Clallam County

DRAFT Comprehensive Stormwater Management Plan

DRAFT FOR PLANNING COMMISSION REVIEW

~~April~~ May 2014

Find this plan at:

www.clallam.net/landuse/stormwater.html

Acronyms and Abbreviations

B-IBI	*Benthic Index of Biological Integrity*
BMP	*Best Management Practice*
BOCC	*Board of County Commissioners*
CCC	*Clallam County Code*
Clallam County DCD	*Clallam County Department of Community Development*
DIP	*Detailed Implementation Plan*
Ecology	*Washington State Department of Ecology*
EPA	*U.S. Environmental Protection Agency*
ESA	*Endangered Species Act*
FEMA	*Federal Emergency Management Agency*
GIS	*Geographic Information Systems*
LAMIRD	*Limited Areas of More Intensive Rural Development*
LID	*Low impact development*
MRA	*Marine Recovery Area*
NOPLE	*North Olympic Peninsula Lead Entity for Salmon*
NPDES	*National Pollutant Discharge and Elimination System*
OSS	*On-site septic systems*
Partnership	*Puget Sound Partnership*
Phase I permittees	*Large jurisdictions required to obtain a permit for stormwater management from Ecology under NPDES*
Phase II permittees	*Medium-sized jurisdictions required to obtain a permit for stormwater management from Ecology under NPDES*
PSSWG	*Puget Sound Stormwater Work Group*
PSWQMP	*Puget Sound Water Quality Management Plan*
RCW	*Revised Code of Washington*
SMP	*Shoreline Master Program*
TMDL	*Total Maximum Daily Load*
UA	*Urbanized Areas*
UGA	*Urban Growth Area*
WAC	*Washington Administrative Code*
WDNR	*Washington Department of Natural Resources*
WRIA	*Water Resource Inventory Area*

Definitions

Aquifer	A geologic stratum containing ground water that can be withdrawn and used for human purposes.
Best Management Practice (BMP)	The schedules of activities, prohibitions of practices, maintenance procedures, and structural and/or managerial practices, that when used singly or in combination, prevent or reduce the release of pollutants and other adverse impacts to waters of Washington State.
Conveyance	A mechanism for transporting water from one point to another, including pipes, ditches, and channels.
Critical Areas	At a minimum, areas which include wetlands, areas with a critical recharging effect on aquifers used for potable water, fish and wildlife habitat conservation areas, frequently flooded areas, geologically hazardous areas, including unstable slopes, and associated areas and ecosystems.
Development	Land disturbing activities, including Class IV –general forest practices that are conversions from timberland to other uses; structural development, including construction or installation of a building or other structure; creation of hard surfaces; and subdivision, short subdivision and binding site plans, as defined and applied in Chapter 58.17 RCW.
Discharge	Runoff leaving a new development or redevelopment via overland flow, built conveyance systems, or infiltration facilities. A hydraulic rate of flow, specifically fluid flow; a volume of fluid passing a point per unit of time, commonly expressed as cubic feet per second, cubic meters per second, gallons per minute, gallons per day, or millions of gallons per day.
Ditch	A long narrow excavation dug in the earth for drainage with its top width less than 10 feet at design flow.
Erosion and sediment Control	Any temporary or permanent measures taken to reduce erosion; control siltation and sedimentation; and ensure that sediment-laden water does not leave the site.
Ground water	Water in a saturated zone or stratum beneath the land surface or a surface waterbody.
Hydrology	The science of the behavior of water in the atmosphere, on the surface of the earth, and underground.

Illicit Discharge	All non-stormwater discharges to stormwater drainage systems that cause or contribute to a violation of state water quality, sediment quality or ground water quality standards, including but not limited to sanitary sewer connections, industrial process water, interior floor drains, car washing, and greywater systems.
Impervious	A surface which cannot be easily penetrated. For instance, rain does not readily penetrate paved surfaces.
Impervious surface	A non-vegetated surface area which either prevents or retards the entry of water into the soil mantle as under natural conditions prior to development. A non-vegetated surface area which causes water to run off the surface in greater quantities or at an increased rate of flow from the flow present under natural conditions prior to development. Common impervious surfaces include, but are not limited to, roof tops, walkways, patios, driveways, parking lots or storage areas, concrete or asphalt paving, gravel roads, packed earthen materials, and oiled, macadam or other surfaces which similarly impede the natural infiltration of stormwater. ~~Open, uncovered retention/detention facilities shall not be considered as impervious surfaces for the purposes of determining whether the thresholds for application of minimum requirements are exceeded. Open, uncovered retention/detention facilities shall be considered impervious surfaces for purposes of runoff modeling.~~
Infiltration	Means the downward movement of water from the surface to the subsoil.
Low Impact Development (LID)	A stormwater and land use management strategy that strives to mimic pre-hydrologic processes of infiltration, filtration, storage, evaporation and transpiration by emphasizing conservation, use of on-site natural features, site planning, and distributed stormwater management practices that are integrated into a project design.
Nonpoint source Pollution	Pollution that enters a waterbody from diffuse origins on the watershed and does not result from discernible, confined, or discrete conveyances.
Pervious surface	A surface material that allows stormwater to infiltrate into the ground. Examples include lawn, landscape, pasture, native vegetation areas, and permeable pavements.
Redevelopment	On a site that is already substantially developed (i.e., has 35% or more of existing hard surface coverage), the creation or addition of hard surfaces; the expansion of a building footprint or addition or replacement of a structure; structural development including construction, installation or

expansion of a building or other structure; replacement of hard surface that is not part of a routine maintenance activity; and land disturbing activities.

Salmonid A member of the fish family Salmonidae. Chinook, coho, chum, sockeye, and pink salmon; cutthroat, brook, brown, rainbow, and steelhead trout; Dolly Varden, kokanee, and char are examples of salmonid species.

Sediment Fragmented material that originates from weathering and erosion of rocks or unconsolidated deposits, and is transported by, suspended in, or deposited by water.

Stakeholder Someone with a "stake," or interest, in the issues being addressed. In practice, this means anyone could be a stakeholder because a resident, taxpayer, and concerned citizen could all have an interest.

Stormwater That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes and other features of a stormwater drainage system into a defined surface waterbody, or a constructed infiltration facility.

Note: The cover page photo is Three Crabs Road; courtesy of Clallam County Department of Community Development (DCD).

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Chapter 1 - Executive Summary

This project was funded by the U.S. Environmental Protection Agency West Coast Estuaries Initiative. This grant has provided funding to Clallam County and the Jamestown S'Klallam Tribe to work with stakeholders in the community to ascertain their concerns, to develop this Comprehensive Stormwater Management Plan and associated ordinances, and to develop a stormwater public outreach plan. It has also supported monitoring and land use-land cover modeling to assess the impacts of stormwater to the County's aquatic resources.

Clallam County is known for its natural resources – for its temperate rain forests sustained by significant rainfall, for its fast-flowing rivers from the Olympic Mountains to the Strait of Juan de Fuca and the Pacific Ocean, for its shellfish beds, and for its recreational opportunities. The appeal of these resources and the region's mild climate has helped the county's economy and population grow significantly in recent years. That growth and development has begun to affect the quality and quantity of stormwater runoff, which in turn affects the value of the region's natural resources.

Mindful of projections for further population increases in the region, the County has developed this stormwater strategy to enhance and restore natural processes, to address current issues and prevent them from worsening, and to avoid future problems where feasible. Specific challenges associated with stormwater in Clallam County include flooding and related impacts to public and private property, and impacts to surface and ground water resources and aquatic species such as shellfish and salmonids. This strategy draws on the resources and guidance developed for other jurisdictions in Washington which are required to manage stormwater. In order to continue to comply with the Growth Management Act, Clallam County needs to update its stormwater management strategy and regulations. By embarking on this path now, before additional regulatory requirements for stormwater management becomes a mandate, the County hopes to establish practices for stormwater management that are tailored to work best for Clallam County's residents and its environment.

1.1 Goals

Clallam County's goals for its stormwater management program are as follows:

1. Improve the quality of stormwater runoff and thereby minimize impacts to surface waters (fresh and marine) and ground water, protect human health, restore salmonid and other aquatic habitat, and ensure shellfish beds are open to harvest.

2. Reduce the speed and volume of stormwater flows in order to reduce flooding problems, prevent erosive streamflows from damaging property and salmonid habitat, and maintain ground water recharge.

3. Raise public awareness of stormwater issues and the societal value of water resources to encourage behavior that improves stormwater quality and reduces problematic high stormwater flows.

These goals are further elaborated in the main text of this plan.

1.2 Background

The impacts of development and other human activities on the quantity and quality of stormwater runoff are of increasing concern throughout western Washington. Stormwater runoff occurs when rain (or snowmelt) flows over land into natural or constructed drainage systems. Land development alters the natural ability of

soils and plants to absorb this rain and snowmelt. These altered conditions cause water to run off the land at faster rates and larger volumes (see Figure 1 in Chapter 2). Stormwater can also transport a mixture of pollutants present on the landscape, such as petroleum products, bacteria, metals, and sediments. These changes in the amount, the timing, and the quality of stormwater runoff can affect surface and ground water resources, with negative impacts including flooding, property damage, altered wildlife habitat, ocean acidification, and impacts to drinking water supplies.

~~To minimize the impacts of development on stormwater quantity and quality, and thus the impacts of stormwater runoff on private property and aquatic resources, Clallam County must take significant action today. By acting now, the County can avoid more costly consequences associated with avoiding stormwater management, such as property damage, shellfish bed downgrades, and habitat degradation.~~

1.3 Recommendations and implementation

To help develop this plan's recommendations, Clallam County Department of Community Development (Clallam County DCD) elected to form a Stormwater Work Group composed of people who live and work in Clallam County and ex-officio members from outside the county (see the list of members in Appendix B). This Work Group provided recommendations to the County in eight major topic areas, listed below. This section summarizes the County's planned strategy to move forward on these recommendations. *Clallam County will require additional staff and resources to implement many of these approaches.*

Public education and involvement. Clallam County has developed a public outreach plan, which includes specific strategies to educate the public with regards to stormwater goals (See Appendix E for the public outreach plan).

Development and redevelopment requirements. Clallam County is working to develop and adopt ordinances for stormwater management and clearing and grading, with new standards and permit requirements for development and redevelopment sites. The County will continue to seek opportunities to encourage the use of Low Impact Development (LID) techniques. The County will move forward with revising and adopting the Small Project Stormwater Drainage Manual~~,~~ and will apply this manual to certain residential and commercial projects.

Illicit discharges. Clallam County will prohibit illicit discharges. For purposes of this document, illicit discharges are those that are not composed entirely of stormwater, except a discharge pursuant to another NPDES permit or a discharge resulting from firefighting activities. Implementation of this recommendation will also be addressed through Ordinance adoption. As funding and staff resources are available, the County will conduct outreach to the general public, and will discuss with neighboring jurisdictions the possibility of developing an illicit discharge hotline and website.

Pollution prevention measures within County operations. The County will continue to regularly review operations and maintenance practices, formally document drainage and water quality problem locations, and inventory county stormwater facilities as staff resources are available.

Long-term compliance. As staffing and funding allow, Clallam County will implement long-term compliance measures, such as a Drainage Facility Maintenance Covenant for private stormwater facility maintenance.

Additional assessments. As staffing and funding allow, Clallam County will assess whether specific basins have additional needs or unique conditions that are not addressed by the new stormwater program, and will develop and implement basin-specific management approaches as appropriate.

Stormwater monitoring and analysis. As staffing and funding allow, Clallam County should maintain a comprehensive stormwater monitoring program that collects and analyzes stormwater quality and quantity data throughout Clallam County in accordance with the recommendations put forth by the Puget Sound Partnerships' Stormwater Work Group in 2010 in the Stormwater Assessment and Monitoring program for Puget Sound (SWAMPPS).

Funding the stormwater program. Clallam County will establish sustainable financing for strategies in the Comprehensive Stormwater Management Plan and other clean water activities in Clallam County, which may include implementation of the County's On-Site Septic Management Plan.

Chapter 2 - Introduction and Background

This Comprehensive Stormwater Management Plan was developed to guide Clallam County's efforts to manage stormwater in ways that benefit people and the environment. The County faces many challenges in implementing this program. Clallam County is a large region with diverse land ownership, increasing development pressures, and variable hydrologic regimes across the county. Stormwater impacts range from property flooding, to physical impacts to surface waters such as streams and wetlands, to pollution problems in streams, ground water, and coastal areas, to contributing to ocean acidification. Amidst these complicated needs and drivers, funding for new programs is increasingly constrained.

This plan presents a comprehensive set of recommended solutions for implementing policies, program components, capital improvement projects, and studies that address these needs and challenges. These solutions were developed with awareness of current budget constraints, and many will need additional funding to be successfully implemented.

This chapter, Chapter 2--Introduction and Background, provides more detail into the issues driving the County to develop a comprehensive stormwater management program and how the plan was developed. Chapter 3 details the County's stormwater management strategy, addressing public education and involvement, development and redevelopment requirements, illicit discharge detection and elimination, pollution prevention and source control, drainage and water quality problems, long-term compliance, sub-basin assessments, stormwater monitoring and analysis, and funding the stormwater program.

2.1 Purpose and goals

Proactive stormwater management can maintain and enhance water resource conditions. Clallam County staff and stakeholders have been moving toward a comprehensive stormwater program for many years. Recognizing the increasing impact of stormwater runoff to water quality and quantity, to environmental resources such as habitat and drinking water, and to property, the County has twice before worked to centralize and reconcile County regulations in order to control stormwater in a more comprehensive manner. This effort is supported by regional planning consortiums such as the North Olympic Peninsula Lead Entity for Salmon (NOPLE), which has identified updating the Clallam County stormwater management program as a priority for salmonid recovery, and by local watershed plans. It is also in line with priorities and goals set by regional and statewide agencies such as the Environmental Protection Agency, Washington State Department of Ecology (Ecology), and Puget Sound Partnership.

Current adopted County growth management and watershed plans identify a need for a more comprehensive approach to stormwater management. The Growth Management Act itself requires local governments to protect critical areas and also to review drainage, flooding and stormwater runoff and provide guidance for corrective actions to mitigate or cleanse those discharges that pollute waters of the state, including the Strait of Juan de Fuca and Puget Sound. Current stormwater regulations in Clallam County are dated and may not reflect current science, and also do not address stormwater management issues such as erosion/sediment control and water quality for projects outside the critical area jurisdiction.

As of 2014, Clallam County is not densely populated enough to be required to develop a stormwater management program under the Federal Clean Water Act, as administered by Ecology through the National Pollutant Discharge Elimination System (NPDES). However, as NPDES permits are revised in coming years and as growth in the County continues, Clallam County may be designated as a permittee in the near future. Therefore, the recommendations in this plan were developed in the context of the requirements for an

NPDES Phase II (medium-sized jurisdiction) permittee, with an explicit focus on Clallam County-specific needs and priorities.[1]

By taking this proactive approach to stormwater management, the County can help to protect its invaluable water resources and natural environment, resources which are critical to the Clallam County economy and the well-being of its residents. The County expects that taking action now will be more cost-effective than meeting stormwater requirements after they arise, resolving flooding problems after they have damaged property, and restoring damaged habitat and wildlife populations.

2.1.1 Goals of this plan

Clallam County's goals for this Comprehensive Stormwater Management Plan are to:

Improve the quality of stormwater runoff, and thereby minimize impacts to surface waters (fresh and marine) and ground water, protect human health, improve salmonid and other aquatic habitat, and re-open shellfish beds to harvest. Specifically,

- Meet water quality standards and designated beneficial uses of surface waters.
- Prevent the direct discharge of pollutants to surface waters and stormwater ditches which drain into surface waters.

Reduce the speed and volume of stormwater flows in order to reduce flooding problems, prevent erosive streamflows from damaging property and salmonid habitat, and maintain ground water recharge. Specifically,

- Implement development and redevelopment stormwater standards to mimic the natural hydrology as much as possible and reduce high flows resulting from existing and future development.
- Operate and maintain stormwater ditches, culverts, and ponds in a manner that ensures their longevity and effectiveness.

Raise public awareness of stormwater issues and the societal value of improving stormwater quality and reducing problematic high stormwater flows.

The scope of Clallam County's authority to manage stormwater is limited to the unincorporated portions of the county, excluding cities, state, federal, or tribal lands (i.e., Forks, Port Angeles, Sequim, Olympic National Park, Olympic National Forest, Washington Department of Natural Resources; and Jamestown S'Klallam, Lower Elwha Klallam, Makah, and Quileute Tribe lands. See Figure 2 for the extent of Clallam County's jurisdiction). As with watershed planning and other natural resource management, the County will need to work cooperatively with neighboring jurisdictions in order to achieve improvements in stormwater quantity and quality.

2.2 How this plan was developed

This plan was developed in close collaboration among Clallam County staff, the Clallam County Stormwater Work Group, and the consultant team. The plan builds on previous and ongoing work by the County and its

[1] The requirements for a Phase II jurisdiction are briefly summarized in Section 2.3.4.

partners. Resources consulted in the process are referred to in footnotes and listed in Appendix A. Detailed information on concerns, trends, and challenges for stormwater management in the County was obtained from staff from the Departments of Community Development; Health and Human Services; Parks, Fair, and Facilities; and Road Department who responded to a questionnaire in early summer 2010 (see Appendix D). Clallam County DCD was the lead agency in plan development. The plan was put forth for public consideration and Planning Commission and Board of County Commissioners review, as detailed below.

2.2.1 Stormwater Work Group

From the beginning of this process, the County has been committed to developing the stormwater management program with the input of people who live and work in Clallam County, and who have specific knowledge related to stormwater and to stormwater drivers. In early 2010, the County created by invitation a small Work Group of 25-30 people to provide recommendations to the Board of County Commissioners. The Work Group began a series of meetings in April 2010, meeting eleven times over the course of 2010-2011. Work Group meetings were open to the public, and were announced through an e-mail list to over 200 people. Press releases announcing the meetings were sent to local papers and radio stations. The Work Group also had a dedicated webpage on the county website providing information on the meeting schedule and meeting agendas and summaries.

The Work Group considered technical and policy options for each of the topics discussed in this plan, as put forth by the consultant team based on County priorities, background resources, and expert knowledge. The Work Group then made recommendations for each topic (public education and involvement, development and redevelopment requirements, illicit discharges and source control, pollution prevention measures within County operations, long-term compliance, sub-basin assessments, stormwater monitoring and analysis, and funding the stormwater program). The Work Group recommendations are listed in Appendix B. The County has used these recommendations as the basis for its stormwater strategy.

2.2.2 Public involvement

As described above, this plan was guided by input from the Stormwater Work Group meetings, which were open to the public and included dedicated agenda time for public comment. Clallam County held public workshops in Sequim, Forks and Port Angeles to present this plan and ask for comment. A work session on the plan and Work Group recommendations was held before the Planning Commission on March 16, 2011 and April 20, 2011. The County also arranged public workshops in fall 2010 and winter 2011, some co-sponsored with the Puget Sound Partnership, on topics including stormwater as ground water recharge, the Ecology stormwater manuals, LID techniques, and the Kitsap County Surface and Stormwater Management Program.

Due to a reduction in County staff resources and a re-organization of the workplan, continued progress through the County approval process was interrupted. This updated version has, again, been reviewed by the Planning Commission at workshops held from February to _____, 2014. Additional public outreach was provided with _____ workshops held in _____, _____, and _____ from _____ to _____, 2014.

2.2.3 Commissioner roles

A public hearing with the Planning Commission was held _____, 2014. Subsequent to the workshops and hearing, a revised draft was prepared and presented to the Board of County Commissioners (BOCC). The

BOCC reviewed the plan during work sessions held _____, 2014. A public hearing was held _____ with BOCC approval of Resolution #___occurring on _____, 2014.

2.3 Current conditions in Clallam County

This section summarizes major attributes of Clallam County's physical and social environment, sensitive and impacted natural resources, and regulatory responsibilities that affect the need for and implementation of a comprehensive stormwater management plan.

2.3.1 Stormwater – a primer

Prior to European contact, the majority of the Olympic Peninsula was covered by temperate rainforest. Under the natural hydrology of an Olympic Peninsula forest, almost all rain and snow that reaches the ground infiltrates into the soil, where it is taken up by plant and tree roots, evaporates, or recharges streams and ground water. However, as land is developed and surfaces are converted from natural forest cover to impervious and compacted pervious surfaces, less water infiltrates into the ground. The results include increases in stormwater runoff rates and volumes and associated physical impacts to streams, rivers, marine waters, and ground water resources. Figure 1, below, provides a simple depiction of how development alters stormwater runoff.

Changes to runoff patterns, especially long-lasting high flows, can cause flooding and damage property. Stormwater runoff can harm and render unusable fish and wildlife habitat by eroding stream banks, scouring stream channels, depositing excessive sediment, and altering natural wetlands. Increased impervious surface area reduces ground water recharge, resulting in impacts to ground water drinking water supplies, as well as changing the quality and quantity of water supporting streams and wetlands (i.e., through shallow infiltration). This can lead to water shortages for people, inadequate stream flows for fish, and loss of wetland habitat.

