areas, in order to minimize degradation of air, soil and water resources and protect public health.
Waste Storage Facility (313) -- A waste impoundment made by constructing an embankment and/or excavating a pit or dugout or by fabricating a structure to temporarily store wastes such as manure, wastewater, and contaminated runoff as a function of an agricultural waste management system.
Waste Treatment Lagoon (359) -- An impoundment made by excavation or earthfill for biological treatment of animal or other agricultural waste to biologically treat organic waste and to reduce pollution and protect the environment.
Water and Sediment Control Basin (638) -- An earth embankment or a combination ridge and channel generally constructed across the slope and minor watercourses to form a sediment trap and water detention basin to reduce watercourse and gully erosion, trap sediment, reduce and manage onsite and downstream runoff, and improve downstream water quality.
Water Harvesting Catchment (636) -- A facility for collecting and storing precipitation to provide water for livestock, fish and wildlife, recreation, or other purposes.
Wetland Creation (658) -- A wetland that has been created on a site location which historically was not a wetland or is a wetland but the site will be converted to a wetland with a different hydrology, vegetation type, or function than naturally occurred on the site.
Wetland Enhancement (659) --The modification or rehabilitation of an existing or degraded wetland, where specific functions and/or values are modified for the purpose of meeting project objectives.
Wetland Restoration (657) -- The rehabilitation of a degraded wetland to restore both the hydrologic conditions and the hydrophytic plant community that occurred on site before modification.

Wetland Wildlife Habitat Management (644) -- Retaining, developing or managing habitat for wetland wildlife to maintain, develop, or improve habitat for waterfowl, fur-bearers, or other wetland associated flora and fauna.
Wildlife Watering Facility (648) -- Develop, improve, or modify watering places and systems for wildlife to provide adequate drinking water during critical periods, to create or expand suitable habitat for wildlife and to improve water quality.

6.3 Notes Table 6

a. An instantaneous concentration not to be exceeded at any time.
b. A 24-hour average not to be exceeded.
c. A 1-hour average concentration not to be exceeded more than once every three years on theaverage.
d. A 4-day average concentration not to be exceeded more than once every three years on the average.
e. Aldrin is metabolically converted to Dieldrin. Therefore, the sum of the Aldrin and Dieldrin concentrations are compared with the Dieldrin criteria.
f. Shall not exceed the numerical value given by:

For salmonids present: $0.275 + 39.0$

$1 + 10^{7.204-pH}$ $1 + 10^{pH-7.205}$

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For salmonids absent: $0.411 + 58.4$

$1 + 10^{7.204-pH}$ $1 + 10^{pH-7.20}$

g. Shall not exceed the numerical concentration calculated as follows:
Unionized ammonia concentration for waters where salmonid habitat is an existing or designated use:

$0.80 \div (FT)(FPH)(RATIO)$

where: $RATIO = 13.5$; $7.7 \leq pH \leq 9$

$RATIO = (20.25 \times 10^{(7.7-pH)}) \div (1 + 10^{(7.4-pH)})$; $6.5 \leq pH \leq 7.7$

$FT = 1.4$; $15 \leq T \leq 30$

$FT = 10^{[0.03(20-T)]}$; $0 \leq T \leq 15$

$FPH = 1$; $8 \leq pH \leq 9$

$FPH = (1 + 10^{(7.4-pH)}) \div 1.25$; $6 \leq pH \leq 8.0$

Total ammonia concentrations for waters where salmonid habitat is not an existing or designated use and other fish early life stages are absent:

Chronic criterion $= 0.0557 + 2.487\ (1.45 \times 10^{0.028(25-A)})$

$1 + 10^{7.688-pH}$ $1 + 10^{pH-7.688}$

where: A = the greater of either T (temperature in degrees Celsius) or 7.

Applied as a thirty-day average concentration of total ammonia nitrogen (in mg N/L) not to be exceeded more than once every three years on average. The highest four-day average within the thirty-day period should not exceed 2.5 times the chronic criterion.

Total ammonia concentration for waters where salmonid habitat is not an existing or designated use and other fish early life stages are present:

Chronic criterion $= 0.0557 + 2.487\ (B)$

$1 + 10^{7.688-pH}$ $1 + 10^{pH-7.688}$

where: B = the lower of either 2.85, or $1.45 \times 10^{0.028 \times (25-T)}$. T = temperature in degrees Celsius.