Stormwater can also transport a mixture of pollutants present on the landscape such as petroleum products, heavy metals, nutrients, bacteria, and sediments generated from a range of land uses such as construction sites, roads, parking lots, lawns, farms, forestry lands, and other human-modified and impervious surfaces. Stormwater pollution can contribute to shellfish harvest restrictions such as those at Dungeness Bay, or to exceedances of water quality standards for bacteria such as fecal coliform and other pollutants in area rivers and streams. An analysis in the Elwha-Dungeness Water Resource Inventory Area (WRIA) suggests that above-background levels of certain metals and petroleum products associated with cars and roads (and known to have negative impacts to salmon and other aquatic species) are found in area streams.[2]

[2] Brandenberger et al., 2003.; National Research Council, 2008.

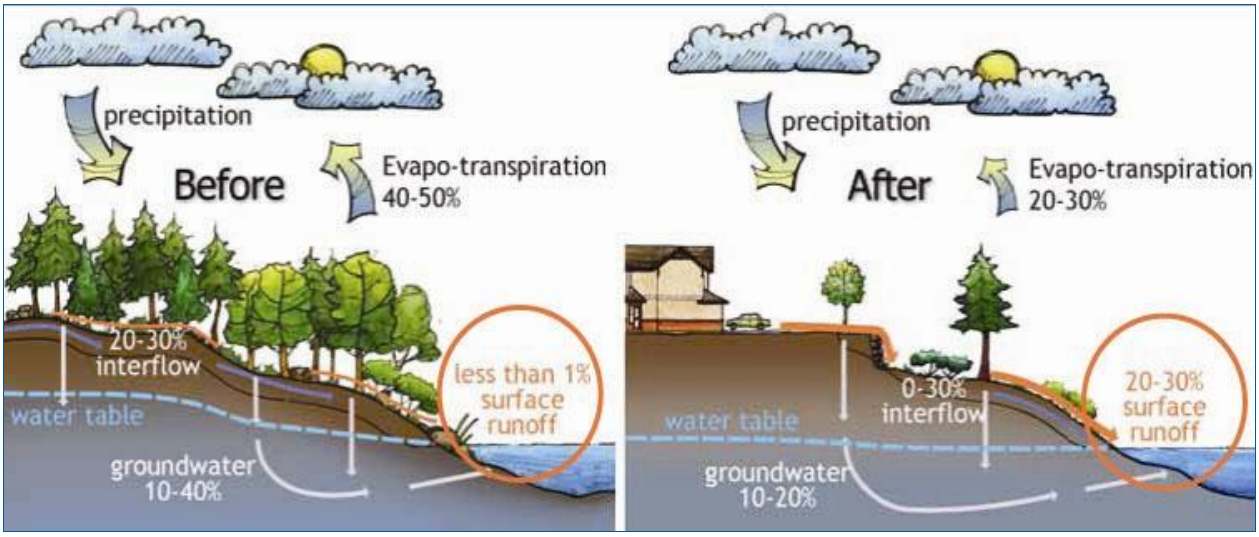


Figure 1. A simplified sketch of the impacts of development to the hydrologic cycle, courtesy of Puget Sound Partnership.

Further details on specific impacts within Clallam County may be found in the "Effects of stormwater on aquatic resources in the county" section (2.3.3).

2.3.2 Clallam County's physical and social environment

Situated on the northwestern tip of the Olympic Peninsula, Clallam County is bordered to the west by the Pacific Ocean and to the north by the Strait of Juan de Fuca. The rugged Olympic Mountains form much of the southern boundary of the County. The County encompasses approximately 1,740 square miles, and is home to an estimated 71,404 people according to Census 2010, about 59% of whom live in unincorporated parts of the county. Population centers include the incorporated cities of Port Angeles (19,038), Sequim (6,606), and Forks (3,532); as well as the unincorporated Urban Growth Areas of Clallam Bay-Sekiu, Carlsborg, and Joyce.[3] Precipitation varies significantly with approximately 107 inches per year in the west end of the County to approximately 16 inches per year in the east end of the county with even higher precipitation rates in the mountains (an estimated 240 inches per year in the headwaters of many rivers).[4] The climate is generally mild in the lowland regions, with snow accumulation to depths of 2-12 feet in the winters in the Olympic Mountains.[5]

LAND USE AND TRENDS

Land use types and human activities play a large role in determining the quantities of stormwater runoff and the amount and types of pollutants present in that runoff. Historically, Clallam County's land use has been dominated by forestry, and it is still the major land use with 56% of the county designated as Forestry

[3] 2010 Census Estimates: http://www.ofm.wa.gov/pop/census2010/default.asp.
[4] Haring, 1999.
[5] Northwest Weather and Avalanche Center, Climatological Snowdepth Information (historic) from Hurricane Ridge, Olympic National Park, http://www.nwac.us/data/CLISNO.

Resource lands (635,751 acres).[6] Major holdings include large commercial timber companies, the Olympic National Forest, and the Washington Department of Natural Resources (WDNR).[7] Forestry practices impact sediment loads in streams, particularly in the east end of the county.[8] Olympic National Park encompasses a large mostly-forested area of about 317,709 acres, or 28% of the County.

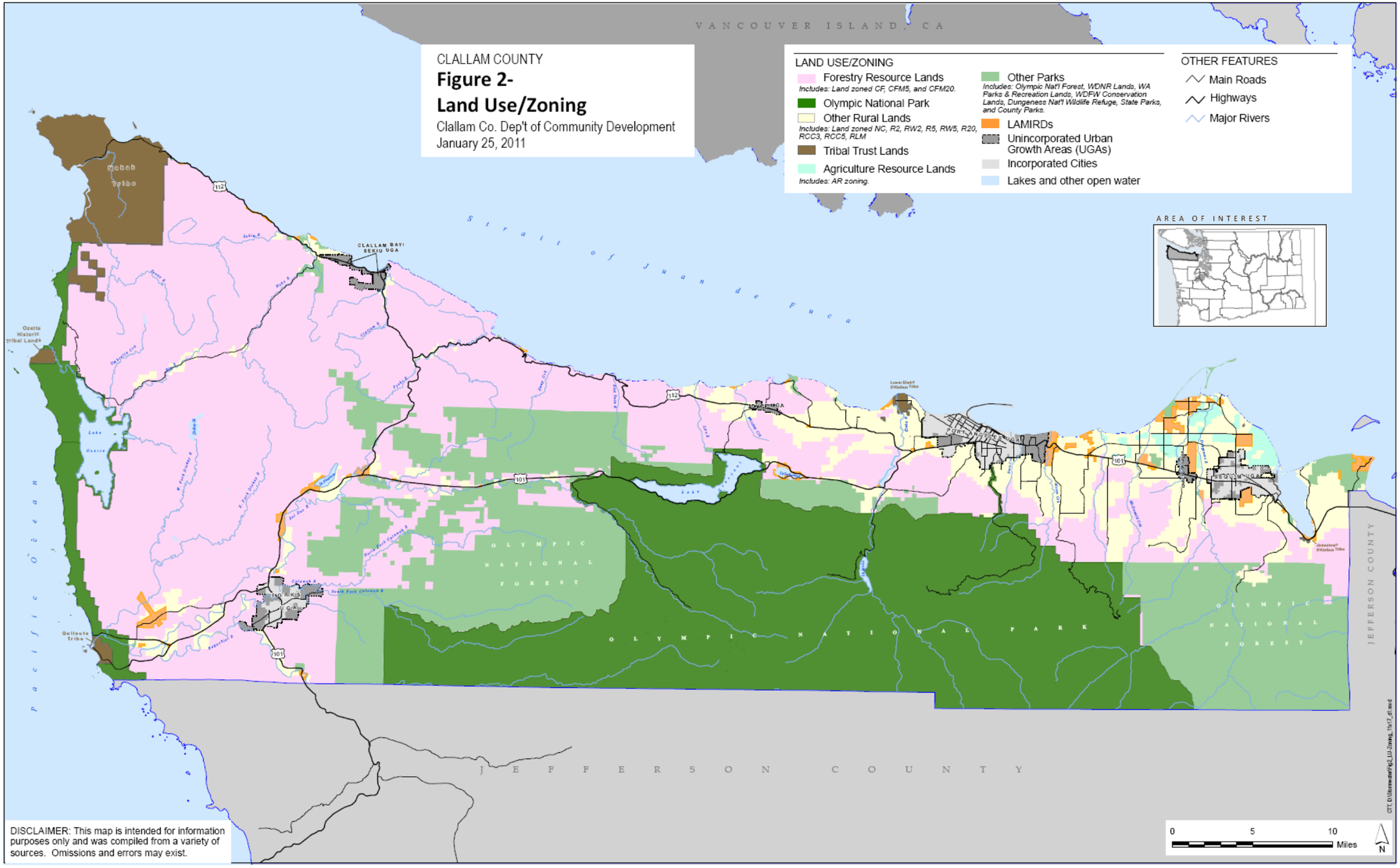
While agriculture represents 1-2% of land area, it is concentrated in the drier Sequim-Dungeness Valley and irrigated by the Dungeness River via a large network of irrigation ditches. This network of irrigation ditches encompass approximately 172 miles and are operated and maintained by nine separate districts or companies. Piping is actively pursued but is dependent upon funding. An average of 3 to 3½ miles of irrigation ditches are piped annually and as of 2014 slightly more than half of the total miles were in pipelines. The remaining open ditches may convey stormwater in wet months although that is not their purpose.[9]

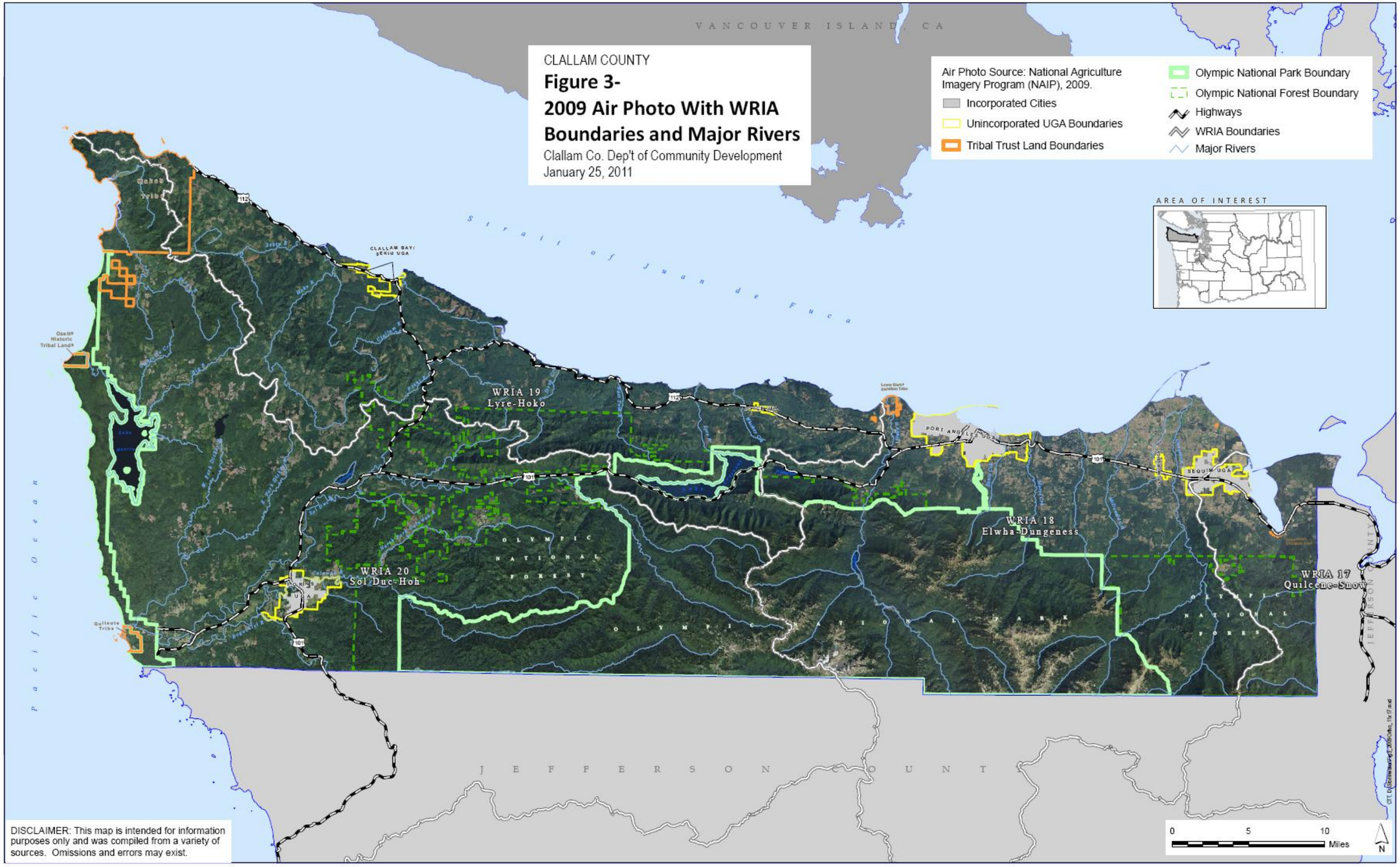
Land use acreage and percentages are identified in Table 1 and shown in Figure 2. Figure 3 provides an aerial view of Clallam County and includes WRIA boundaries and major streams. This figure illustrates the limited extent of development in the County.

Table 1. Land Use acreage and percent within Clallam County.

TYPE	ACRES	PERCENT OF COUNTY
Forestry Resource lands	635,751	56%
Olympic National Park	317,709	28%
Rural lands (excluding LAMIRDs, see below)	93,086	8%
Tribal lands	31,340	3%
Urban growth areas	21,698	2%
Unincorporated	*8,427*	
Cities	*13,271*	
Limited Areas of More Intensive Rural Development (LAMIRD)	8,715	1%
Other parks and lakes	8,573	1%
Agriculture Resource Lands	6,198	<1%
Public	4,951	<1%

[6] Clallam County, 2011.
[7] Clallam Conservation District, 2005
[8] Smith, 1999; Smith, 2000.
[9] Estimates from Clallam County, 2006; Clallam Conservation District, 2014.


CLALLAM COUNTY
Figure 2-
Land Use/Zoning
Clallam Co. Dep't of Community Development
January 25, 2011
LAND USE/ZONING
Forestry Resource Lands
Includes: Land zoned CF, CFM5, and CFM20.
Olympic National Park
Other Rural Lands
Includes: Land zoned NC, R2, RW2, R5, RW5, R20, RCC3, RCC5, RLM
Tribal Trust Lands
Agriculture Resource Lands
Includes: AR zoning.
Other Parks
Includes: Olympic Nat'l Forest, WDNR Lands, WA Parks & Recreation Lands, WDFW Conservation Lands, Dungeness Nat'l Wildlife Refuge, State Parks, and County Parks.
LAMIRDs
Unincorporated Urban Growth Areas (UGAs)
Incorporated Cities
Lakes and other open water
OTHER FEATURES
Main Roads
Highways
Major Rivers
AREA OF INTEREST
VANCOUVER ISLAND, CA
Strait of Juan de Fuca
Pacific Ocean
JEFFERSON COUNTY
JEFFERSON COUNTY
OLYMPIC NATIONAL FOREST
OLYMPIC NATIONAL PARK
OLYMPIC NATIONAL FOREST
CLALLAM BAY/SEKIU UGA
PORT ANGELES UGA
SEQUIM UGA
FORKS UGA
Makah Tribe
Ozette Historic Tribal Lands
Quileute Tribe
Lower Elwha S'Klallam Tribe
Jamestown S'Klallam Tribe
112
101
0
5
10
Miles
N
DISCLAIMER: This map is intended for information purposes only and was compiled from a variety of sources. Omissions and errors may exist.


CLALLAM COUNTY
Figure 3-
2009 Air Photo With WRIA Boundaries and Major Rivers
Clallam Co. Dep't of Community Development
January 25, 2011
Air Photo Source: National Agriculture Imagery Program (NAIP), 2009.
Incorporated Cities
Unincorporated UGA Boundaries
Tribal Trust Land Boundaries
Olympic National Park Boundary
Olympic National Forest Boundary
Highways
WRIA Boundaries
Major Rivers
AREA OF INTEREST
VANCOUVER ISLAND, CA
Strait of Juan de Fuca
Pacific Ocean
WRIA 19
Lyre-Hoko
WRIA 20
Sol Duc-Hoh
WRIA 18
Elwha-Dungeness
WRIA 17
Quilcene-Snow
OLYMPIC NATIONAL FOREST
OLYMPIC NATIONAL PARK
JEFFERSON COUNTY
CLALLAM BAY/SEKIU UGA
PORT ANGELES UGA
SEQUIM UGA
Ozette Historic Tribal Lands
Quileute Tribe
DISCLAIMER: This map is intended for information purposes only and was compiled from a variety of sources. Omissions and errors may exist.
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A significant and increasing source of stormwater pollution throughout Puget Sound and beyond is residential and commercial development.[10] In Clallam County, Highway 101 and other local roads may contribute stormwater runoff polluted with metals and petroleum hydrocarbons.[11] Clallam County population forecasts, as noted by the 2012 Washington Office of Financial Management, indicates a potential increase of over 20,000 (to 91,727) people by 2040 under the high projection, an increase of nearly 3,000 (to 77,224) people under the medium projection and a decrease of over 11,000 (to 60,000) people under the low projection. It is anticipated County population growth will be in the medium-to-high range. [12] Much of this new growth is projected to occur in the east end of the county in designated urban growth areas, and will likely continue to be of a traditional suburban character.

Another land-use consideration that significantly affects Clallam County's management is that an estimated 61% of the County's area is publicly owned, and therefore outside of the County's jurisdiction. Major holdings include Olympic National Park (28%), Olympic National Forest (18%), and state Forest Board and WDNR lands (15%).[13] Other lands outside the County's jurisdiction include about 3% of lands designated as tribal lands (including Jamestown S'Klallam, Lower Elwha Klallam, Makah, and Quileute Tribe lands) and more than 1% of lands in the cities of Sequim, Port Angeles, and Forks. The majority of the population of unincorporated Clallam County are within the jurisdiction of this plan.

SOILS

Soil permeability influences the percentage of precipitation that becomes surface runoff, and is an important factor to consider when selecting stormwater management approaches that rely upon infiltration. Soils in Clallam County vary from well drained to poorly drained. Based on County soil maps (see Figure 4), major areas with slow drainage occur dispersed around the Sequim/Dungeness Peninsula, the northern shoreline of the County around Joyce, and the western portion of the County around Lake Ozette. Well-drained soils occur predominantly in the eastern end of the County, mostly along creeks and rivers. These characterizations do not include the tribal and federal lands, where the County has no jurisdiction over stormwater management methods.

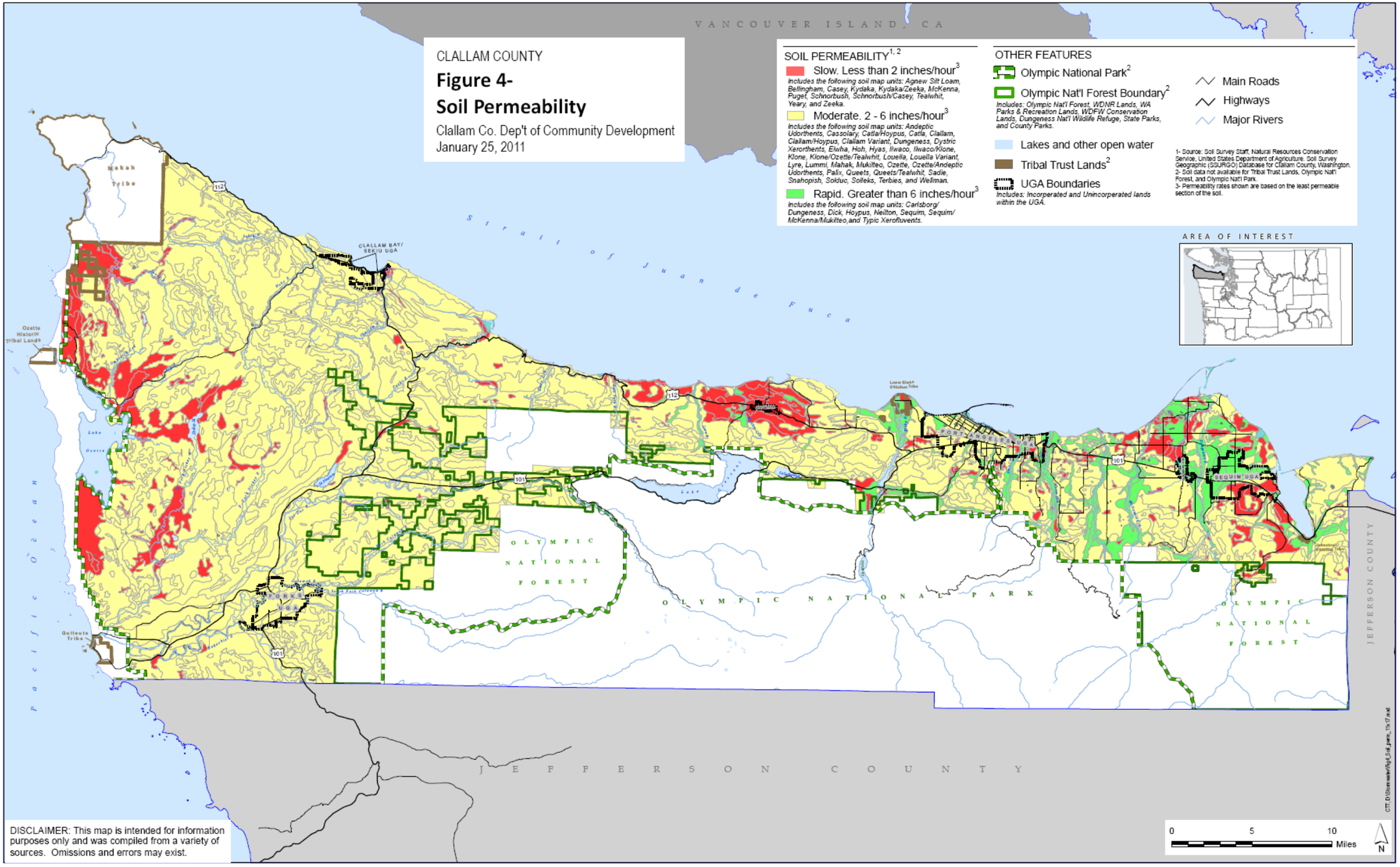
WATERSHEDS

Four state-determined Water Resources Inventory Areas (WRIAs) are within Clallam County boundaries, including the Elwha-Dungeness (WRIA 18), Lyre-Hoko (WRIA 19), and part of the Quilcene-Snow (WRIA 17) and Sol Duc-Hoh (WRIA 20) watersheds. Each of these WRIAs contains multiple river systems, as depicted in Figure 3. A brief description of each WRIA, with reference to specific stormwater issues, is below.

WRIA 17 (Quilcene-Snow). Only the westernmost portion of this watershed lies within Clallam County. That portion includes the streams discharging to Sequim Bay: Jimmycomelately, Chicken Coop, Dean, and Johnson creeks. Residential areas include the eastern portion of Sequim.

WRIA 18 (Elwha-Dungeness). The upper reaches of the Elwha and the Dungeness Rivers flow through national forest and national park. The lower Dungeness Valley contains an extensive irrigation system for agricultural and domestic uses; the irrigation ditches that are not piped often convey stormwater during the wet season although that is not their purpose. Annual precipitation varies from roughly 16 inches in

[10] Puget Sound Partnership. 2009. 2020 Action Agenda.
[11] Brandenberger et al., 2003.
[12] Calculated from Washington State Growth Management Population Projections for Counties: 2010 to 2040: http://www.ofm.wa.gov/pop/gma/projections12.asp
[13] Clallam Conservation District, 2005, Clallam County, 2006 and 2011.


CLALLAM COUNTY
Figure 4-
Soil Permeability
Clallam Co. Dep't of Community Development
January 25, 2011
SOIL PERMEABILITY[1, 2]
Slow. Less than 2 inches/hour[3]
Includes the following soil map units: Agnew Silt Loam, Bellingham, Casey, Kydaka, Kydaka/Zeeka, McKenna, Puget, Schnorbush, Schnorbush/Casey, Tealwhit, Yeary, and Zeeka.
Moderate. 2 - 6 inches/hour[3]
Includes the following soil map units: Andeptic Udorthents, Cassolary, Catla/Hoypus, Catla, Clallam, Clallam/Hoypus, Clallam Variant, Dungeness, Dystric Xerorthents, Elwha, Hoh, Hyas, Ilwaco, Ilwaco/Klone, Klone, Klone/Ozette/Tealwhit, Louella, Louella Variant, Lyre, Lummi, Mahak, Mukilteo, Ozette, Ozette/Andeptic Udorthents, Palix, Queets, Queets/Tealwhit, Sadie, Snahopish, Solduc, Solleks, Terbies, and Wellman.
Rapid. Greater than 6 inches/hour[3]
Includes the following soil map units: Carlsborg/Dungeness, Dick, Hoypus, Neilton, Sequim, Sequim/McKenna/Mukilteo, and Typic Xerofluvents.
OTHER FEATURES
Olympic National Park[2]
Olympic Nat'l Forest Boundary[2]
Includes: Olympic Nat'l Forest, WDNR Lands, WA Parks & Recreation Lands, WDFW Conservation Lands, Dungeness Nat'l Wildlife Refuge, State Parks, and County Parks.
Lakes and other open water
Tribal Trust Lands[2]
UGA Boundaries
Includes: Incorporated and Unincorperated lands within the UGA.
Main Roads
Highways
Major Rivers
1- Source: Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Soil Survey Geographic (SSURGO) Database for Clallam County, Washington.
2- Soil data not available for Tribal Trust Lands, Olympic Nat'l Forest, and Olympic Nat'l Park.
3- Permeability rates shown are based on the least permeable section of the soil.
AREA OF INTEREST
VANCOUVER ISLAND, CA
Strait of Juan de Fuca
Pacific Ocean
Makah Tribe
Ozette Historic Tribal Lands
Quileute Tribe
CLALLAM BAY/ SEKIU UGA
FORKS UGA
PORT ANGELES UGA
SEQUIM UGA
OLYMPIC NATIONAL FOREST
OLYMPIC NATIONAL PARK
JEFFERSON COUNTY
JEFFERSON COUNTY
DISCLAIMER: This map is intended for information purposes only and was compiled from a variety of sources. Omissions and errors may exist.
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the Dungeness Valley near Sequim to an estimated 240 inches in the headwaters of the Elwha. Stormwater is listed as a potential limiting factor for salmonids in many WRIA 18 streams.[14] The majority of Clallam County's population (88%) is within WRIA 18.[15]

WRIA 19 (Lyre-Hoko). This WRIA comprises many rivers and streams along the northern section of Clallam County, bordering the Strait of Juan de Fuca. Annual precipitation typically ranges from 80 to 130 inches in the headwaters of these rivers. Sedimentation was identified as a limiting factor for salmonid habitat in most WRIA 19 streams.[16] WRIA 19 includes the unincorporated Clallam Bay-Sekiu and Joyce Urban Growth Areas, and a small portion of Olympic National Park (around Lake Crescent).

WRIA 20 (Sol Duc-Hoh). WRIA 20 includes rivers and streams draining the Olympic Mountains in a generally westward direction to the Pacific Ocean. The majority of WRIA 20 lies within Clallam County, although most of the Hoh River basin is in Jefferson County. Major rivers include the Waatch, Quillayute, Dickey, Calawah, Bogachiel, and Sol Duc rivers. WRIA 20 also includes Lake Ozette. The watershed experiences significant rain and wind storms, with annual rainfall in the basin ranging from 80 inches near the coast to 240 inches in the Olympic Mountains. Forests in the upper watershed are largely undisturbed due to their location within Olympic National Park; lower areas were first harvested for timber in the 1920s and 1930s. Residential development in this area is very rural, with some concentration in the City of Forks along Highway 101, and on the Makah, Ozette, and Quileute tribal lands.[17] As noted above, each of these WRIA's exhibit unique characteristics with diversity in annual precipitation being prominent. This diversity requires flexible approaches to stormwater management from the east side of the County to the west. The Clallam County Conservation District has identified three distinct regions (see Figure 5) within the County based on annual rainfall and soil type to assist in Low Impact Development Best Management Practices facility sizing.

STORMWATER INFRASTRUCTURE

Unincorporated Clallam County has limited infrastructure for stormwater conveyance. The County Road Department maintains an estimated 490 miles of roads with roadside ditches. These ditches are designed to convey the runoff from County roads to streams, rivers, and salt water bodies. The County also maintains roughly 6,000 culverts for roads that cross ditches, streams, and rivers. Clallam County is planning to map County-maintained stormwater conveyance systems in a geographic information systems (GIS) database.

Parks, Fair, and Facilities Department maintains stormwater detention ponds and bioswales at the Fairgrounds and at Juvenile and Family Services and a bioswale at Salt Creek. The parking lot at the Clallam County Courthouse has oil-water separators to treat petroleum products in stormwater runoff from the parking lot. Clallam County is proceeding with a retrofit project of this parking lot and associated impervious surfaces to divert stormwater into Low Impact Development (LID) Best Management Practices facilities.

Private infrastructure includes stormwater control systems at commercial/ industrial establishments, as well as at residential developments. Residential stormwater control ranges from complex drainage systems at large developments to simple drywells at some single family residences to no stormwater controls at others.

The County continues to address issues related to maintaining the roadside ditch system. For example, residents and businesses frequently block the ditches by intentionally or unintentionally filling in the ditches adjacent to their property, and flood the ditches by directing excess runoff from their property into the ditch

[14] Haring, 1999.
[15] Clallam Conservation District, 2005.
[16] Smith, 1999.
[17] Smith, 2000.

without permission and without proper flow control measures. These cumulative impacts to the drainage system can have a significant effect on the overall function of the system, increasing the effort and expense the County must put into maintaining the system.[18]

Other jurisdictions and agencies such as Port Angeles, Sequim, Forks, and the Washington State Department of Transportation maintain stormwater facilities for flow control and water quality treatment within the County boundaries; these facilities are not under the County's jurisdiction. In addition, while not designed or constructed as stormwater infrastructure, the extensive system of open irrigation ditches concentrated in the lower Dungeness Valley does convey stormwater in the winter months.

2.3.3 Effects of stormwater on aquatic resources in the County

The impacts of stormwater runoff on Clallam County's aquatic resources are of increasing concern. As the County's Comprehensive Plan describes:

"Uncontrolled and untreated stormwater carried through our waterways damages the entire system, with large cumulative effects downstream. Loss of water storage capacity must be replaced using public funds and at a high cost. Fish, shellfish, and wildlife have economic benefits for tourism as well as commercial and recreational harvest, but more importantly, indicate the overall health of our watersheds. Shellfish, whether harvested or not, perform a valuable function in filtering contaminants from water. Flood damage can devastate community resources, with human health and safety impacts, economic losses, and loss of infrastructure and habitat. Aquifers are rechargeable, but remediation of a contaminated drinking water supply is costly and sometimes impossible." Clallam County Code (CCC) 31.02.310.

Flooding due to stormwater runoff from developed areas, and associated excessively high stream flows, is an overarching concern in Clallam County, largely due to impacts to roads and private property. From 1979 – 2009, the Federal Emergency Management Agency (FEMA) made almost $900,000 in flood damage payments to Clallam County.[19]

The following sections summarize the known and anticipated impacts of stormwater runoff on various aquatic resources in the county.

SURFACE WATERBODIES WITH IMPAIRED WATER QUALITY

The Puget Sound Partnership's Action Agenda and its supporting appendices identify surface water runoff, including stormwater, as the "present primary transporter of pollution throughout the Puget Sound basin."[20] Stormwater runoff can affect surface waterbodies due to changes in runoff rates and volumes, increased erosion, temperature changes, and increased inputs of nutrients, pathogens, and toxic chemicals.[21]

Exact cause-and-effect relationships may be challenging to demonstrate between stormwater runoff and Clallam County surface water quality, especially given the limited resources the County and its partners can devote to monitoring.[22] However, a number of creeks, rivers, and irrigation ditches in Clallam County are listed by Ecology as "impaired waterbodies," meaning they do not meet one or more state water quality

[18] C. Creasey, H. Catuzo, personal communication, 2010.
[19] Clallam County, 2009a.
[20] Puget Sound Partnership, 2009; Puget Sound Partnership, 2008.
[21] Puget Sound Partnership, 2008.
[22] Puget Sound Partnership, 2008.

standards for the biological, chemical, and physical health of the stream (see further discussion under Section 2.3.4).[23] Streamkeepers of Clallam County uses the Benthic Index of Biological Integrity (B-IBI), essentially a measure of ecological population dynamics of underwater invertebrates in a stream, to assess the biological health of Clallam County surface waters. Using this index, Streamkeepers has classified all non-ephemeral Clallam County streams as ranging from compromised to critically impaired.[24] Regional information and trends suggest that stormwater runoff is likely a major contributor to the impairment of these streams.

SHELLFISH HARVEST AREAS AND BEACH CLOSURES

As stormwater moves over the landscape, it picks up and transports nutrients and fecal coliform generated by other activities. In this way, increases in stormwater runoff have contributed to the restrictions that have been placed on shellfish harvesting and swimming beach use in Clallam County over the last decade. The Washington State Beach Environmental Assessment, Communication, and Health Program generally advises against water contact recreation such as swimming and wading for 48 hours following rainfall, when bacteria levels tend to be highest at most beaches[25]. Commercial shellfish closures and associated regulatory responses include the following.

Figure 5. Beach closure sign.

Dungeness Bay, a traditional shellfish growing and harvesting area, has experienced increases in fecal coliform bacteria, with subsequent downgrading of some shellfish beds from *Approved* to *Prohibited* in 2000

[23] Ecology, 2008.
[24] Streamkeepers, 2010.
[25] Ecology, 2008.

and 2001. The entire Inner Bay was downgraded to *Conditionally Approved* in 2003; this area is closed from November through January. In 2001 the County established the Sequim Bay-Dungeness Watershed Clean Water District for this area and adopted a non-point pollution plan called the "Clean Water Strategy" in order to restore and protect water quality for shellfish harvest and other beneficial uses (CCC 27.16). In coordination with the Jamestown S'Klallam Tribe, County, and other partners, Ecology had two bacteria total maximum daily loads (TMDLs) approved for the area by EPA in 2002 and 2004 (detailed further under Section 2.3.4). Ecology and partners developed a TMDL Detailed Implementation Plan (DIP) which incorporates the Clean Water Strategy[26]. This combined plan specifically calls out the role stormwater plays in contributing pollution. The County also specifically manages the impacts of septic systems to this area, under CCC 41.20.170(2). After a decade of water clean-up implementation, Washington State Department of Health in May, 2011 upgraded a portion of the Prohibited commercial shellfish growing area to Conditionally Approved due to an overall improvement in marine water quality. However, because bacteria levels are consistently elevated during the rainy season, the upgraded area like the inner bay, will remain closed from November through January to protect public health.

As of December 31, 2009, the Jamestown S'Klallam Tribe and the Washington State Department of Health had established two small prohibited shellfish harvest zones around the mouths of Cassalery Creek and Golden Sands Slough, in the Jamestown growing area. These two streams have elevated levels of fecal coliform above state standards.[27]

AQUATIC SPECIES

Stormwater runoff can affect aquatic species, primarily through modification of their physical and chemical habitat.[28] Five fish species in Clallam County are listed as threatened with extinction under the Endangered Species Act: Chinook, summer chum, bull trout, sockeye, and steelhead. Stormwater runoff is thought to be a limiting factor for salmonid recovery, impacting fish through changes to instream peak flow frequency and magnitude (higher and faster high flows, lower and slower low flows), altered channel morphology and related aquatic habitat, and increased pollutant loading and instream concentrations of pollutants such as sediment and metals.[29] The critical nature of managing these impacts is reflected in the North Olympic Peninsula Lead Entity for Salmon's three-year work plan for salmonid recovery, which identifies updating the Clallam County stormwater management program as a necessary recovery action from 2006 to present.[30]

Researchers studying stormwater inputs to urban and urbanizing streams in WRIA 18 found higher than normal background concentrations of zinc, lead, and petroleum hydrocarbons in stream sediments where human land-use activities were present in the watershed, though the concentrations were generally low. Metals, which have been shown to impact salmonid spawning behavior, were slightly elevated in stream sediments at sites located downstream of Highway 101.[31] Jamestown S'Klallam Tribe staff found elevated copper levels in all sampled stormwater outfalls to Sequim Bay; low concentrations of copper have been linked to salmonid pre-spawn mortality.[32]

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[26] Streeter and Hempleman, 2004.
[27] Washington State Department of Health, 2009.
[28] Puget Sound Partnership, 2008.
[29] Haring, 1999; Smith, 1999; Smith, 2000.
[30] North Olympic Peninsula Lead Entity for Salmon, 2006, 2007, 2008, 2009, 2010, 2011, 2012, and 2013, 3-year work plans.
[31] Brandenberger et al., 2003; Puget Sound Partnership, 2008.
[32] Turnbull, 2010.

Streamkeepers' measurements of benthic macroinvertebrates from 1998-2011 (as measured by the 10-metric genus-level Benthic Index of Biological Integrity (B-IBI) developed at the University of Washington in the 1990s) indicate significant compromising and impairment of biological health at stream sites across the county, demonstrating a reduction in these streams' ability to support self-sustaining salmonid populations.[33] Although rigorous statistical studies linking degradation of local biological health to stormwater are not available, there is considerable evidence of co-occurrence between biological degradation and land uses such as impervious surfaces, rural development, and forestry activity; these data likely indicate stormwater runoff impacts, based on the scientific literature.

GROUND WATER

The majority of Clallam County residents rely on groundwater from wells for their drinking water supply. Coarse glacial soils and shallow aquifers are susceptible to contamination from activities at the land surface, leading to the designation of several Critical Aquifer Recharge Areas throughout the County. The shallow aquifer in eastern Clallam County is particularly vulnerable to contamination from the surface[34] and ground water characterization efforts that have been focused on the Dungeness watershed.

Repeat sampling of Sequim area wells shows that nitrate concentrations have significantly increased in the region's ground water since 1980, and some ground water samples from the Carlsborg and Agnew areas have exceeded the federal standard for nitrate.[35] Land-use activities contributing to increased ground water nitrate concentrations likely include septic systems, fertilizer applications, and livestock waste management. Stormwater runoff can transport nitrate and other pollutants from their sources to locations where soils or other conditions facilitate infiltration, thereby accelerating the pollution of this heavily used aquifer.

Results from limited groundwater quality sampling of stormwater contaminants from four shallow wells in or near Sequim show that potential pollutants such as minerals, metals, pesticides, and PCB's were not currently detectable in the four shallow wells sampled. Trace amounts of gasoline, however, were.[36]

2.3.4 Existing policy framework

A number of federal, state, and local policies and regulations drive stormwater management in Clallam County, whether by setting the standards for water quality (the federal Clean Water Act), setting regional guidelines for appropriate stormwater management (e.g., Ecology, the Puget Sound Partnership), or setting requirements for stormwater drainage control (e.g., county ordinances). Local watershed planning groups have emphasized the importance of improved stormwater management. These policy drivers are discussed in further detail below.

FEDERAL AND STATE REGULATIONS AND POLICIES

The major federal law driving stormwater management is the Clean Water Act, which sets the framework for the NPDES stormwater permits and for water quality standards. The Endangered Species Act (ESA) has driven local planning and research for salmonid species; that research has highlighted stormwater impacts and stormwater management needs. While several state agencies implement components of these regulations, the two referenced here are Ecology and the Puget Sound Partnership.

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[33] Streamkeepers, 2010.
[34] Soule, 2005.
[35] Soule, 2005 and 2009.
[36] Soule, 2009; Soule, personal communication, 2011.

National Pollutant Discharge and Elimination System (NPDES) permits

The Clean Water Act regulates stormwater discharges, among other aspects of water quality and quantity. The Washington Water Pollution Control Act, Chapter 90.48 RCW, designates Ecology to administer the provisions of the Clean Water Act. All jurisdictions must comply with relevant portions of the Water Pollution Control Act. Furthermore, Ecology requires a subset of Washington jurisdictions to meet a variety of requirements for local stormwater programs and regulations, through what are known as Phase I and II NPDES Municipal Stormwater Permits.

Phase I permittees are jurisdictions with populations of more than 100,000. Phase II jurisdictions are defined based on "urbanized areas" (UA), as described by the U.S. Bureau of the Census. In general, a UA comprises one or more central places and the adjacent densely settled surrounding area that together have a residential population of at least 50,000 and an overall population density of at least 1,000 people per square mile. EPA Phase II municipal stormwater regulations also required Ecology to evaluate all jurisdictions outside of census-defined UAs with a population of greater than 10,000 people to determine whether they should be covered under the Phase II municipal stormwater permit. In 2007 Port Angeles was one of a number of jurisdictions evaluated and determined to require coverage as a Phase II jurisdiction.

Although Clallam County is not currently designated as a permittee, the Phase II stormwater program requirements were used to shape this plan because the County may be designated as a Phase II permittee in the future. The Phase II permit provides an established and efficient framework for developing an effective stormwater program for Clallam County, capitalizing on the wealth of information being developed by Phase I and II permittees around the region. In May 2011 Clallam County was contacted by Washington State Department of Ecology with the purpose to inform Clallam County that they would be evaluating the unincorporated Port Angeles Urban Growth Area (PA UGA) for possible coverage under the 2012 permit. The Phase II permits were reissued in August 2012; after much evaluation Ecology determined that the unincorporated PA UGA did not meet the criteria for permit coverage and Clallam County was not listed as a Phase II permittee.

A Phase II permittee must address the following five "minimum control measures." The minimum control measures are a broad summary of requirements to improve stormwater management. Further detail on requirements for Phase II permittees may be found on Ecology's website at the link footnoted below.[37] Clallam County's approach to achieving each of these five measures is described in Chapter3, Stormwater Strategy. These measures are as follows:

1. Public education and outreach
2. Public participation and involvement
3. Illicit discharge detection and elimination
4. Controlling runoff from new development, redevelopment, and construction sites
5. Pollution prevention and operations and maintenance for municipal operations.