Applied as a thirty-day average concentration of total ammonia nitrogen (in mg N/L) not to be exceeded more than once every three years on the average. The highest four-day average within the thirty-day period should not exceed 2.5 times the chronic criterion.

h. Measured in milligrams per liter rather than micrograms per liter.
i. ≤(0.944)(e(1.128[ln(hardness)]-3.828)) at hardness = 100. Conversion factor (CF) of 0.944 is hardness dependent. CF is calculated for other hardnesses as follows: CF = 1.136672 - [(ln hardness)(0.041838)].
j. ≤(0.909)(e(0.7852[ln(hardness)]-3.490)) at hardness = 100. Conversions factor (CF) of 0.909 is hardness dependent. CF is calculated for other hardnesses as follows: CF = 1.101672 - [(ln hardness)(0.041838)].
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k. Criterion based on dissolved chloride in association with sodium. This criterion probably will not be adequately protective when the chloride is associated with potassium, calcium, or magnesium, rather than sodium.
l. Salinity dependent effects. At low salinity the 1-hour average may not be sufficiently protective.
m. ≤(0.316)e(0.8190[ln(hardness)] + 3.688)
n. ≤(0.860)e(0.8190[ln(hardness)] + 1.561)
o. ≤(0.960)(e(0.9422[ln(hardness)] - 1.464))
p. ≤(0.960)(e(0.8545[ln(hardness)] - 1.465))
q. ≤(0.791)(e(1.273[ln(hardness)] - 1.460)) at hardness = 100. Conversion factor (CF) of 0.791 is hardness dependent. CF is calculated for other hardnesses as follows: CF = 1.46203 - [(ln hardness)(0.145712)].
r. ≤(0.791)(e(1.273[ln(hardness)] - 4.705)) at hardness = 100. Conversion factor (CF) of 0.791 is hardness dependent. CF is calculated for other hardnesses as follows: CF = 1.46203 - [(ln hardness)(0.145712)].
s. If the four-day average chronic concentration is exceeded more than once in a three-year period, the edible portion of the consumed species should be analyzed. Said edible tissue concentrations shall not be allowed to exceed 1.0 mg/kg of methylmercury.
t. ≤(0.998)(e(0.8460[ln(hardness)] + 3.3612))
u. ≤(0.997)(e(0.8460[ln(hardness)] + 1.1645))
v. ≤e[1.005(pH) - 5.290]
w. ≤e[1.005(pH) - 4.830]
x. The status of the fish community should be monitored whenever the concentration of selenium exceeds 5.0 ug/ l in salt water.
y. ≤(0.85)(e(1.72[ln(hardness)] - 6.52))
z. Channel Catfish may be more acutely sensitive.

aa. ≤(0.978)(e(0.8473[ln(hardness)] + 0.8604))
bb. ≤(0.986)(e(0.8473[ln(hardness)] + 0.7614))
cc. Nonlethal effects (growth, C-14 uptake, and chlorophyll production) to diatoms (*Thalassiosira aestivalis* and *Skeletonema costatum*) which are common to Washington's WAC 173-201A 27 waters have been noted at levels below the established criteria. The importance of these effects to the diatom populations and the aquatic system is sufficiently in question to persuade the state to adopt the USEPA National Criteria value (36 µg/L) as the state threshold criteria, however, wherever practical the ambient concentrations should not be allowed to exceed a chronic marine concentration of 21 µg/L.
dd. These ambient criteria in the table are for the dissolved fraction. The cyanide criteria are based on the weak acid dissociable method. The metals criteria may not be used to calculate total recoverable effluent

limits unless the seasonal partitioning of the dissolved to total metals in the ambient water are known. When this information is absent, these metals criteria shall be applied as total recoverable values, determined by back-calculation, using the conversion factors incorporated in the criterion equations. Metals criteria may be adjusted on a site-specific basis when data are made available to the department clearly demonstrating the effective use of the water effects ratio approach established by USEPA, as generally guided by the procedures in USEPA Water Quality Standards Handbook, December 1983, as supplemented or replaced by USEPA or ecology. Information which is used to develop effluent limits based on applying metals partitioning studies or the water effects ratio approach shall be identified in the permit fact sheet developed pursuant to WAC 173-220-060 or 173-226-110, as appropriate, and shall be made available for the public comment period required pursuant to WAC 173-220-050 or 173-226-130(3), as appropriate. Ecology has developed supplemental guidance for conducting water effect ratio studies.
ee. The criteria for cyanide is based on the weak acid dissociable method in the 17th Ed. Standard Methods for the Examination of Water and Wastewater, 4500-CN I, and as revised (see footnote dd, above).
ff. These criteria are based on the total-recoverable fraction of the metal.
gg. Where methods to measure trivalent chromium are unavailable, these criteria are to be represented by total-recoverable chromium.
hh. The listed fresh water criteria are based on unionized or total ammonia concentrations, while those for marine water are based on total ammonia concentrations. Tables for the conversion of total ammonia to un-ionized ammonia for freshwater can be found in the USEPA's Quality Criteria for Water, 1986. Criteria concentrations based on total ammonia for marine water can be found in USEPA Ambient Water Quality Criteria for Ammonia (Saltwater)-1989, EPA440/5-88-004, April 1989.
ii. The conversion factor used to calculate the dissolved metal concentration was 0.982.
jj. The conversion factor used to calculate the dissolved metal concentration was 0.962.
kk. The conversion factor used to calculate the dissolved metal concentration was 0.85.
ll. Marine conversion factors (CF), which were used for calculating, dissolved metals concentrations are given below. Conversion factors are applicable to both acute and chronic criteria for all metals except mercury. The CF for mercury was applied to the acute criterion only and is not applicable to the chronic criterion. Conversion factors are already incorporated into the criteria in the table. Dissolved criterion = criterion x CF
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Metal CF
Arsenic 1.000
Cadmium 0.994
Chromium (VI) 0.993
Copper 0.83
Lead 0.951