Jurisdictions which develop stormwater management programs are required to adopt a manual to provide the technical guidance for many aspects of their program. They may adopt Appendix 1 to the Phase II permit, the Stormwater Management Manual for Western Washington (Ecology 2001, 2005, 2012), or an equivalent Phase I manual. The updated 2012 Ecology manual reflects extensive research, testing, and refinement of

[37] A full list of municipal stormwater permittees and associated resources are at http://www.ecy.wa.gov/programs/wq/stormwater/municipal/index.html

stormwater management technology and practices. Currently, Clallam County may require that development in the jurisdiction of Critical Areas comply with an engineered drainage plan that includes permanent flow control and treatment BMPs designed in accordance with Ecology's Stormwater Management Manual for the Puget Sound Basin (1992).

TMDLs (Total Maximum Daily Load allocations) and TMDL Plans

The Clean Water Act also sets forth a system to identify water bodies which exceed water quality standards, and to develop a clean-up plan for those waters. Water bodies considered significantly "impaired" for one or more of a small set of pollutants are designated in what is known as the 303(d) list, referring to section 303(d) of the Clean Water Act. Placement in this category indicates that Ecology must establish a Total Maximum Daily Load allocation, or TMDL, for each categorized pollutant in the waterbody. A TMDL represents the daily limit on pollutants the water body can contain while still complying with water quality standards, and the associated clean-up plan accounts for which pollutant sources in the watershed will need to make reductions to achieve that standard.

In 1996, Matriotti Creek, a tributary to the Dungeness River, was placed on the 303(d) list because of high fecal coliform bacteria. Monitoring revealed bacteria problems in other streams and ditches in the lower Dungeness River basin. Bacteria levels were also increasing in Dungeness Bay, leading to closures of commercial shellfish growing areas. In response to these water quality concerns, Ecology performed two TMDL studies and established fecal coliform TMDLs for lower Dungeness River and Matriotti Creek (2002) and Dungeness Bay (2004)[38]. As a result of the initial TMDL, Ecology assisted with formation of the Clallam County Clean Water Workgroup and associated implementation plans.[39] These plans identify a number of action items that the County and/or its partners must implement. Several of these items call for improvements in stormwater management, as shown in Figure 6. Appendix C includes the entire list of actions from the combined Clean Water Strategy and Detailed Implementation Plan (DIP).

[38] Sargeant, 2002; Sargeant, 2004.
[39] Ecology, 2010. Also see http://www.ecy.wa.gov/programs/wq/tmdl/dungeness/index.html

Figure 6. Clean Water implementation strategy

STORMWATER-RELATED ACTION ITEMS FROM THE DUNGENESS BAY AND WATERSHED CLEAN WATER STRATEGY AND TMDL DETAILED IMPLEMENTATION PLAN (DIP) (Streeter and Hempleman, 2004)

From Clean Water Strategy for Addressing Bacteria Pollution in Dungeness Bay and Watershed (2002):

STORMWATER

- Signs on street drains and ditches about pollution effects.
- Provide treatment for ditch tail waters.
- Continue piping of irrigation ditches, using Clallam Conservation District's prioritization of ditches based on bacterial monitoring.
- Outreach to residents living alongside irrigation and roadside ditches.
- Develop/implement a Sub-Basin Stormwater Management Plan for the Marine Drive and Three Crabs area that includes recommendations for capital facilities, retrofits, standards for new development, and basic BMPs based on soil characteristics, topography, and development patterns.
- Investigate BMPs for stormwater management specific to local conditions; compile them in a publication. Consider comprehensive stormwater planning for sub-areas within the Clean Water District.

MONITORING

- Develop overall freshwater monitoring strategy that includes wet season/storm events/ditches (modify based on research) and continues source identification as well as initiate effectiveness monitoring.
- Implement freshwater quality monitoring and BMP effectiveness monitoring.
- Continue Streamkeeper monitoring of bacteria and baseline monitoring of streams.

REGULATORY AND POLICY

- Approve and implement a comprehensive stormwater ordinance.
- Provide maps and information on sensitive areas (shellfish beds, ESA listed critical area) to county decision-makers.
- Provide information on low impact approaches to stormwater management in the permitting information packet. (This information can be given to developers, builders, architects, or general public)
- Conduct a comprehensive review of ordinances and make changes to encourage low impact development, and also look for disincentives in the county's permits and associated fees.

From the Detailed Implementation Plan (2004):

- Approve and implement a comprehensive stormwater ordinance.
- Develop a minor project stormwater design guidebook [the Small Project Drainage Manual].

Puget Sound Partnership and Regional Stormwater Initiatives

Improving stormwater management around Puget Sound has been a focus of regional entities for several decades. The Puget Sound Water Quality Management Plan (PSWQMP), adopted in 1987 and subsequently updated, contained a number of recommendations for managing water quality.[40] The PSWQMP recommended that local governments develop and implement a comprehensive stormwater program.

[40] Puget Sound Action Team, 2000.

In 2009 the Puget Sound Partnership (Partnership) developed the 2020 Action Agenda to supersede the PSWQMP. The Action Agenda calls for improving management of stormwater to protect water quality, habitats, and aquatic resources as one of its eight key objectives established in law (RCW 90.71.300(2)). Specifically, the Action Agenda identifies the following as regional stormwater management needs:

- The creation of consistent protection and restoration standards for the region.
- Reducing pollutant inputs at the source.
- Prioritizing and retrofitting existing stormwater management facilities.
- Ramping up low impact development techniques in urbanizing areas.

The Action Agenda also identifies more specific stormwater related strategies related to Clallam County:

- Implement Sequim-Dungeness Clean Water District Strategies to address TMDLs and shellfish downgrades (as discussed above).
- Update and implement stormwater management plans and codes.
- Implement stewardship and outreach programs and provide technical assistance focused on protection and prevention with residents and tourists.

In 2008, the Puget Sound Stormwater Work Group (PSSWG) was established at the request of the Partnership and Ecology to develop a coordinated, integrated approach to quantifying the stormwater problem in Puget Sound and evaluate the effectiveness of management efforts. In 2010, the PSSWG released a strategy that included 55 key recommendations to Ecology and the Partnership regarding coordinated regional monitoring and assessment for NPDES permittees. The PSSWG subsequently released 33 additional recommendations for municipal stormwater permit monitoring.[41] Clallam County should stay abreast of these evolving requirements as they pertain to both NPDES Phase II permittees as well as regional water quality monitoring, assessment, and prioritization.

LOCAL REGULATIONS AND POLICIES

The County has tried several times to centralize County stormwater regulations and reconcile inconsistencies among them, developing draft codes and standards in 1999 and 2003. The County largely manages stormwater volume through its requirement for drainage plans to manage roof runoff prior to issuance of certain building and land development permits. Clallam County also may require specific stormwater management in Critical Areas, and for certain types of development in designated shoreline areas under the Shoreline Master Program. In addition, the County may require that stormwater impacts be mitigated for projects subject to the State Environmental Policy Act, RCW 43.21C.120 and to Clallam County Environmental Policy, Chapter 27.01 CCC. Projects causing one acre or more of land-disturbing activity are regulated by Ecology under the NPDES Construction Stormwater General Permit, which was reissued in December 2010.

Key regulations and policies are further summarized below.

Comprehensive Plan policies

The Clallam County Comprehensive Plan makes policy statements regarding the need for comprehensive stormwater management. This includes the following goal for Runoff and Erosion: “Stormwater quality and quantity should be managed to protect shellfish beds, fish habitat, and other resources; to prevent the contamination of sediments from urban runoff and combined sewer overflows; and to achieve standards for

[41] http://www.ecy.wa.gov/programs/wq/psmonitoring/swworkgroup.html

water and sediment quality by reducing and eventually eliminating harm from pollutant discharges from stormwater and combined sewer overflows" (CCC 31.02.320(8)). The Comprehensive Plan states means by which this goal should be achieved, including:

- Protection of natural drainages, habitat, and wetlands.
- Use of Best Management Practices (BMPs) to control and treat pollution at the source.
- Control of erosion and sedimentation from development.
- Requirements for stormwater facilities concurrent with new development.
- Development of watershed or basin plans.
- Implementation of operation and maintenance programs for publically owned stormwater systems.
- Requirements for operation and maintenance of privately owned stormwater systems.
- Public education about stormwater impacts and effects of waste oil dumping.
- Monitoring compliance and publishing the results.

Requirements for drainage plans

Clallam County primarily regulates stormwater through Chapter 5.100 CCC, which requires an approved stormwater drainage plan prior to issuance of other County permits that may affect stormwater runoff, such as a building permit or a land division approval. These drainage plans must address aspects of stormwater quantity but do not specifically address quality.

Critical Areas Ordinance

Through its Critical Areas Ordinance (Chapter 27.12 CCC, adopted in 1992 and most recently amended in 2005), Clallam County may require projects within the jurisdiction of Critical Areas to prepare drainage and erosion control plans, using the 1992 Ecology manual as a design standard, as noted above. Other stormwater management and protection standards may apply based on project type and Critical Area affected. Clallam County DCD and Road Department staff share the responsibility for reviewing these plans for compliance with Critical Areas standards and stormwater design standards, respectively.

Shoreline Master Program

Clallam County is updating its Shoreline Master Program (SMP) to improve protection of the shoreline environments and ensure their continued use and enjoyment. This is the first comprehensive update of the SMP since adopted in 1976. The update is required by the State Shoreline Management Act of 1971 (RCW 90.58). The Act has three main policy objectives: 1) prioritize water-dependent shoreline uses; 2) promote public access to shorelines; and 3) protect shoreline natural resources and functions. The State also adopted guidelines under Chapter 173-26 of the Washington Administrative Code (WAC 173-26) to guide local government SMP updates.

In general, the SMP applies to County marine waters, lakes, larger rivers and streams, and a narrow area bordering these shorelines. Specifically, shorelines include marine waters, lakes 20 acres or larger, and segments of streams downstream of a point where the mean annual flow is 20 cubic feet per second or higher, and their associated shorelands. Associated shorelands means those lands extending landward for 200 feet in all directions as measured on a horizontal plane from the ordinary high water mark; floodways and contiguous floodplain areas landward 200 feet from such floodways; and all wetlands and river deltas associated with the streams, lakes and tidal waters. The SMP will also address critical areas (e.g., wetlands, geologic hazardous areas, etc.) protection (e.g., buffers) where overlapping or otherwise coincident with shoreland areas. Shorelines and/or associated shorelands not within the jurisdiction of Clallam County are not subject to the SMP.

The SMP is a comprehensive use plan for shoreline areas that includes goals and policies consistent with state law (RCW 90.58.020); use and development regulations; and administrative procedures for the shoreline permitting process. It is supported by multiple technical studies and documents including, but not limited to: shoreline inventory and characterization reports; shoreline restoration plans; and cumulative impact analysis and no net loss reports.

Each segment of the shoreline has an "environment designation" that reflects its existing ecological condition, land use pattern, zoning, the types of health and safety hazards that are present (flooding, landslides, for example), geology, and other characteristics. The environment designations, which are depicted on maps attached to the SMP, provide a framework for tailoring shoreline policies and regulations to different shoreline segments based on their characteristics.

The updated Shoreline Master Program will need to set policies and regulations to achieve "no net loss" standards of shoreline ecological functions (WAC 173-26-186).[42] Because stormwater runoff affects shoreline ecology, the SMP will contain direction for stormwater management associated with new projects within the shoreline jurisdiction.

Watershed Planning

Clallam County and its partners have a long history of watershed planning, beginning in Sequim Bay and the Dungeness Watershed. The Dungeness River Management Team, first formed in 1988, still serves as a key forum and a regional model. In 1991, Ecology selected the Dungeness-Quilcene watersheds as a pilot area to test the feasibility of water resource management planning by local stakeholders. The resulting Dungeness-Quilcene Plan was in place by the time the Washington State Legislature passed the Watershed Management Act of 1998, which set forth a statewide system and funding structure for locally-based development of water resource policy direction (RCW 90.82). The Elwha-Dungeness (WRIA 18), Lyre-Hoko (WRIA 19), and Sol Duc-Hoh (WRIA 20) watershed planning groups all formed under this act. The Sequim Bay sub-basin, on the east end of the county, was initially designated as part of WRIA 17, but because Clallam County had already been conducting watershed planning and implementation in that area, it was included in the WRIA 18 planning process through an agreement with the WRIA 17 Planning Unit, and Clallam County thus opted out of the WRIA 17 planning process.

These watershed plans address stormwater to varying degrees. For instance, the WRIA 18 watershed plan's stormwater section recommends that the County adopt a more comprehensive, collaborative stormwater management program that builds on existing local efforts and meets state and federal natural resource and water quality laws.[43] The plan notes the limited staffing and other resources at Clallam County to administer stormwater programs. The WRIA 19 watershed plan, which has not yet been adopted, contains a few specific recommendations addressing the need to improve stormwater management. It points out the potential to use stormwater management tools to improve stream flows in priority areas (Stream and Ground water Recommendation 3), and recommends developing and implementing a comprehensive stormwater management program that uses LID principles to manage stormwater quality and quantity.[44]

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[42] The rule does not define "no net loss", but states that "To ensure no net loss of ecological functions…master programs shall contain policies, programs, and regulations that address adverse cumulative impacts [such as] (i) current circumstances affecting the shorelines and relevant natural process; (ii) reasonably foreseeable future development and use of the shoreline; and (iii) beneficial effects of any established regulatory programs under other local, state, and federal laws." WAC 173-26-186 (8)(d)

[43] Elwha-Dungeness Planning Unit, 2005 (Chapter 3.6, Land Use and Land Management Recommendations).

[44] Clallam County, 2009b.

The Dungeness River Management Team further recognized the importance of stormwater management during the development of the Dungeness River Comprehensive Flood Hazard Management Plan. Incorporation of comprehensive planning solutions into flood hazard management, including the use of stormwater management systems, was identified as a flood hazard management principle.

Stormwater Monitoring

Since 1999, Streamkeepers, Clallam County's watershed public-involvement program, has performed ambient monitoring in Clallam County watersheds, deploying teams of volunteers who adopt streams. Teams monitor quarterly, annually, or monthly at multiple established sites on each stream, sampling a suite of parameters of stream health including biological, chemical, and physical parameters. While not specifically targeting stormwater runoff, many data-points in Streamkeepers' large dataset are related to storms. For example, some of the quarterly monitoring samples were collected (by chance) during or soon after rainfall and add to our understanding of runoff-induced water quality changes. Streamkeepers' benthic macroinvertebrate data (B-IBI) provides an excellent assessment of stream and watershed health, which can be an important indicator of runoff-related influences.

In 2003, Clallam County Department of Community Development (DCD), using funding from Washington State Department of Ecology, contracted with Battelle Marine Sciences Laboratory to study the impacts of stormwater runoff on streambed sediments in five county streams in WRIA 18.[45] Researchers found higher than normal background concentrations of zinc, lead, and petroleum hydrocarbons in stream sediments where human land-use activities were present in the watershed, though the concentrations were generally low. Metals, which have been shown to impact salmonid spawning behavior, were slightly elevated in stream sediments at sites located downstream of Highway 101.

In February 2008, Jamestown S'Klallam Tribe, Clallam Conservation District, and Clallam County Environmental Health staff collected samples during two storms in streams and ditches in the Dungeness Watershed under an EPA Targeted Watershed Grant. In 2005, Makah Fisheries Management started an ambient monitoring program for turbidity and suspended sediment concentration (SSC) in the Ozette Watershed, using automated sampling equipment. The goal of the project was to detect long-term (5-10 plus year) trends in turbidity, SSC, and suspended sediment load delivery to mainstem channel habitats and the Lake Ozette shoreline. Initial findings are that sediment and turbidity generally peak at peak flows during storms and then drop off rapidly after peak, but that during very large storms on certain systems (e.g., Big River), sediment continues to be transported after peak, indicating an unlimited supply of fine sediment at a certain level of hydraulic power.

Starting in late 2008 Clallam County DCD, Streamkeepers of Clallam County, and Jamestown S'Klallam Tribe initiated a pilot stormwater monitoring program in the Sequim-Dungeness Watershed with EPA West Coast Estuaries Initiatives funding. The program has focused on identifying acute concentrations of selected pollutants associated with stormwater runoff, including hydrocarbons, metals, pesticides, herbicides, fecal coliform, and sediment. Two phases of stormwater monitoring were conducted during this pilot project. During both phases of the pilot project, samples were collected before (to assess the pre-storm conditions) and twice during the each storm. The first (during-storm) sample was collected soon after runoff began (rising-curve) and the second at the height of the storm flows (peak). Staff consulted both rainfall and flow data to determine the optimal times to collect each sample. For detail sampling criteria refer to Chadd.[46]

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[45] Brandenberger, J.M., C.W. May, N.P. Kohn, and L.S. Bingler. 2003.

[46] Chadd, E.A, R.L. Knapp, C.L. Creasey, L. Kawal, and S. Golding. 2010.

The goal of Phase 1 was to determine the impacts of land use on stormwater quality and quantity. Sample locations in the first phase of the pilot program were selected based on the upgradient land use and land cover types, and included road and irrigation ditches, parking lot catch basins, and streams. Phase 1 sampling took place from December 2008 through October 2009 at 18 very diverse sites in the Dungeness Valley. Eight full storm events were sampled. Phase 2 of the program focused on assessing the concentrations of target pollutants that ultimately reached receiving waters. Phase 2 was initiated in 2010 at five sampling locations on four streams in the Sequim-Dungeness area. [47] By March of 2011, ten full storm events were sampled. Figure 7 shows photos of stormwater volunteers sampling and measuring water levels at stormwater monitoring sites.

Additionally, in June 2009, as part of the EPA West Coast Estuaries Initiatives project, DCD, and Jamestown S'Klallam Tribe staff along with Streamkeepers' volunteers collected streambed sediment samples at 10 sites.[48] Samples were analyzed for a suite of stormwater associated parameters including hydrocarbons, metals, pesticides, organic carbon, and grain size. Parameters were selected so that results could be compared to both the earlier Brandenberger study[49] and future Statewide Status and Trends sediment sampling.[50] Three sites sampled by Brandenberger et al.[51] were resampled in 2009. Data are currently being analyzed from the stormwater samples and sediment samples collected for the EPA West Coast Estuaries Initiatives project and have been included in the Clallam County Water Resources database.

[47] Chadd, E.A, R.L. Knapp, C.L. Creasey, L. Kawal, and S. Golding. 2010.
[48] Knapp, R.L., E.A. Chadd, and C.L. Creasey. 2009.
[49] Brandenberger, J.M., C.W. May, N.P. Kohn, and L.S. Bingler. 2003.
[50] Merritt, G. 2009.
[51] Brandenberger, J.M., C.W. May, N.P. Kohn, and L.S. Bingler. 2003.

Figure 7. Stormwater volunteers sampling and taking flow gage measurements for stormwater monitoring.

Chapter 3 - Stormwater Strategy

This chapter describes Clallam County's stormwater management strategy in eight major areas:

- Public education and involvement
- Development and redevelopment requirements
- Illicit discharge detection and elimination
- Pollution prevention and operations and maintenance; source control
- Long-term compliance
- Additional assessments
- Stormwater monitoring and analysis
- Funding

Chapter 3 contains a guiding principle for stormwater management, followed by sections for each of these eight areas. The introduction to each program element describes the rationale—why that element is a key part of the stormwater strategy. The **current activities** sections describe what Clallam County and partners have done to date in each area. The **stormwater strategy** sections describe the strategy Clallam County will use to address each topic.

The topic areas were selected based on Clallam County priorities and issues, and informed by the guidelines of the five minimum control measures under an NPDES Phase II permit, as well as the 13 points recommended for comprehensive stormwater management under the Puget Sound Water Quality Management Plan. See table in section 3.11 of this plan describing how this strategy addresses those guidelines.

It is important to note that many components of this stormwater strategy cannot be implemented without additional County resources. The funding strategy in Section 3.8 is intended to address this need.

3.1 Guiding principle

It is Clallam County's intent that stormwater should be managed on an individual basis ~~by each property owner~~ to ensure that stormwater from their property does no damage to public or private property, to public health, safety or welfare, or to water quality. Any new development or redevelopment within the county should include stormwater management so that there is no increase in stormwater runoff as a result of the development.

This principle builds on the County's Runoff and Erosion Goal, as stated under the Comprehensive Plan CCC 31.02.320(8), that "Stormwater quality and quantity should be managed to protect shellfish beds, fish habitat, and other resources; to prevent the contamination of sediments from urban runoff and combined sewer overflows; and to achieve standards for water and sediment quality by reducing and eventually eliminating harm from pollutant discharges from stormwater and combined sewer overflows." This goal further establishes that education and regulation are County responsibilities that enhance the effectiveness of public and private stormwater management.

3.2 Public education and involvement

For Clallam County's stormwater management plan to be a success, the County's residents, visitors, development community, and businesses need to understand the basics of stormwater runoff and its impacts, and be involved in and supportive of implementing solutions. Because awareness and participation

are tightly linked, the standard NPDES permit requirements on public outreach and education and public involvement are combined in this section. Public outreach and education activities typically include teaching about the impacts of stormwater discharges on local waterbodies and the steps that can be taken to reduce stormwater pollution. The public involvement element emphasizes incorporating public input when developing, implementing, updating, and reviewing stormwater management programs (e.g., stormwater comprehensive plans, manuals, standards, and code).

3.2.1 Current activities

Clallam County developed this stormwater management plan with significant public involvement and with an eye towards expanded education efforts.

The Clallam County Stormwater Work Group enabled public participation in development of the recommendations of this plan. This 25-30 member Work Group (Appendix B contains a Work Group member list) met eleven times over the course of 2010 and early 2011, and developed recommendations for the County. Work Group meetings were open to the public with opportunities for public comment at each meeting. A stormwater mailing list of over 200 recipients was also created to distribute information about the Work Group activities, the development of the draft stormwater plan, and other general information pertaining to stormwater.

Clallam County has been involved in promoting understanding of stormwater topics, through means such as:

- Arranging and sponsoring or co-sponsoring workshops, conference, and training on Low Impact Development (LID), land excavation, and erosion and sediment control.
- Producing and distributing brochures on topics including drainage requirements, building and living in Clallam County, the Critical Areas Ordinance, protection of the Dungeness Watershed, protecting water quality in and around the home, water conservation, and septic system inspection requirements.
- Co-sponsoring two Land Excavator Workshops with Built Green of Clallam County. These workshops were developed to explore non-regulatory and regulator strategies that encourage environmentally sensitive land development.
- Arranging and sponsoring Certified Erosion and Sediment Control Lead (CESCL) training.
- Providing information at public venues such as Streamfest and the Dungeness River Festival.
- Arranging for a series of stormwater presentations and workshops, some co-sponsored with the Puget Sound Partnership, on topics including stormwater as ground water recharge, the Ecology stormwater manuals, LID techniques, and the Kitsap County Surface and Stormwater Management Program.
- Developing a brochure with the Jamestown S'Klallam Tribe on stormwater management for homeowners.
- Planning workshops on stormwater management for homeowners.

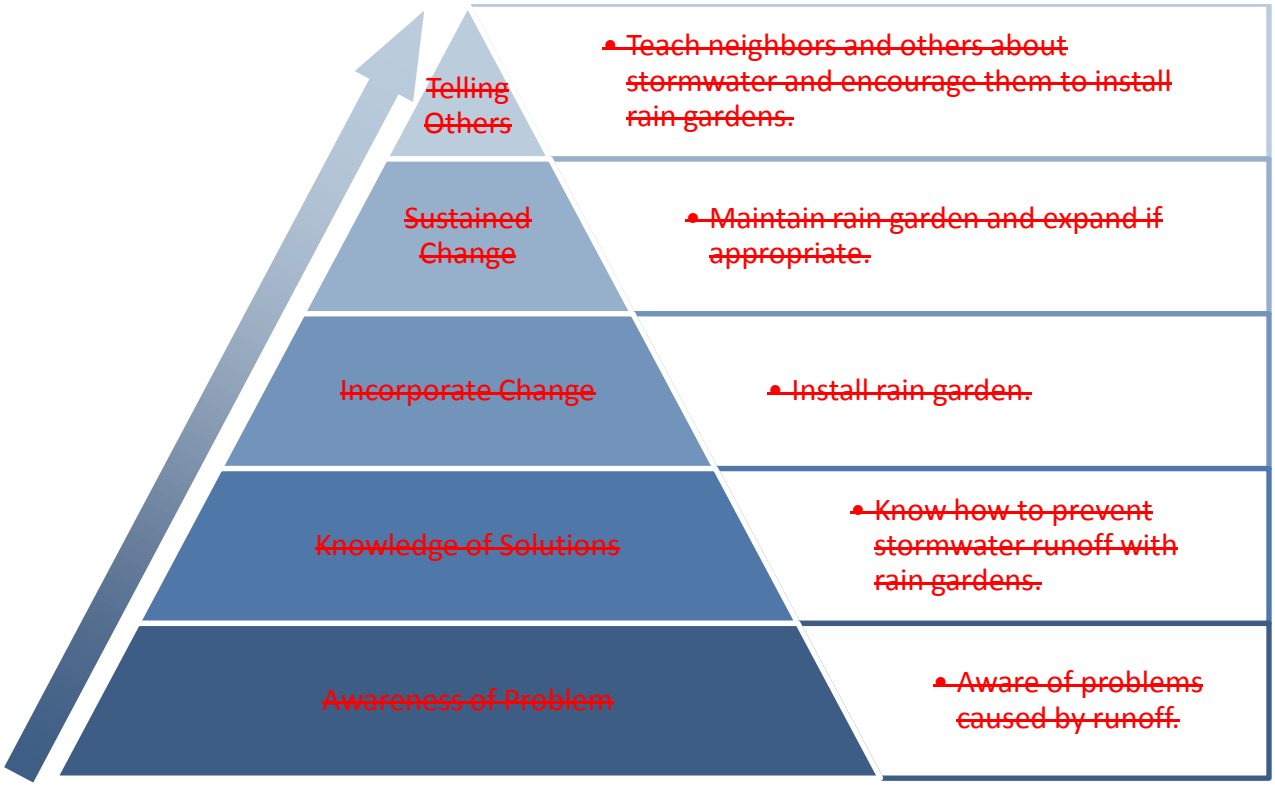
Partners such as the Clallam Conservation District, WSU Extension, the Makah Nation, the Jamestown S'Klallam Tribe, Streamkeepers of Clallam County, League of Women Voters, Dungeness Clean Water Work Group, and Olympic Baywatchers conduct outreach around specific stormwater-related topics.

Clallam County also prepared a stormwater outreach plan (attached as Appendix E) that provides Clallam County with effective, achievable strategies to accomplish the goals of this stormwater management plan. This outreach plan is discussed in more detail in the following section.

3.2.2 Clallam County's Stormwater Outreach Plan

This stormwater outreach plan is intended to provide Clallam County with effective, achievable strategies to accomplish the goals of this stormwater management plan. The outreach plan seeks to start residents and businesses on a progression from awareness of stormwater through adopting actions that improve stormwater management to encouraging others to join them in making changes. ~~Figure 8 presents the progression using rain gardens as an example. In the first steps,~~ Clallam County residents must know that stormwater runoff causes problems and that rain gardens are a solution before they will take action to install a rain garden. Next, rain gardens, like many changes, must be maintained and sustained for the stormwater benefits to continue. Ideally, outreach efforts gain further momentum, leading individuals who adopt the change early to tell others about the problem, solution, and benefits of change.

~~***Figure 8. Individual Change Progression with Rain Garden Example***~~



~~The progression shown in Figure 8 is repeated for each specific change, with subsequent campaigns built on previous efforts. Comprehensive stormwater outreach programs use a variety of individual, coordinated strategies to achieve specific goals (such as installing and maintaining rain gardens) with a series of campaigns that incrementally move target audiences to more advanced and beneficial stormwater management practices.~~ The stormwater outreach plan for Clallam County was developed using the following approach:

Evaluate geographic areas recommended for targeting by the Stormwater Work Group, prioritizing them using the following criteria:

- Expected likelihood of achieving change through education and outreach.

- Expected effort required for outreach.

Research barriers and motivations to changing target personal actions. Sources of information included:

- Property owner interviews.
- Internet search of programs elsewhere.

Develop outreach strategies that identify the beneficial results of change. Proposed strategies go beyond providing information to overcome barriers and provide incentives that motivate audience to change actions. Information alone does not create change. Successful strategies often involve:

- Face-to-face communication, which is more effective than television, radio, newspaper, or other printed materials.
- Tangible incentives for positive implementation, i.e. coupons for organic pesticides.
- Increasing the convenience of doing the right thing by providing tools or systems to overcome barriers.

Develop evaluation strategy to assess effectiveness of outreach, addressing:

- Project outputs.
- Reported or observed action change.
- Measured environmental impact.

Estimate resources required to implement strategies and identify potential sources of funding.

3.2.3 Clallam County's ~~S~~stormwater strategy for public education and involvement

1. ~~The County should i~~Implement the stormwater public outreach plan that was developed to guide County activities to encourage citizens to take actions to improve stormwater management (see Appendix E). Because the regulatory components of this stormwater plan only address new development or redevelopment, the stormwater public outreach plan will be a primary tool to encourage improved stormwater management for existing developments. The goals of the outreach efforts include the following:
    a. Residents understand the basic concepts of stormwater and the general impact of their actions.
    b. Residents are aware that roadside ditches are for conveying road runoff and not residential stormwater.
    c. Homeowner/builders understand and comply with stormwater management requirements.
    d. Residents use natural yard care practices that limit stormwater contamination.
    e. Livestock owners store manure in ways that limit stormwater contamination.
    f. Businesses properly operate and maintain their stormwater facilities.

2. ~~The County should also p~~Provide education and assistance on a number of aspects of stormwater management. These are addressed in more detail within other elements of the stormwater plan.

3.3 Development and redevelopment requirements

New development and redevelopment projects can have significant impacts on stormwater quality and quantity. Construction activities such as clearing and grading can expose large areas of soil. This increases the

site's susceptibility to erosion, destabilizes steep slopes, and compacts native soils, leading to increased stormwater flows carrying high loads of sediment and pollutants. Once development is complete, the resulting increased impervious surfaces and altered pervious surfaces can contribute to stormwater pollutant loads and alter the volume and timing of stormwater runoff.

NPDES Phase I and II permittees are required to adopt prescriptive and enforceable mechanisms to ensure that appropriate actions are taken with respect to stormwater flow control, water quality treatment, and erosion and sediment control associated with new development, redevelopment, and construction sites (including roadways). These apply to development on lands previously forested or used for agriculture, as well as to redevelopment in areas which were already partially or fully developed.

In addition to traditional flow control and water quality treatment measures, development and redevelopment requirements increasingly incorporate low impact development (LID) approaches. LID encompasses a broad range of land use planning, site design, and policy tools collectively aimed at reducing or eliminating the adverse effects of development and related land use conversion on the environment. Stormwater management in the context of LID seeks to preserve or mimic natural hydrologic processes to avoid increases in runoff volumes and peak flow rates, prevent or reduce pollutant loadings in runoff to surface and ground waters, and recharge ground water.

LID approaches are BMPs that focus on preserving or restoring the processes of evaporation, transpiration, and infiltration to treat stormwater onsite through native soils, vegetation, tree retention and replanting, and bioengineering.[52] LID practices include protecting native vegetation (including trees); reducing impervious surfaces; and using permeable pavements, green roofs, bioretention areas (rain gardens), topsoil amendment, and cisterns for water reuse. LID stormwater BMPs can be selected for flow control and/or water quality treatment depending on site-specific conditions.

3.3.1 Current activities

Clallam County currently has specific drainage requirements that must be met prior to issuance of building permits for most new construction and structural modification, as follows:

All single family residential and duplex developments, at a minimum, are required to route roof runoff into drywells, which hold the water while it infiltrates.[53] Drywells must be designed and located according to prescriptive County standards. An engineered drainage and sediment control plan may be provided as an alternative to the drywell approach.

Single family residential and duplex developments may be required to have an engineered drainage and sediment control plan, designed by a civil engineer licensed in the state of Washington. Situations that trigger this requirement include proximity to critical areas, or requirements placed on plats through the land division process. Other plats may include an engineered design for individual lots, addressing stormwater quantity and/or quality management approaches. Drainage facilities must be inspected after construction.

[52] Puget Sound Action Team and Washington State University Pierce County Extension, 2005

[53] Drywells are underground structures designed to hold stormwater runoff while it infiltrates. They must be large enough to receive expected runoff volumes, deep enough to reach porous soils, and located away from septic drainfields, wells, and foundations. Clallam County provides sizing standards which account for local precipitation differences.

Multifamily, industrial, and commercial development in the jurisdiction of Critical Areas must have an engineered drainage plan that includes permanent flow control and treatment BMPs designed in accordance with Ecology's Stormwater Management Manual for the Puget Sound Basin (1992). These drainage plans must be approved by the Road Department before a building permit will be issued. Drainage facilities must be inspected after construction. In Critical Aquifer Recharge Areas there may be additional requirements for treatment due to water quality concerns.

Construction activity for projects with one acre or more of land disturbing activity is regulated by Ecology under the NPDES Construction Stormwater General Permit.

The County has developed, in partnership with the Clallam Conservation District, a draft Small Project Drainage Requirements and Technical Guidance Manual (Small Project Stormwater Drainage Manual). This manual outlines drainage techniques for small-scale residential and commercial projects, many techniques would be characterized as LID, such as preservation of native vegetation, trees, soil protection measures during construction, and use of infiltration systems to absorb runoff from impervious areas.

Temporary erosion and sediment control (TESC) at construction sites is not formally addressed in the current Clallam County permit and plan review process, unless the project is determined to be within the jurisdiction of a Critical Area or is a construction project larger than one acre.

In developing recommendations for regulating stormwater management for new and redevelopment, the County and the Work Group took under consideration a number of issues, including the following:

Anticipated future development trends. Small, single-family residences are the predominant development type in Clallam County. The County developed the Small Project Stormwater Drainage Manual with the recognition that simplified, targeted guidance was needed for those types of projects, particularly for residences developed on clay soils where drywells are less effective. The County expects that the Ecology 2005 or 2012 stormwater manuals or similar manual would be used for the larger developments for which such manuals are better suited.

Specialized tools needed for stormwater design. Simplified methodologies for hydrologic analysis and facility sizing for small sites can make stormwater design more efficient for developers as well as permit review more efficient for County staff. Clallam County already provides simplified facility sizing tools for single-family homes (drywells) and the draft Small Project Drainage Manual includes a simplified sizing table for many BMPs used at small sites, including LID BMPs.

Staff resources needed for administration of requirements. The County has found that single family home owners building their own home typically require a lot of assistance to develop drainage plans. The assistance needs are currently greater than what can be offered by Clallam County staff due to time limitations and liability issues. The Small Project Stormwater Drainage Manual is designed as a guide most home builders can use to develop drainage plans.

Approaches for encouraging development patterns which more closely mimic natural land cover. These include approaches to ensure preservation of a high percentage and high quality of open space, minimizing removal of soil and vegetation during construction, and retention of natural vegetation.

3.3.2 Clallam County's ~~S~~stormwater strategy for development and redevelopment

1. ~~The County should a~~Adopt a clearing and grading ordinance. The clearing and grading ordinance will require the following temporary controls:

- At all new and redevelopment sites, prevent erosion and discharge of sediment and other pollutants into receiving waters by implementing Temporary Erosion and Sediment Controls (TESC) measures.
- Obtain a clearing and grading permit and submit a TESC plan for activities that do **any** of the following (See Figure ~~9~~8):
  - Results in land disturbing activity of 7,000 square feet or more.[54]
  - Result in slopes over 25% and greater than 5 feet in height.
  - Impound water exceeding a volume of 1 acre-foot.
  - Result in the diversion of existing drainage courses.
  - Involve clearing and grading in erosion hazard areas or on slopes steeper than 25%.
  - Involve clearing and grading within the jurisdiction of the County's Critical Areas and Shoreline Master Program.

Sites that result in land disturbances of less than one acre but do not trigger any other of the above criteria are exempt from the Clearing and Grading Permit requirement if they can demonstrate to the County that no runoff will be produced.

2. ~~The County should a~~Adopt updated requirements for drainage design and review. These requirements will vary by project size and project type as detailed below (See Figure ~~9~~8). All approved drainage plans will be subject to inspection and enforcement.

Tier One

Size threshold: *Residential sites that require a building permit but generate less than 2,000 square feet of new or replaced effective impervious surface.*

Submittal requirement: *Applicants must complete a 1-page stormwater permit application that certifies the project will not exceed the size threshold, and attach a drainage plan that addresses how the design standards will be implemented.*

Design standards: *All new, replaced, and disturbed topsoil must be amended with organic matter. All sites must implement TESC Best Management Practices (BMPs) to prevent erosion from the site during construction. Roof runoff must be managed by being routed to a drywell or, if a dry well is not appropriate for site conditions, it must be routed to alternative BMPs from the list below (c-g). In addition, the following permanent stormwater BMPs are strongly encouraged as appropriate and feasible:*

a. Retain and plant new trees.
b. Retain native vegetation and preserve existing topsoil.
c. Disperse runoff to vegetated areas.
d. Install rain gardens/bioretention.
e. Implement rainwater collection and dispersal.
f. Install permeable pavement.
g. Install infiltration systems: trenches and drywells.

[54] The definition of land disturbance will exempt gardening.

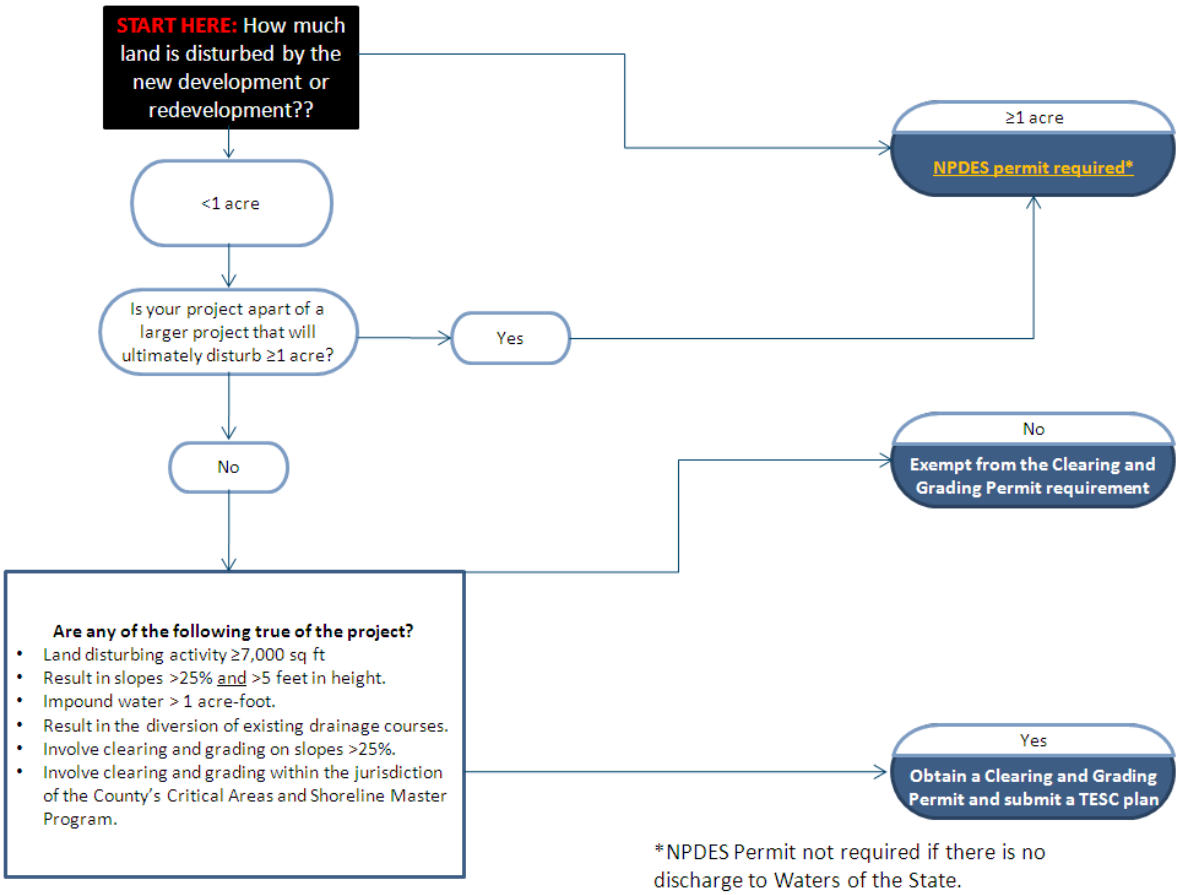


Figure ~~9~~ 8: Flowchart depicting permit requirements.

Tier Two

Size threshold: *All single family residential sites which generate 2,000 square feet or more of new or replaced impervious surfaces. Other residential development which generates 2,000 to 5,000 square feet of new or replaced impervious surface or cause land disturbance of 7,000 or more square feet. All commercial projects smaller than 5,000 square feet that do not use or discharge hazardous substances.*[55]

Submittal requirement: *Applicants must submit a small project site plan in accordance with the Small Project Stormwater Drainage Manual.*

Design standards: *Projects must meet the following minimum requirements:*

a. *Preparation of a drainage plan, which describes how the following four items (b-e) will be met.*
b. *Prevention of pollution from construction sites.*
c. *Source control of pollution.*
d. *Preservation of natural drainage systems and outfalls.*
e. *On-site stormwater management controls, to be sized and designed in accordance with the Small Project Stormwater Drainage Manual.*

[55] Hazardous substances will be defined in the stormwater code.