Mercury 0.85
Nickel 0.990
Selenium 0.998
Silver 0.85
Zinc 0.946
mm. The cyanide criteria are: 2.8µg/l chronic and 9.1µg/l acute and are applicable only to waters which are east of a line from Point Roberts to Lawrence Point, to Green Point to Deception Pass; and south from Deception Pass and of a line from Partridge Point to Point Wilson. The chronic criterion applicable to the remainder of the marine waters is µg/L.

(4) USEPA Quality Criteria for Water, 1986, as revised, shall be used in the use and interpretation of the values listed in subsection (3) of this section.

(5) Concentrations of toxic, and other substances with toxic propensities not listed in subsection (3) of this section shall be determined in consideration of USEPA Quality Criteria for Water, 1986, and as revised, and other relevant information as appropriate. Human health-based water quality criteria used by the state are contained in 40 CFR 131.36 (known as the National Toxics Rule).

(6) Risk-based criteria for carcinogenic substances shall be selected such that the upperbound excess cancer risk is less than or equal to one in one million. [Statutory Authority: Chapters 90.48 and 90.54 RCW. 03-14-129 (Order 02-14), amended and recodified as § 173-201A-240, filed 7/1/03, effective 8/1/03. Statutory Authority: Chapter 90.48 RCW and 40 CFR 131. 97-23-064 (Order 94-19), § 173-201A-040, filed 11/18/97, effective 12/19/97. Statutory Authority: Chapter 90.48 RCW. 92-24-037 (Order 92-29), § 173-201A-040, filed 11/25/92, effective 12/26/92.]

NOTES:
Reviser's Note: The brackets and enclosed material in the text of the above section occurred in the copy filed by the agency.

WAC 173-201A-250

Radioactive substances.
(1) Deleterious concentrations of radioactive materials for all classes shall be as determined by the lowest practicable concentration attainable and in no case shall exceed: WAC 173-201A 29
(a) 1/12.5 of the values listed in WAC 246-221-290 (Column 2, Table II, effluent concentrations, rules and regulations for radiation protection); or
(b) USEPA Drinking Water Regulations for radionuclides, as published in the Federal Register of July 9, 1976, or subsequent revisions thereto.
(2) Nothing in this chapter shall be interpreted to be applicable to those aspects of governmental regulation of radioactive waters which have been preempted from state regulation by the Atomic Energy Act of 1954, as amended, as interpreted by the United States Supreme Court in the cases of *Northern States Power Co. v. Minnesota 405 U.S.1035 (1972) and Train v. Colorado Public Interest Research Group, 426 U.S. 1 (1976).*[Statutory Authority: Chapters 90.48 and 90.54 RCW. 03-14-129 (Order 02-14), recodified as §173-201A-250, filed

7/1/03, effective 8/1/03. Statutory Authority: Chapter 90.48 RCW and 40 CFR 131. 97-23-064 (Order 94-19), § 173-201A-050, filed 11/18/97, effective 12/19/97. Statutory Authority: Chapter 90.48 RCW. 92-24-037 (Order 92-29), § 173-201A-050, filed 11/25/92, effective 12/26/92.]

WAC 173-201A-260

Natural conditions and other water quality criteria and applications.

(1) **Natural and irreversible human conditions.**
(a) It is recognized that portions of many water bodies cannot meet the assigned criteria due to the natural conditions of the waterbody. When a waterbody does not meet its assigned criteria due to natural climatic or landscape attributes, the natural conditions constitute the water quality criteria.
(b) When a waterbody does not meet its assigned criteria due to human structural changes that cannot be effectively remedied (as determined consistent with the federal regulations at 40 CFR 131.10), then alternative estimates of the attainable water quality conditions, plus any further allowances for human effects specified in this chapter for when natural conditions exceed the criteria, may be used to establish an alternative criteria for the waterbody (see WAC 173-201A-440).
(2) **Toxics and aesthetics criteria.** The following narrative criteria apply to all existing and designated uses for fresh and marine water:
(a) Toxic, radioactive, or deleterious material concentrations must be below those which have the potential, either singularly or cumulatively, to adversely affect characteristic water uses, cause acute or chronic conditions to the most sensitive biota dependent upon those waters, or adversely affect public health (see WAC 173-201A-240, toxic substances, and 173-201A-250, radioactive substances).
(b) Aesthetic values must not be impaired by the presence of materials or their effects, excluding those of natural origin, which offend the senses of sight, smell, touch, or taste (see WAC 173-201A-230 for guidance on establishing lake nutrient standards to protect aesthetics).
(3) **Procedures for applying water quality criteria.** In applying the appropriate water quality criteria for a water, the department will use the following procedure:

* Beneficial Uses:
  -- cold water aquatic life;
  -- warm water aaquaaquatic life
  -- public water supplies;
  -- primary contact recreation;
  -- Irrigation;
  -- livestock watering.

Specific criteria for the protection of aquatic life are based on water hardness. Criteria values given are based on a water hardness of 100 mg/l.

	Marine SitePotlatch State Park	Potlatch Cr Lower.	Upper Potlatch Cr Above 101 Culvert.	Confluence Headwaters Potlatch Creek	R Trib Before Confluence
	SS15	SS 33	SS 90	SS 94	SS 95
Dec-95					
Jan-96	5				
Feb-96	38				
Mar-96	105				
Apr-96	55				
May-96	4				
Jun-96	4				
Jul-96	75				
Aug-96	40	380			
Sep-96	4	10			
Oct-96	135				
Nov-96	10				
Dec-96	4				
Jan-97	4				
Feb-97					
Mar-97	185				
Apr-97	125				
May-97	20				
Jun-97	4				
Jul-97	5				
Aug-97					
Sep-97	300				
Oct-97	190				
Nov-97					
Dec-97					
Jan-98	15				
Feb-98					
Mar-98					
Apr-98					
May-98					
Jun-98					
Jul-98					
Aug-98					
Sep-98					
Oct-98					
Nov-98					
Dec-98	5				
Jan-99	4				
Feb-99	4				
Mar-99	10				
Apr-99	4				
May-99	25				
Jun-99	38				
Jul-99	15				
Aug-99	20				
Sep-99	4				
Oct-99					
Nov-99	89.5				
Dec-99	10				
Jan-00	4				

Feb-00	5		
Mar-00	4		
Apr-00			
May-00			
Jun-00	20		
Jul-00			
Aug-00	27.5		
Sep-00	4		
Oct-00	5		
Nov-00			
Dec-00			
Jan-01	4		
Feb-01	4		
Mar-01	5		
Apr-01	4		
May-01	55		
Jun-01	5		
Jul-01	5		
Aug-01	4		
Sep-01	5		
Oct-01	35		
Nov-01	4		
Dec-01	25		
Jan-02	23		
Feb-02	4		
Mar-02	4		
Apr-02	5		
May-02			
Jun-02			
Jul-02	5		
Aug-02	0		
Sep-02	19		
Oct-02	9		
Nov-02	1		
Dec-02	16		
Jan-03	1		
Feb-03	2	56	
Mar-03	16	43	
Apr-03	2		
May-03	3	1	
Jun-03	1	29	
Jul-03	22	25	
Aug-03	137	59	
Sep-03	2	87	
Oct-03			
Nov-03	64	10	
Dec-03	10		
Jan-04	9		
Feb-04	60		
Mar-04	1	27	2
Apr-04	2	255	29
May-04	173	25	13
Jun-04	49	1252	4
Jul-04	1		9
Aug-04	44	291	219
Sep-04	2	12	9

Oct-04	8	81	81		
Nov-04	36		43		
Dec-04	1	1	1		
Jan-05	2	4	1		
Feb-05	12	1	1		
Mar-05	13	5	8		
Apr-05	13	5	8		
May-05	11	15	1		
Jun-05	26	32	45		
Jul-05	1	332	392		
Aug-05	1	96	140		
Sep-05	2	188	208		
Oct-05	5	149	50		
Nov-05	2	40	64		
Dec-05	6	20	20		
Jan-06	4	248	122		
Feb-06	3	142	98		
Mar-06	1	23	120		
Apr-06	<1	110	94	99	
May-06	69	108	106	102	
Jun-06	38	59	56	68	
Jul-06	288	21	187	1056	
Aug-06	3	125	124	212	
Sep-06	1	150	130	208	784
Oct-06	48	124	226	660	1000
Nov-06	4	109	205	282	
Dec-06	2	21	30	13	64
Jan-07	4	32	25	1	596
Feb-07					
Mar-07					
Apr-07					
May-07					
Jun-07					
Jul-07					
Aug-07					
Sep-07					
Oct-07					
Nov-07					
Dec-07					

L Trib Before Confluence	Numaric Criteria Limit 50/100 Colinies/100/ml
SS 96	
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