Tier Three

Size threshold: *All industrial; commercial and residential development which generates more new or replaced impervious surface than is allowed in Tier 2, converts three-quarters acre or more of native vegetation to lawn or landscaped areas, or converts 2.5 acres or more of native vegetation to pasture; and all commercial projects that use hazardous substances.*

Submittal requirement: *Applicants must submit a stormwater site plan in accordance with specifications set forth by the County (e.g., a stormwater manual adopted by the County).*

Design standards: *Projects must meet the following minimum requirements* ***as applicable.*** *For guidance on meeting these requirements, applicants will rely on a stormwater manual (to be selected by the County).*

a. Preparation of stormwater site plans.
b. Prevention of pollution from construction sites.
c. Source control of pollution.
d. Preservation of natural drainage systems and outfalls.
e. On-site stormwater management.
f. Runoff treatment.
g. Flow control.
h. Wetlands protection.
i. Operation and maintenance.

3. ~~The County should e~~Encourage and provide additional incentives for expanded Low Impact Development Techniques.

4. ~~The County should a~~Adopt the Small Project Stormwater Drainage Manual for projects that fall in the Tier Two category for development and redevelopment (see above).

~~5. The County should continue to support rural density cluster zoning designed to retain native vegetation, trees, and undisturbed soils. These individual open space areas are conducive to forming linear, connected corridors which provide wildlife habitat and maintain the hydrologic function of the natural landscape.~~

~~6.~~ 5.~~The County will c~~Continue to coordinate with the cities to support urban levels of density within certain areas of the unincorporated urban growth areas.

~~7.~~ 6.~~The County should e~~Ensure that specifications for drainage designs allow for on-site septic system and drinking water well location needs.

~~8.~~ 7.~~The County should e~~Ensure that County development regulations are internally consistent with the new stormwater and clearing and grading regulations.

~~9.~~ 8.~~The County should p~~Provide for adequate staff resources to administer stormwater management regulations in terms of stormwater management plan review, site inspections, public outreach, and, if necessary, code compliance enforcement.

~~10.~~ 9.~~The County should a~~Administer code compliance efforts based on the three project scale and type threshold categories described above as follows:

Tier One – Compliance

The County should have the authority to review installation of best management practices (BMP) consistent with the approved stormwater management permit during the course of other site inspections (e.g., building permit) in order to confirm that the BMPs are constructed in a manner that is consistent with County guidance and that the BMPs present no obvious danger to down gradient property or people.

Tier Two Project Compliance

The County should have the authority to conduct inspections during construction to review temporary erosion and sediment control measures and a final inspection at each site to confirm that the BMPs were constructed in accordance with the approved drainage plan.

Tier Three Project Compliance

The County should have the authority to conduct inspections during construction to review temporary erosion and sediment control measures and a final inspection at each site to confirm that the BMPs were constructed in accordance with the approved drainage plan.

~~11.~~ 10.~~The County should c~~Consider withholding necessary permits for building completion and occupancy if inspections suggest stormwater BMPs are not properly installed.

~~12.~~ 11.~~The County should d~~Develop administrative procedures and assess staffing resources to enable site inspections. Considerations should include, but not be limited to, using building inspectors to field-verify stormwater management plan implementation, coordination between inspectors and Road Department engineering/plan review staff, developing procedures for prioritizing, and random inspections where resources are limited.

~~13.~~ 12.~~The County should d~~Develop and internally adopt procedures, including submittal (i.e., application) forms, for issuing clearing and grading and stormwater permits. The County may require additional resources to develop and adopt these procedures.

~~14.~~ 13.~~The County should t~~Train plan review, inspection, and enforcement staff on the new code requirements. The County should also train plan review staff on the procedure for reviewing and approving stormwater plans for flow control and water quality treatment.

~~15.~~ 14.~~The County should u~~Use data analyses tools such as the “Nonpoint-Source Pollution and Erosion Comparison Tool” (N-SPECT) and other land use-land cover models to assist with visualizing the effects and implications of development patterns on stormwater quantity and quality.

~~16.~~ 15.~~The County should r~~Review the stormwater and clearing and grading codes every five years, or as needed, to ensure that the codes reflect current stormwater best management practices.

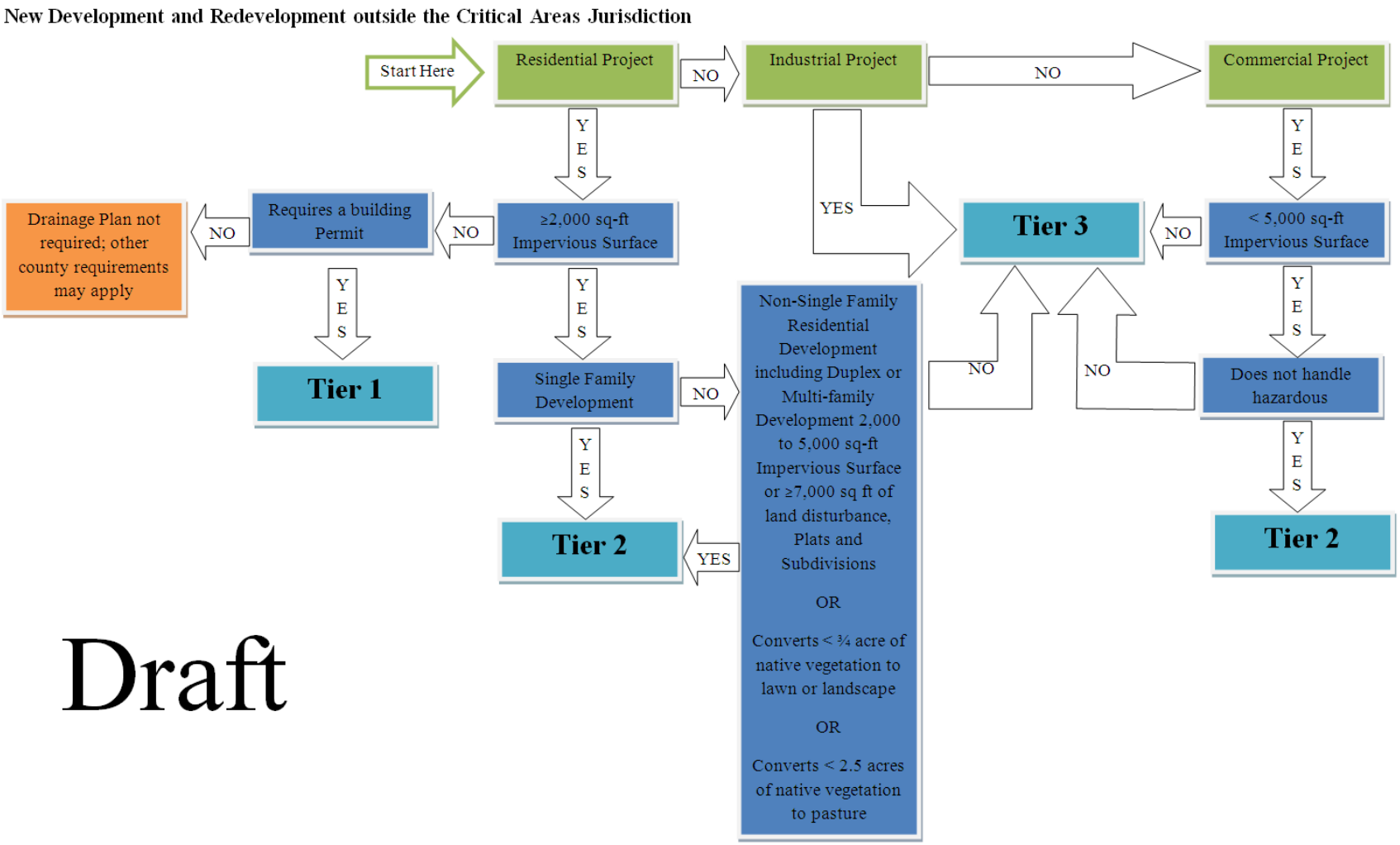


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Figure ~~10~~9: Drainage Plan Tiering Flowchart

3.4 Illicit discharge detection and elimination

Stormwater and receiving water (rivers, lakes & streams, etc.) quality can be degraded by illicit discharges and illicit connections. An illicit discharge is any discharge to a stormwater system that is not composed entirely of stormwater (i.e., not washed in by rainwater), and which is not otherwise regulated. Illicit connections are situations where non-stormwater systems are connected to the stormwater systems. Examples include:

- Disposal of automobile and household toxics to stormwater systems.
- Direct discharges of wastewater (e.g., from sinks, washing machines) to stormwater conveyance systems such as drainage ditches.
- Discharge of wastes from incidental sources such as car washing or spills from road accidents into stormwater drainage.

Typically, smaller, uncontaminated non-stormwater discharges are not considered illicit discharges, such as uncontaminated pumped ground water, foundation or footing drains, and air conditioning condensation.

Jurisdictions which hold NPDES stormwater permits must implement requirements and programs to prohibit and prevent illicit discharges and illicit connections to the stormwater system, including an enforcement strategy, staff training, and a reporting hotline. Management of illicit discharges varies in jurisdictions that do not hold permits under the NPDES system such as Clallam County. For example, Island County prohibits non-stormwater discharge to the stormwater system and other counties only explicitly prohibit discharge of sewage to surface waters.

The overall goal of an illicit discharge detection and elimination program is to ensure that non-stormwater substances are not delivered to the stormwater system or otherwise picked up in stormwater runoff and delivered to Clallam County streams, rivers and lakes.

3.4.1 Current activities

Clallam County code prohibits discharge of solid wastes or sewage to surface waters under the Health Code (CCC 41.10 and .20). The Health Code does not explicitly prohibit other non-stormwater discharges to the stormwater system. County staff has observed illicit discharges in the course of other routine maintenance activities; illicit discharges to irrigation ditches and streams have also been observed by others. To date, the County has relied on the state's legal authority to address illicit discharges under Chapter 90.48 RCW because it has lacked any code language prohibiting all non-stormwater discharges to the stormwater system. Instead, County staff has been able to provide recommendations to residents and businesses on alternatives to illicit discharges (e.g., where to recycle used motor oil).

The Clallam County Environmental Health Division within the Health and Human Services Department in the past has provided educational outreach through the Ecology funded Local Source Control (LSC) program. The County's LSC Specialist works with willing business regarding dangerous-waste management. Historically, most small businesses have had little access to dangerous-waste handling, disposal, or BMP expertise. The County's LSC Specialists provide this expertise to help small businesses identify and implement best pollution-prevention techniques and practices. As of July 1, 2013, Clallam County Environmental Health Division is no longer participating in the LSC program due to staffing shortages.

3.4.2 Clallam County's ~~S~~stormwater strategy for illicit discharge detection and elimination

1. ~~The County should p~~Prohibit illicit discharge to the stormwater conveyance system, including roadside ditches, in the new stormwater code.

2. ~~The County should d~~Develop a strategy to enforce the illicit discharge prohibition and provide training to staff to identify potentially illicit discharges while in the field. Additional staffing resources may be required to fully implement the enforcement strategy.

3. ~~The County should c~~Conduct outreach to the general public on what an illicit discharge is, what to do if one is suspected, and the consequences of illicit discharges.

4. ~~The County should c~~Consider partnering with the Cities of Sequim, Forks, and Port Angeles, as well as with regional agencies such as tribes or Olympic National Park, on an illicit discharge hotline and website for streamlined reporting throughout the County.

5. ~~The County should d~~Determine the appropriate roles and responsibilities when illicit discharges or illicit connections are observed or reported. The County should establish a process for evaluating suspected illicit discharges and connections.[56]

3.5 Pollution prevention and source control

Under the pollution prevention element, NPDES Phase I and II permittees typically identify ways to reduce the amount and type of pollution that collects on streets, parking lots, open spaces, and storage and vehicle maintenance areas and is discharged into local waterways. Pollution prevention and operations and maintenance strategies also typically address pollution that results from actions such as land development, ongoing stormwater management practices (particularly commercial/industrial development), and maintenance of stormwater facilities or systems. Approaches may include the following:

- Maintenance activities, schedules, and long-term inspection procedures.
- Controls for reducing or eliminating pollutant discharge, including structural controls such as grates on outfalls, advanced treatment facilities, and non-structural controls such as recycling programs.
- Procedures for proper disposal of waste removed from roadside ditches.

Requirements for source control BMPs may also be implemented in order to reduce the amount of pollutants entering the stormwater system. Phase II permittees are required to implement source control BMPs for their own operations, and through their stormwater code requirements also require source control BMPs for new development or redevelopment. Source control measures include activities such as spill prevention/cleanup, employee training, and covered material storage areas.

~~Formally documenting procedures, "problem areas", and the system as a whole reduces the chance that knowledge will be lost due to staff turnover or absence, that priorities will be miscommunicated during extreme events, or that sites will not be visited at critical times.~~

Many of the key pollutant sources of concern in Clallam County are external to County operations, such as agriculture, land-clearing, gardens, and pet waste.[57] As noted above, source control and pollution prevention

[56] E.g., Center for Watershed Protection. 2004. Illicit discharge detection and elimination: A guidance manual for program development and technical assessments.
[57] From staff responses to questionnaires, July, 2010.

for private activities can be addressed through the development and redevelopment code, as well as through public outreach and education.

3.5.1 Current activities

The County takes the following steps to prevent pollution from its operations and to maintain its systems which are affected by or convey stormwater:

County staff continues to compile a list of stormwater facilities in the County, most of which are outside the County's jurisdiction, and is planning to map them in GIS.

Clallam County is one of the agencies involved in the early development of a Pollution Identification and Correction (PIC) plan for the Sequim-Dungeness Clean Water District, which includes the area from the eastern County boundary to Bagley Creek. The goal of the PIC plan is to better coordinate water quality monitoring and clean-up efforts among area agencies and organizations. The PIC plan will include a water quality monitoring plan to identify specific problems caused by nonpoint source pollution (including stormwater), identify specific measures to correct them, coordinate outreach and education efforts, clearly define when and how enforcement action should be taken, and include a plan for stable funding.

Road Department staff conducted a video inventory of all County roads miles allowing the opportunity to review many roadside ditches, and are planning to have an approach to incorporate this data into the County's GIS system. The 2009 video inventory is being updated in 2014.

Road Department maintenance staff track and regularly visit areas where maintenance is a recurring need following major storms, and track and inventory maintenance activities. This monitoring of the maintenance inventory is documented monthly.

North Olympic Peninsula Lead Entity for Salmon in conjunction with the Road Department and Streamkeepers volunteers are conducting an inventory of almost all county road culverts. This inventory provides an understanding of where possible fish-blocking, undersized or failing culverts exist which impact salmon and to assist in prioritizing culvert improvement projects. All data collected is being entered into a GIS layer. This countywide inventory is updated regularly and is assisted by tips from property owners and visual observation by county road crews.

The County prevents pollution from internal activities by following the *Regional Road Maintenance Endangered Species Act Program Guidelines*.[58] The County's three road maintenance crews (in the Sequim, Port Angeles, and Lake Creek areas, with a satellite crew in Clallam Bay), follow BMPs outlined in these guidelines, such as conducting road sweeping, primarily after winter storms that required placement of sand for traction purposes, and performing vehicle maintenance indoors. Crews are trained regularly on emerging road maintenance BMPs.

The Parks, Fair, and Facilities Department periodically inspects its storm retention ponds at the fairgrounds and at Juvenile and Family Services, and annually maintains oil-water separators in the Courthouse parking lot.

[58] Regional Road Maintenance Technical Working Group. 2002.

3.5.2 Clallam County's ~~S~~stormwater strategy for pollution prevention and source control

1. ~~The County should c~~Continue their monthly review of current practices at County-owned stormwater facilities and in standard operations to consider opportunities to implement additional pollution prevention and good housekeeping BMPs that protect surface and ground water quality. New practices, technologies and strategies should be incorporated into the County's practices as appropriate. Staff should continue to formally document drainage and water quality problem locations, mapping them in GIS for easy reference. This effort will remain part of a broader inventory of County stormwater facilities (e.g., roadside ditches, culverts). Staff should continue to formally document their process for regular inspection and maintenance.

2. ~~The County should c~~Continue to maintain an up-to-date inventory of all County-owned or operated stormwater facilities. The County should also conduct an inventory of outfalls.[59]

    - As staffing and funding allow, the County should inventory all known locations where drainage, flooding, or water quality are significant issues. Documentation of these significant issues should continue on a monthly basis and be coordinated through the regional road maintenance program.
    - If the County maps this information in GIS, this database should be used to produce office and field maps and maintenance checklists that enable field staff to make efficient use of this problem location data before, during, and after storm events.
    - The list (and map) will be updated annually as needed and any new problem locations identified.
    - As staffing and funding allow, the County will continue to inventory the County-maintained stormwater infrastructure, including roadside ditches, culverts, retention ponds, and oil-water separators. This effort may include in-office mapping (using institutional knowledge and available video) as well as field work (verifying locations, adding missing locations, obtaining additional information as needed).
    - If the County maps this information in GIS, the database could be used to more accurately track records of maintenance and identify potential sources of pollutants to surface waters.
    - The County will maintain this database biannually by recording any new facilities (built or identified) or maintenance performed.

3. ~~The County should p~~Prepare a written plan describing current practices for inspection and maintenance of County-owned or operated facilities as well as post-storm spot checks of the stormwater system. If applicable, the plan should note any issues or concerns with current practices and recommend revisions. Staff should continue their monthly review of current practices at County-owned facilities and in standard operations to consider opportunities to implement additional pollution prevention and good housekeeping BMPs. New practices, technologies, and strategies should be incorporated into the County's practices as appropriate. The County may use the Stormwater Pollution Prevention Plan examples available on Ecology's website as guidance.

4. ~~The County should c~~Continue to participate in development of the PIC plan. After creation of the PIC, the County should participate in implementation of the plan.

[59] Outfalls are points where pipes or ditches discharge to natural water bodies.

3.6 Long-term compliance

Stormwater programs typically involve provisions for long-term compliance, such as maintenance covenants, requiring owners of private drainage facilities to agree to long-term maintenance of the facilities. The County recognizes the need to implement long-term compliance strategies that ensure that drainage plans are implemented and maintained in accordance with the stormwater permit, and will consider numerous options. The Stormwater Work Group developed recommendations regarding long-term compliance. Some recommendations were designed to ensure that requirements on new development or redevelopment are not "undone" when ownership changes, and to ensure that buyers are aware of the stormwater maintenance requirements on their property. The Work Group also encouraged inspections at the time of sale so that buyers can be assured that the drainage system is working as intended. The County will consider the Work Group recommendations as well as other options to address long-term compliance.

3.6.1 Clallam County's ~~S~~stormwater strategy for long-term compliance

~~1. The County should develop a Drainage Facility Maintenance Covenant that ensures private stormwater facilities are maintained and not eliminated when the property is sold.~~

~~2.~~ 1.Although stormwater management will generally only be required for ~~the~~ new development or redevelopment, the County should require that the drainage plan reflect all impervious surfaces on the parcel, and encourage applicants to voluntarily address stormwater management on the entire parcel. However, if there is a known stormwater problem that is causing harm to public or private property, or to public health, safety or welfare, or to water quality, the County should require retrofits of existing development as part of the required drainage plan for redevelopment.

~~3. Whenever a property is sold that has an existing Tier Two or Tier Three drainage plan, the County should consider requiring an inspection to ensure that the drainage system is functioning in accordance with the approved drainage plan.~~

~~4.~~2.~~The County should a~~Adopt provisions requiring the ongoing maintenance and repair of required drainage facilities and systems. The provisions should include requiring a Drainage Facility Maintenance Covenant for privately maintained drainage facilities and should authorize County inspections of privately maintained storm water facilities, including right of entry. A sample covenant is included as Appendix F.

~~5.~~3.~~The County should p~~Prohibit construction of drainage systems that divert/channel stormwater or illicit discharges from a parcel into a County roadside ditch. The County should enforce these provisions to ensure long-term compliance.

3.7 Additional assessments

Clallam County encompasses a number of watersheds, or basins, with unique characteristics, opportunities, and constraints. A basin-based approach to stormwater management tailors strategies to meet the specific needs of a basin. These approaches could entail programmatic activities, capital improvement projects, or thresholds and performance requirements for flow control, water quality, and other elements. These strategies can address impacts including:

- Future impacts anticipated from ongoing development and growth in the basin.
- Residual effects – development effects on hydrology and water quality not well mitigated by stormwater control standards and BMPs applied to new and redeveloping projects.

- Cumulative effects – aggregated effects on hydrology and water quality resulting from imperfect application of stormwater standards and BMPs in development/redevelopment.
- Impacts from current and past projects subject to lesser standards.
- Waterbody-specific needs due to ecological conditions.
- Differing jurisdictional authority across a basin.

Ecology and the Puget Sound Partnership (and its predecessor the Puget Sound Action Team) have been encouraging basin planning as the preferred means of managing stormwater and water resources for decades. Such an approach would recognize the differences in population densities, precipitation quantities, and amount of mature forest cover across the County. Basin planning can allow managers to minimize and avoid impacts before they occur, saving money and resources. Ecology is currently working with several NPDES permittees (King County, Issaquah, and Thurston County) who are developing basin plans specific to stormwater impacts. Permittees' basin plans must be reviewed and approved by Ecology to modify NPDES requirements.

A stormwater-focused basin planning effort would allow further tailoring of the Clallam County stormwater program to meet better specific resource needs. Prioritizing basin planning is particularly important given that Clallam County is not yet regulated under the NPDES municipal stormwater permit. If the County identifies and establishes basin-specific needs and priorities, it is possible that potential future NPDES requirements (should the County become an NPDES permittee) could be negotiated based on the basin study recommendations (as opposed to prescriptive permit requirements). This would enable a more tailored approach to stormwater management that is reflective of the basin needs and opportunities, including those of the natural environment and all stakeholders in the basin.

3.7.1 Current activities

There is a wealth of information available on Clallam County basin-specific resources, challenges, and needs. Resources include the basin characterizations and subsequent plans developed for the Elwha-Dungeness (WRIA 18), Lyre-Hoko (WRIA 19), and Sol-Duc-Hoh (WRIA 20) watersheds. Salmon and steelhead habitat limiting factors analyses have also been conducted in each of these watersheds. Extensive research has been conducted into ground water conditions in the Sequim-Dungeness region. Additional resources include the State of the Waters report, the State Wetland Integration Strategy (SWIS) report, and subsequent database and GIS coverages.[60]

3.7.2 Clallam County's ~~S~~stormwater strategy for additional assessments

1. The County, in partnership with affected cities, should seek grant funds to assess prioritized sub-basins in the County. The assessments should 1) evaluate available information to determine specific resource protection actions needed in the sub-basin, and 2) assess stormwater management actions and requirements to address those resource protection needs. The final assessments should recommend improvements in stormwater management activities such as basin-specific incentive programs, tailored stormwater program activities (e.g., targeted restoration, public outreach), and revised regulatory requirements.

2. ~~The County should c~~Continue to use data from monitoring and from other sources to refine its land use-land cover modeling to understand better the impacts of development patterns on stormwater quality and quantity.

[60] Clallam County, 1995, 2004.

3.8 Funding

Implementing most of the recommendations in this plan would require a sustainable, long-term source of funding, mainly to support Clallam County staff time devoted to stormwater management. Other counties fund their stormwater programs with permit fees or by establishing a utility district. Income from a utility district may be further leveraged for grant funding for clean water-related activities and provide funding to the county's on-site septic system inspection program, allowing for even greater benefit to the county.

If the County decides to establish a utility, the County will need to determine the appropriate legal authority to use. Options include the following:

Chapter 36.89 RCW, Stormwater Control Facilities. This regulation provides a mechanism to fund planning, designing, establishing, acquiring, developing, constructing, or improving open space, park, recreation, and community facilities, public health and safety facilities, storm water control facilities, and highways. It is used to fund stormwater activities in Clark, Island, King, Kitsap, Pierce, Skagit, and Snohomish counties.

Chapter 36.94 RCW, Sewerage, Water, and Drainage Districts. This chapter provides for the establishment of sewerage, water, and drainage systems, including storm or surface water drains, channels, and facilities; outfalls for storm drainage; and nonpoint water pollution monitoring programs. Research suggests no counties are currently using this authority to fund stormwater activities.

Chapter 86.15 RCW, Flood Control Zone District. The express purpose of this statute is to raise funds to "control, conserve, and remove flood waters and storm waters." It is used to fund stormwater activities in Cowlitz, Lewis, Mason, Pacific, and Whatcom counties.

3.8.1 Current funding

The County Road Department receives the majority of its funding through gas tax revenues, which are required to be used for road-related purposes. To support its permit review staff, the department charges fees for drainage plan review. Revenue from these fees is used exclusively to cover the costs associated with drainage plan review. Fees have been adjusted over the years as needed to match staff time spent on plan review. The current fee schedule can be found under Clallam County Code Chapter 5.100.310, Schedule 310-B.

3.8.2 Clallam County's ~~F~~funding strategy

1. ~~The County should~~ ~~e~~Establish sustainable financing to fund implementation activities within the Comprehensive Stormwater Management Plan and other activities related to clean water in Clallam County, which may include implementation of the County's On-Site Septic (OSS) Management Plan. The County should consider a variety of financing options, including the establishment of a utility or district that spreads the costs to property owners throughout the unincorporated County and is collected via the property tax collection system. The County should dedicate any revenues collected to clean water programs and activities, and should not divert fees or assessments to the general fund. The County should use any funds collected for incentives, public awareness, outreach and education, monitoring, training, compliance, and matching funds for grants.

2. ~~Clallam County should d~~Develop a detailed cost assessment to determine the funding need for the stormwater program. The cost assessment should evaluate additional staff resources needed to implement the Comprehensive Stormwater Management Plan.

3. ~~The County should c~~Continue to collect appropriate permit fees to cover the costs of permit processing.

4. ~~The County should s~~Seek grants to fund short-term expenses.

3.9 Stormwater Monitoring and Analysis

Stormwater monitoring is an integral part of stormwater management because it allows jurisdictions to assess the impacts from land development and stormwater runoff, and also allows them to assess the effectiveness of efforts to mitigate impacts. A comprehensive stormwater monitoring program provides useful data on both water quality of stormwater and the volumes of stormwater. In particular, a comprehensive monitoring program would allow Clallam County to:

- Assess stormwater impacts on water quality and their relation to current human activities. This includes evaluating the concentrations of target pollutants that ultimately reach receiving waters and identifying acute concentrations of selected pollutants associated with stormwater runoff, including hydrocarbons, metals, pesticides, herbicides, fecal coliform, sediment, and other pollutants.

- Evaluate the impacts of land use on stormwater quality and quantity and assess the potential mitigation contributions of selected Best Management Practices.

- Assess the relationship between stormwater run-off and groundwater quality and aquifer recharge.

In addition, comprehensive stormwater monitoring and analysis would also allow Clallam County to assess stormwater's interrelationship with other high priority problems in the watershed. Non-point pollution, which is distributed through uncontrolled stormwater, is exceeding water quality standards in eight key watersheds in the County. There are also problems with sediment aggradation, elevated bacteria counts in surface water bodies, two major shellfish area closures to harvest due to bacterial pollution, and a dramatic reduction in salmonid productivity, with four of seven species in the watershed listed as threatened or endangered. Comprehensive stormwater monitoring and analysis would help the County track trends as well as assist with early identification of new problems that will benefit from early action.

Such a comprehensive stormwater monitoring plan as described above was typically implemented by high-population jurisdictions covered by stormwater-discharge permits in Phase 1 of the National Pollutant Discharge Elimination System (NPDES). However, the value of each jurisdiction gathering similar data has been questioned, and the costs of such comprehensive efforts are difficult to justify in the current funding environment. This fact has been well recognized by the Puget Sound Partnership, whose Stormwater Work Group in 2010 recommended a Stormwater Assessment and Monitoring Program for Puget Sound (SWAMPPS) which now governs regional stormwater monitoring efforts for NPDES stormwater permittees. In general, ***the Puget Sound Partnership's Stormwater Work Group plan does not recommend stormwater sampling per se*** except for certain specific circumstances, because of the considerable cost of such monitoring and the fact that stormwater disturbance vectors and mitigations are fairly well known. Instead, the Partnership intends to initiate, starting in 2015, a broad (rather than stormwater-targeted) monitoring program expected to pick up signals of stormwater status and trends at a regional scale (a more localized scale being rejected for lack of funding). In order to reach valid conclusions about status and trends

throughout Puget Sound, the Partnership is selecting monitoring sites throughout the region, even in jurisdictions not subject to NPDES stormwater permits, such as Clallam County[61].

Since jurisdictions covered under NPDES permits have found reason to scale back their stormwater monitoring efforts to a more efficient and achievable set of monitoring activities, it would be well within reason for Clallam County to follow the recommendations in SWAMPPS.

3.9.1 Current activities

The County has undertaken the following activities related to understanding the impacts of stormwater on quality and quantity:

- Streamkeepers, Clallam County's volunteer watershed-involvement program, performs ambient monitoring in Clallam County watersheds, deploying teams of volunteers who adopt streams. Teams monitor quarterly, annually, or monthly at multiple established sites on each stream, sampling the biological, chemical, and physical parameters of stream health. While not specifically targeting stormwater runoff, many data points in Streamkeepers' large dataset are related to storms. Streamkeepers' benthic macroinvertebrate (B-IBI) data provides an excellent assessment of stream and watershed health, which can be an important indicator of runoff-related influences.

- Clallam County Department of Community Development (DCD), Streamkeepers, and Jamestown S'Klallam Tribe initiated a pilot stormwater monitoring program in December 2008 as a part of an EPA Watershed initiative Grant. The pilot program had two parts: Phase I-- focused on the impacts of land use on stormwater quality and quantity and Phase II- assessed the concentrations of storm pollutants that ultimately reached receiving waters. Streambed sediment sampling was also conducted to ascertain pollutants associated with stormwater and to compare results from sediment sampling performed 5 years earlier by Brandenberger and others.[62] Data from the stormwater monitoring and sediment sampling for the EPA Watershed Initiative grant has been uploaded to EPA's STORET database.

- Streamkeeper volunteer Coleman Byrnes has initiated an Olympic Forest Coalition (OFCO) funded stormwater monitoring project in WRIA 19 focused on suspended sediment. This study will add valuable complementary data from areas of Clallam County outside the Dungeness Valley.

- Clallam County DCD applied the GIS modeling tool Nonpoint-Source Pollution and Erosion Comparison Tool (N-SPECT) with land-cover data from NOAA's Coastal Change Assessment Program (C-CAP) to estimate the relative effects of land-use/land-cover on stormwater pollutant loading. Pollution and erosion estimates were generated and compared using 1992 to 2006 C-CAP datasets for the watersheds of Clallam County. Relative pollutant loadings were estimated for Total Phosphorus, Total Nitrogen, Total Suspended Solids, Zinc, and Copper. The analysis provides qualitative comparative maps that do not substitute for water quality monitoring. Many of the model estimates showed higher runoff, pollution loading potential, and erosion potential in areas with heavier rainfall, mostly on the western part of the County. Managed timber areas showed reduced amounts of erosion and pollutant loading potential in 2006 compared to 1992. Across the entire study area, maximum pollutant potential for all pollutants appeared to have decreased between 1992 and 2006. In contrast, when evaluating only the eastern County's Marine Recovery Area, maximum pollutant potential increased or stayed the same between 1992 and 2006. The results could be used to identify priority areas for future stormwater

[61] Stormwater Work Group. 2010.
[62] Brandenberger, J.M., C.W. May, N.P. Kohn, and L.S. Bingler. 2003.

monitoring and could be used to gain a general understanding of the effects that land-cover can have on water quality. In general, results showed that any land-use that produces a land-cover change with large areas of bare ground creates the potential for increased pollutant loading.

3.9.2 Clallam County's ~~S~~stormwater monitoring and analysis strategy

In order to devise a strategy for assessing local stormwater impacts and mitigation, Clallam County should follow the lead of the Puget Sound Partnership, whose overall stormwater monitoring strategy has been described earlier. Figure 1~~1~~0 presents local recommendations based on details of the Partnership's plan[63].

Figure 1~~1~~0. Puget Sound Partnership local stormwater monitoring recommendations.

Puget Sound Partnership Recommendations	Current Activity in Clallam County	Recommendations
• **Status and trends monitoring on small streams—probabilistic (i.e. random):**	**Status and trends monitoring on targeted streams:**	• **Remain targeted rather than probabilistic due to the expense of probabilistic monitoring** • **City of Port Angeles (PA) will be part of a region-wide consortium performing probabilistic sampling for stormwater permittees**
○ Monthly standard water-quality parameters	Standard water-quality parameters (monthly except quarterly for Streamkeepers): Sequim Bay watershed (Jamestown S'Klallam Tribe), Dungeness Bay watershed (Clean Water District), West of Sequim to West of PA (Streamkeepers), Hoko (citizens supported by Streamkeepers), Western Straits (Elwha & Makah Tribes), West End (Quileute Tribe)	• Continue as possible and as needed • Expand Streamkeepers quarterly to monthly sampling, as funding allows • City of PA will be responsible for monthly sampling beginning in 2015 • Collect all data in Clallam County Water Resources database, as funding allows • Submit data for State Water Quality Report
○ Sediment sampling for contaminants every five years	Limited sediment sampling has been conducted in Sequim and PA areas	• City of PA will be responsible beginning in 2015 • County should resample outside

[63] Stormwater Work Group. 2010.

		the City of PA and in the Dungeness area every five years as funding allows
○ Benthic macroinvertebrate (BMI) sampling along with basic habitat information	• BMI sampling has been conducted across the County, mostly by Streamkeepers, with a variety of funding • Habitat data is a patchwork depending on lead agency	• City of PA will be responsible beginning in 2015 • County should continue BMI sampling outside the City of PA, as funding allows • County should continue BMI sampling across the County, as funding allows • Follow Dept. of Ecology standard for habitat assessment, as funding allows
○ Use of currently-operated continuous flow/temperature gages to assess questions of flood flashiness and pollutant loading	• Ecology and USGS gauges are operating at various sites, though many have been shut down due to lack of funding • Assessment of available data in WRIA 18-East yielded no solid evidence of hydrologic impairment	• Support continuation of Ecology and USGS gauging as possible • Support re-establishing flow and weather stations on some streams, because site conditions in Clallam County vary widely and other water-quality data are difficult to interpret without such information. The considerable cost of operating such gauges should be factored into the development of a stormwater monitoring program. • Assess hydrologic changes in areas undergoing exceptional development or BMPs, where gauging stations enable it
• **Status and trends monitoring in marine nearshore areas:**		
○ Monthly fecal coliform sampling in Urban Growth Areas (UGAs)	• City of Port Angeles (PA) and Streamkeepers take twice-yearly samples at City Pier and Hollywood Beach, connected to storms as possible • BEACH program takes weekly samples from Memorial Day to Labor Day at Hollywood Beach	• City of PA and Streamkeepers take twice-yearly samples at City Pier and Hollywod Beach
○ Sediment sampling for contaminants every five years in UGAs	• Port Angeles Harbor has been the subject of extensive study in recent years by the WA DOE, related to harbor cleanup	• City of PA will be responsible beginning in 2015

○ Mussel Watch tissue contaminant sampling annually near stormwater outfalls	• Potentially part of Port Angeles Harbor study	• City of PA will be responsible beginning in 2015
○ Benthic organism sampling as possible		
• **Source identification and diagnostic monitoring—follow Clean Water Act guidance:**		
○ IDDE (Illicit Discharge Detection & Elimination) process prescribed for NPDES permittees	• City of PA conducts under their NPDES permit	• City of PA will continue under their NPDES permit • County should conduct as possible, along with partners such as Tribes, Ecology, Cities, and Conservation District (e.g., Pollution Identification & Correction process)
○ TMDL (Total Maximum Daily Load) cleanup process described for Impaired waters	Numerous water bodies in Clallam County are on the Impaired Waters list, but only those in the Dungeness Watershed have had a TMDL cleanup process initiated	• County should work to correct Impaired waters to forego TMDLs as possible, seeking funding from Ecology for this cost-effective approach • For water bodies that cannot be corrected within an adequate timeframe, County should work with Ecology to get them on the TMDL schedule
• **Effectiveness studies:**		
○ Use a region-wide application process to sponsor studies exploring effectiveness of each type of stormwater management action	No applicants known in Clallam County	Clallam County entities can apply, but generally it will be the more-populous jurisdictions who will apply for these

In addition to the activities in the above Figure, there are a number of other activities which should be undertaken:

- All data described in the above table should be compiled in one place, made available to the public in a timely fashion, and analyzed and reported upon on a regular basis, along with metadata sufficient to assess the data's quality. The logical agency to collate and present the data would be Streamkeepers, which has served as the manager of the Clallam County Water Resources database since its inception in 2000. Alternatively, Clallam County could see to it that all other entities upload their data to the Dept. of Ecology's EIM database, in which case Ecology's online query tools could be used. For reporting, certain standardized reporting routines should be

devised; a good starting template might be the 2004 *Clallam County State of the Waters* report (http://www.clallam.net/SK/stateofwaters.html).

- Current water quality data, including data collected from the stormwater monitoring of the Sequim-Dungeness Valley area under the EPA grant, need to be carefully analyzed to understand current conditions and the overall influences of stormwater on water quality.

- ~~Clallam County should p~~Provide support for real-time, online-accessible, data-recording weather and flow stations to accurately assess sampling conditions and timing, as well as to properly analyze stormwater monitoring sample results. Individual stations are needed because site conditions in Clallam County can vary widely. It should be noted that rain and flow gauges can be expensive to buy and time-consuming to install and maintain, so these capital and staff costs should be considered as part of the cost of a stormwater monitoring program.

- ~~Clallam County should a~~Assess program effectiveness and adaptive management by tracking Best Management Practices (BMP) implementation at every scale (from parcel to basin). If a basin's stream health is found to have degraded or improved over a period of time, it would be important to know how much new development or land clearance occurred, what BMP mitigations had been applied, and what restoration projects and retrofits had been completed. A system to track such BMPs should be implemented as soon as possible. This information would be useful to the sub-basin assessment process.

- In order to track watershed health broadly across the County and over time, onsite sampling should be supplemented by remote-sensing datasets interpreted through models such as the GIS tool N-SPECT.
  - Use NOAA's Coastal Change Analysis Program (C-CAP) remote-sensing data to interpret long-term trends about gross changes to the landscape. Such interpretation requires funding for local GIS analysis to calculate basin-level changes in category percentages. This information would be useful to the sub-basin assessment process. Approximately every five years a new C-CAP dataset is released and modeling should be repeated to track trends in watershed health over time.

  - Areas that have been modeled as degraded should be evaluated by follow-up field assessment. GIS staff resources, if available, could be used to examine more closely the modeled results for select areas. A cell-by-cell analysis and comparison to aerial photographs might clarify the model results and identify those areas worthy of field assessment. Additionally, onsite field assessment should be considered in an attempt to verify that the area does indeed have a stormwater related pollution problem. Use GIS modeling tools to assist the County in visualizing and comparing the effects and implications of different development patterns on stormwater quantity and quality. If modeling indicates that certain kinds or extents of development degrade watersheds due to altering stormwater patterns, those conclusions should be incorporated into future land-use planning.

- ~~Clallam County should a~~Annually convene its Stormwater Monitoring Advisory Committee to review the data, consider emerging trends, and steer the program. Clallam County should invite all other agencies gathering data and the members of the Clallam County Stormwater Workgroup to join this committee, which could play an important and low-cost role in the future of stormwater monitoring in Clallam County.

- Funding needs to be procured to undertake the activities described above.

3.10 Implementation Schedule

STRATEGY	IMPLEMENTATION TARGET
A. Public Education and Involvement	
1. ~~Develop and i~~Implement public outreach plan	Near-Term/Long-Term
2. Education and assistance on stormwater management	Ongoing
B. Development and Redevelopment	
1. Adopt a clearing and grading ordinance	Near-Term
2. Adopt a stormwater code	Near-Term
3. Provide LID incentives and encouragement	Ongoing/Near-Term
4. Adopt the Small Project Stormwater Drainage Manual	Near-Term
~~**5.** Support rural density cluster development outside of Urban Growth Areas~~	Near-Term
~~6~~5. Coordinate with cities to support urban development within Urban Growth Areas	Near-Term
~~7~~6. Ensure drainage designs account for well and septic locations	Ongoing
~~8~~7. Ensure new stormwater regulations and existing development regulations are consistent	Ongoing
~~9~~8. Provide adequate staff resources to implement the stormwater plan and code	Near-Term/Long-Term
~~10~~9. Administer code-compliance efforts for each tier of development	Near-Term
~~11~~10. Withhold permits if stormwater requirements are not being met	Near-Term
~~12~~11. Develop procedures for site inspections	Near-Term
~~13~~12. Develop procedures and forms for clearing and grading and stormwater permits	Near-Term
~~14~~13. Train staff on new code requirements and procedures.	Ongoing
~~15~~14. Assess development patterns using land cover models	Near-Term
~~16~~15. Review stormwater and clearing and grading codes and update as needed	Long-Term
C. Illicit Discharge Detection and Elimination	
1. Prohibit illicit discharges in the stormwater code	Near-Term
2. Develop an enforcement strategy for illicit discharges	Near-Term
3. Conduct public education on illicit discharges	Near-Term
4. Develop a joint illicit discharge hotline and website	Near-Term
5. Determine internal roles and responsibilities for illicit discharge compliance actions	Near-Term
D. Pollution Prevention and Source Control	
1. Continue monthly review of current practices	Ongoing
2. Continue to maintain an up-to-date inventory of outfalls and county owned or operated stormwater facilities	Ongoing
3. Prepare a plan describing current practices for inspection and maintenance of stormwater facilities	Near-Term
4. Participate and assist in implementation of Pollution Identification and Correction Plan	Ongoing
E. Long-Term Compliance	
~~**1.** Require stormwater facility maintenance agreements be conveyed with property transfer.~~	~~Near-Term~~

~~2~~1.	Require drainage plans to reflect all impervious surfaces and encourage applicants to voluntarily address stormwater management on the entire parcel	Near-Term
~~3.~~	~~Require inspections when properties with Tier 2 or 3 drainage plans are sold.~~	~~Near-Term~~
~~4~~2.	Require ongoing maintenance, periodic inspection, and repair of required drainage systems.	Near-Term
~~5~~3.	Prohibit intentional discharges into County roadside ditches and prohibit filling of roadside ditches.	Near-Term
F. Additional Assessments		
1.	Seek grant funds to assess prioritized sub-basins in the County	Long-Term
2.	Conduct sub-basin assessments	Long-Term
3.	Continue to use data to refine land-use cover modeling	Ongoing
G. Funding		
1.	Establish a sustainable funding source to implement this Comprehensive Stormwater Management Plan	Near-Term
2.	Develop a detailed cost assessment of staffing and other resource needs	Near-Term
3.	Continue to collect appropriate permit fees to cover permit processing costs	Ongoing
4.	Seek grant funds for short-term expenses	Ongoing
H. Stormwater Monitoring and Modeling		
1.	Maintain a comprehensive stormwater monitoring program that collects and analyzes stormwater quality and quantity data throughout Clallam County	On-going
2.	Conduct data analyses that includes modeling such as the GIS tool "Nonpoint-Source Pollution and Erosion Comparison Tool" (N-SPECT) to track trends in watershed health.	On-going

NOTE: Near-Term = 2015-2017

3.11 Stormwater program elements

This strategy addresses each of the five stormwater program elements or minimum control measures required for a jurisdiction under an NPDES Phase II permit. It also addresses 12 of the 13 points recommended for comprehensive stormwater management under the Puget Sound Water Quality Management Plan.[64] Point #7 of the Puget Sound Water Quality Management Plan, "Identification and ranking of problems," was not a priority for this plan and therefore it was not included in this plan. The table below outlines how this strategy addresses each of those elements and points.

[64] Puget Sound Action Team, 2005.

Table 1. How this strategy addresses stormwater program guidelines from Ecology, EPA, and the Puget Sound Partnership.

CLALLAM COUNTY STORMWATER PLAN SECTION	FIVE MINIMUM CONTROL MEASURES FOR AN NPDES PHASE II PERMITTEE (ECOLOGY/EPA)	13* POINTS FOR COMPREHENSIVE STORMWATER MANAGEMENT (PUGET SOUND ACTION TEAM, PUGET SOUND PARTNERSHIP)[65]
3.2 Public education and involvement	**1.** Public education and outreach **2.** Public participation/involvement	**8.** Public education and involvement
3.3 Development and redevelopment requirements; site plan review	**4.** Controlling runoff from new development, redevelopment, and construction sites	**1.** Stormwater controls for new development and redevelopment **2.** Stormwater site plan review **3.** Inspection of construction sites and maintenance of temporary BMPs **9.** Low Impact Development practices
3.4 Illicit discharge detection and elimination	**3.** Illicit discharge detection and elimination	**6.** Illicit discharges and water quality response
3.5 Pollution prevention and operations and maintenance; source control	**5.** Pollution prevention and operations and maintenance for municipal operations.	**4.** Maintenance of permanent facilities **5.** Source control program
3.6 Long-term compliance		**12.** Monitor program implementation and environmental conditions
3.7 Additional assessment		**10.** Watershed or basin planning
3.8 Funding		**11.** Create local funding capacity
3.9 Stormwater program strategy		**12.** Monitor program implementation and environmental conditions **13.** Schedule for implementation

**** Note that Clallam County staff determined that point #7, "Identification and ranking of problems," was not a priority for this plan.***

[65] Puget Sound Action Team, 2005.

Appendices

A. References
B. Work Group Recommendations
C. Actions under the Dungeness Bay/Matriotti Creek TMDL
D. Questionnaire sent to County staff
E. Clallam County Stormwater Public Outreach Plan
F. Sample Drainage Facility Maintenance Covenant

Appendix A. References

Brandenberger, J.M., C.W. May, N.P. Kohn, and L.S. Bingler. 2003. Potential stormwater impacts on sediment quality in urbanizing Clallam County streams. Battelle Marine Laboratories.

Chadd, E.A., R.L. Knapp, C.L. Creasey, and S. Golding. 2009. Quality Assurance Project Plan: Sequim-Dungeness Watershed Water Pollutant Concentration Pilot Sampling Project. Port Angeles, WA: Clallam County Department of Community Development.

Chadd, E.A, R.L. Knapp, C.L. Creasey, L. Kawal, and S. Golding. 2010. Quality Assurance Project Plan: Sequim-Dungeness Watershed Water Pollutant Concentration Pilot Sampling Project, Phase II. Port Angeles, WA: Clallam County Department of Community Development.

Clallam Conservation District. 2005. Five year plan (2005 to 2010): Resource inventory.

Clallam County. 2009a. Dungeness River comprehensive flood hazard management plan.

Clallam County. 2009b. WRIA 19 (Hoko-Lyre) watershed plan (draft).

Clallam County. 2006. Clallam County rural lands report.

Clallam County. 2004. State of the waters of Clallam County: A report on the health of our streams and watersheds.

Clallam County. 1995. Assessment of wetland functions and wetland management guidance for the Lower Dungeness River area and Sequim Bay watersheds. (Subsequent products in 2001 include wetland hydrology database, GIS coverages available on www.clallam.net and global/regional wetland function maps.)

Clallam County Board of County Commissioners. August 18 2003. Work session agenda item summary.

Elwha-Dungeness Planning Unit. 2005. Elwha-Dungeness Watershed Plan for WRIA 18 and Sequim Bay in West WRIA 17.

Haring, D. 1999. Salmon and steelhead habitat limiting factors – Water Resource Inventory Area 18. Washington State Conservation Commission.

Knapp, R.L., E.A. Chadd, and C.L. Creasey. 2009. Quality Assurance Project Plan: Sequim-Dungeness Watershed Stormwater Sediment Pollutant Concentration Sampling Project. Port Angeles, WA: Clallam County Department of Community Development.

LMI Government Consulting. 2005. Low impact development strategies and tools for local governments. Building a business case.

Merritt, G. 2009. Status and Trends Monitoring for Watershed Health & Salmon Recovery: Field Data Collection Protocol: Wadeable Streams. Environmental Assessment Program Washington State Department of Ecology Olympia, Washington. DRAFT

National Research Council. 2008. Urban stormwater management in the United States. National Academies Press.

North Olympic Peninsula Lead Entity for Salmon. 2006. Three year workplan narrative.

North Olympic Peninsula Lead Entity for Salmon. 2007. Three year workplan narrative.

North Olympic Peninsula Lead Entity for Salmon. 2008. Three year workplan narrative.

North Olympic Peninsula Lead Entity for Salmon. 2009. Three year workplan narrative.

North Olympic Peninsula Lead Entity for Salmon. 2010. Three year workplan narrative.

North Olympic Peninsula Lead Entity for Salmon. 2011. Three year workplan narrative.

North Olympic Peninsula Lead Entity for Salmon. 2012. Three year workplan narrative.

North Olympic Peninsula Lead Entity for Salmon. 2013. Three year workplan narrative.

Puget Sound Action Team. 2005. Developing a comprehensive stormwater program under the Puget Sound water quality management plan. Updated October 2005.

Puget Sound Action Team. 2000. Puget Sound water quality management plan 2000. Olympia, WA.

Puget Sound Action Team and Washington State University Pierce County Extension. 2005. Low impact development technical guidance manual for Puget Sound. Olympia, WA.

Puget Sound Partnership. 2009. 2020 Action Agenda. Updated May 27, 2009.

Puget Sound Partnership. 2008. Discussion paper: Water quality topic forum. July 11, 2008.

Puget Sound Stormwater Work Group. 2010. Draft stormwater monitoring and assessment strategy for the Puget Sound Region, Volume 1: Scientific framework and Volume 2: Implementation plan.

Regional Road Maintenance Technical Working Group. 2002. Regional road maintenance Endangered Species Act program guidelines.

Sargeant, D. and Washington State Department of Ecology. 2002. Dungeness River and Matriotti Creek fecal coliform bacteria TMDL study.

Sargeant, D. and Washington State Department of Ecology. 2004. Dungeness River and Matriotti Creek post-Total Maximum Daily Load data review.

Smith, C.J. 2000. Salmon and steelhead habitat limiting factors in the North Washington coastal streams of WRIA 20. Washington State Conservation Commission.

Smith, C.J. 1999. Salmon and steelhead habitat limiting factors in the Western Strait of Juan de Fuca. Washington State Conservation Commission.

Soule, A. 2009. Ground water quality monitoring in the shallow aquifer near Sequim, Clallam County, WA.

Soule, A. 2005. Monitoring for stormwater contaminants in the shallow aquifer near Priest Road, Clallam County, WA.

Stormwater Work Group. 2010. Recommendations for Municipal Stormwater Permit Monitoring: Report to Ecology. October 29, 2010. 22 pp.

Streamkeepers of Clallam County. 2010. Stormwater and the state of Clallam County's streams. Presentation to the Clallam County Stormwater Work Group, April 22, 2010.

Streeter, V., and C. Hempleman. 2004. Clean Water Strategy For Addressing Bacterial Pollution in Dungeness Bay and Watershed and Water Cleanup Detailed Implementation Plan. 2004. Clallam County and WA Dept. of Ecology.

Turnbull, H. 2010. Blyn stormwater study. Memorandum from the Jamestown S'Klallam Tribe.

Washington State Department of Ecology and the Cadmus Group. 2010. Dungeness Bay and Dungeness River Watershed fecal coliform bacterial TMDL water quality effectiveness monitoring report.

Washington State Department of Ecology. 2008. Water quality assessments.

Washington State Department of Ecology. 2007. Report on implementation of the Dungeness Bay/Matriotti Creek clean water strategy and detailed implementation plan.

Washington State Department of Ecology. 2004. Clean water strategy for addressing bacteria pollution in Dungeness Bay and Watershed and water cleanup detailed implementation plan.

Washington State Department of Health. 2009. Annual growing area review: Jamestown Growing Area.

Washington State Office of Financial Management. 2010. 2010 Census Estimates: http://www.ofm.wa.gov/pop/census2010/default.asp.

Appendix B. Work Group Recommendations

BACKGROUND

Clallam County seeks to improve stormwater management in order to prevent flooding, improve water quality, and preserve aquatic habitat. Stormwater runoff occurs when rain (or snowmelt) flows off of land instead of percolating into the soil. Development typically causes increases in the amount of stormwater runoff, which in turn can cause flooding and impair stream habitat. Residents who direct water running off their roofs and driveways into roadside ditches can exacerbate flooding and road failure problems. Human activities also add pollutants to land surfaces, such as sediment from a logged forest or manure and fertilizers from farms and lawns. Stormwater runoff can pick up these materials and transport them into streams, rivers, and ocean waters, contributing to water quality problems.

Because of its rural nature, Clallam County has not been required to manage stormwater under state and federal standards, but that is expected to change in the future. Furthermore, stormwater runoff is expected to become more of an issue in Clallam County if recent patterns of development continue, converting forests and other natural areas to residences, roads, and stores. By developing a stormwater program now, the County hopes to protect the region's invaluable water resources and natural environment before impacts such as flooding and habitat damage worsen.

The County proposes a stormwater program which is specific to and appropriate for Clallam County issues and needs. To shape the program, the County has sought input from a wide range of individuals representing major interests in the county (a list of Work Group members is included on page ii). The Stormwater Work Group's recommendations for stormwater management are designed to achieve environmental protection while ensuring requirements are streamlined and reasonable.

The recommendations reflect the need for an incremental approach and therefore note actions that should be taken *immediately* (upon adoption of the Comprehensive Stormwater Management Plan by Clallam County), in the *near-term* (within two to five years of adoption) and in the *long-term* (within five to ten years of adoption).

WORK GROUP RECOMMENDATIONS

These recommendations were unanimously adopted at the March 31, 2011 meeting of the Clallam County Stormwater Work Group.

Guiding Principle

1. The Work Group recommends that Clallam County adopt a clear statement of principle for stormwater management. The Work Group recommends the following:

    - It is Clallam County's intent that stormwater should be managed by each property owner to ensure that stormwater from their property does no damage to public or private property, to public health, safety or welfare, or to water quality or aquatic habitat. Any new development or redevelopment within the county should include stormwater management so that there is no increase in stormwater run-off as a result of the development. *(Immediate)*

Public Education and Outreach

3. The Work Group recommends that the County develop and implement a public outreach plan to help change behavior impacting stormwater. *(Immediate)* Recommended goals for this outreach include the following:
    a. Residents understand the basic concepts of stormwater and the general impact of their actions.
    b. Residents are aware that roadside ditches are for conveying road runoff and not residential stormwater.
    c. Homeowner/builders understand and comply with stormwater management requirements.
    d. Residents use natural yard care practices that limit stormwater contamination.
    e. Livestock owners store manure in ways that limit stormwater contamination.
    f. Businesses properly operate and maintain their stormwater facilities.

4. The Work Group also recommends that the County provide education and assistance on specific aspects of stormwater management. These are addressed in more detail in recommendations below.

Development and Redevelopment

1. The Work Group recommends that the County adopt a clearing and grading ordinance. (Immediate) The clearing and grading ordinance should require the following temporary controls:
    - At all new and redevelopment sites, prevent erosion and discharge of sediment and other pollutants into receiving waters by implementing Temporary Erosion and Sediment Control (TESC) measures.
    - Obtain a clearing and grading permit and submit a TESC plan for activities that do any of the following:
        - Result in land disturbing[66] activity of 7,000 square feet or more.
        - Result in slopes over 25% and greater than 5 feet in height.
        - Impound water exceeding a volume of 1 acre-foot.
        - Result in the diversion of existing drainage courses.
        - Involve clearing and grading on slopes steeper than 30%.
        - Involve clearing and grading within the jurisdiction of the County's Critical Areas and Shoreline Master Program.
    - Sites that result in land disturbances of over 7,000 square feet but do not trigger any other of the above criteria are exempt from the Clearing and Grading Permit requirement if they can demonstrate to the County that no runoff will be produced.

2. The Work Group recommends that the County adopt updated requirements for drainage design and review. *(Immediate)* These requirements would vary by project size and project type as detailed below. All approved drainage plans should be subject to inspection and enforcement.

Tier One

Size Threshold: *Residential sites that require a building permit but generate less than 2,000 square feet of new or replaced impervious surface.*

[66] The definition of land disturbance will exempt gardening.

Submittal Requirement: *Applicants must complete a 1-page stormwater permit application that certifies the project will not exceed the size threshold, and attach a drainage plan that addresses how the design standards will be implemented.*

Design Standards: *All new, replaced, and disturbed topsoil must be amended with organic matter. All sites must implement TESC Best Management Practices (BMPs) to prevent erosion from the site during construction. Roof runoff must be managed by being routed to a drywell or, if a dry well is not appropriate for site conditions, it must be routed to alternative BMPs from the list below (c-g) . In addition, the following permanent stormwater BMPs are strongly encouraged as appropriate and feasible:*

a. *Retain and plant new trees.*
b. *Retain native vegetation and preserve existing topsoil.*
c. *Disperse runoff to vegetated areas.*
d. *Install rain gardens/bioretention.*
e. *Implement rainwater collection.*
f. *Install permeable pavement.*
g. *Install infiltration systems: trenches and drywells.*

Tier Two

Size Threshold: *Size Threshold: All single family residences which generate more than 2000 square feet of new or replaced impervious surfaces. Other residential development which generates 2,000 to 5,000 square feet of new or replaced impervious surface or cause land disturbance of 7,000 or more square feet. All commercial projects smaller than 5,000 square feet that do not use hazardous substances*[67]*.*

Submittal Requirement: *Applicants must submit a drainage plan in accordance with the Small Project Drainage Manual.*

Design Standards: *Projects must meet the following minimum requirements:*

a. *Preparation of a drainage plan, which describes how the following four items (b-e) will be met.*
b. *Prevention of pollution from construction sites.*
c. *Source control of pollution.*
d. *Preservation of natural drainage systems and outfalls.*
e. *On-site stormwater management controls, to be sized and designed in accordance with the Small Project Drainage Manual.*

Tier Three

Size threshold: *All industrial development; commercial and residential development which generates more new or replaced impervious surface than is allowed in Tier 2, converts three-quarters acre or more of native vegetation to lawn or landscaped areas, or converts 2.5 acres or more of native vegetation to pasture; and all commercial projects that use hazardous substances.*

[67] Hazardous substances will be defined in the stormwater code.

Submittal Requirement: *Applicants must submit a stormwater site plan in accordance with specifications set forth by the County (e.g., a stormwater manual adopted by the County).*

Design Standards: *Projects must meet the following minimum requirements* ***as applicable.*** *For guidance on meeting these requirements, applicants will rely on a stormwater manual (to be selected by the County).*

a. Preparation of stormwater site plans
b. Prevention of pollution from construction sites
c. Source control of pollution
d. Preservation of natural drainage systems and outfalls
e. On-site stormwater management
f. Runoff treatment
g. Flow control
h. Wetlands protection
i. Operation and maintenance

3. The Work Group recommends the County encourage and provide additional incentives for expanded Low Impact Development Techniques. *(Ongoing/Long-term)*

4. The Work Group recommends that the Small Project Drainage Manual be adopted by the County and applied to applications for projects that fall in the Tier 2 category for development and redevelopment (see above). The draft manual should be revised based on comments from the Public Works Department and from consultants prior to adoption. The Work Group also recommends that adequate staff resources be provided to the Public Works Department to implement the Small Project Drainage Manual. *(Immediate)*

5. The Work Group recommends that in areas outside of Urban Growth Areas, Clallam County require or incentivize cluster development designed to include open space that retains native vegetation and undisturbed soils. This open space should be planned to form a countywide network of corridors. The purpose of this policy is to help avoid stormwater impacts, protect habitat corridors and other natural features, and maintain the hydrologic function of the natural landscape. *(Immediate)*

6. The Work Group recommends that Clallam County take action to reduce development pressures and related stormwater impacts in rural areas by consolidating future development within existing Urban Growth Areas and LAMIRDs, retaining or increasing current density levels as needed, and working with cities to enable increases in density levels. *(Immediate)*

Illicit discharge

1. The Work Group recommends that the County adopt an illicit discharge ordinance that prohibits illicit discharge to the stormwater conveyance system, including to roadside ditches. The ordinance should include clear and precise definitions of “illicit discharges”, “stormwater drainage system”, and “stormwater discharge”. *(Immediate)*

2. The Work Group also recommends that the County develop a strategy to enforce the illicit discharge code and provide training to staff to identify potentially illicit discharges while in the field. (*Near-term*) The County should also conduct outreach to the general public on what an illicit discharge is and what to do if one is suspected. *(Immediate)* The County should consider partnering with the Cities of Sequim,

Forks, and Port Angeles, as well as with regional agencies such as tribes or Olympic National Park, on an illicit discharge hotline and website for streamlined reporting throughout the County. *(Near-term)*

Source Control/Pollution Prevention

1. The Work Group recommends that Clallam County continue their monthly review of current practices at County-owned facilities and in standard operations to consider opportunities to implement additional pollution prevention and good housekeeping BMPs that protect both surface and ground water quality. New practices, technologies and strategies should be incorporated into the County's practices as appropriate. *(Immediate/On-going)*

2. The Work Group recommends that Clallam County continue to maintain an up-to-date inventory of all county-owned or operated stormwater facilities. *(Immediate/Ongoing)* The Work Group also recommends that the County conduct an inventory of outfalls as funding allows. *(Near-term)*

3. The Work Group recommends that the County prepare a written plan describing current practices for inspection and maintenance of County-owned or operated facilities as well as post-storm spot checks of the stormwater system. If applicable, the plan should note any issues or concerns with current practices and recommend revisions. *(Near-term)*

Long-Term Compliance

1. The Work Group recommends that the County require that stormwater maintenance requirements are attached to the property title to ensure that they are not eliminated when the property is sold. *(Near-term)*

2. The Work Group recommends that any time a drainage plan is required it should reflect all impervious surfaces on the parcel. Although stormwater management will generally only be required for the new development or redevelopment site itself, the County should encourage applicants to voluntarily address stormwater management on the entire parcel. In cases where stormwater runoff from the existing site has been shown to cause harm to public or private property; to public health, safety or welfare; or to water quality or aquatic habitat; the Work Group recommends that the County require retrofits of the existing development as part of the drainage plan. *(Near-term)*

3. The Work Group recommends that whenever a property is sold that has an approved Tier 2 or Tier 3 drainage plan, an inspection will be required to ensure that the drainage system is functioning in accordance with the approved drainage plan. *(Near-term)*

4. The Work Group recommends that the County prohibit intentional discharges into County roadside ditches. Intentional discharges include constructing a drainage system that diverts stormwater from a parcel into a ditch. The Work Group also recommends that the County prohibit the filling of roadside ditches. *(Immediate)*

5. The Work Group recommends that the County adopt provisions requiring the ongoing maintenance and repair of required drainage facilities and systems. The provisions should include requiring a maintenance covenant for privately maintained drainage facilities and should authorize County inspections of privately maintained storm water facilities, including right of entry. *(Near-term)*

Sub-Basin Assessments

1. The Work Group recommends that Clallam County, in partnership with affected cities, seek grant funds to assess prioritized sub-basins in the County. The assessments should 1) evaluate available information to determine specific resource protection actions needed in the sub-basin, and 2) assess stormwater management actions and requirements to address those resource protection needs. The final assessments should recommend improvements in stormwater management activities such as basin-specific incentive programs, tailored stormwater program activities (i.e. targeted restoration, public outreach, etc.), and revised regulatory requirements. *(Near-term/Long-term)*

Funding

1. The Work Group recommends that Clallam County establish sustainable financing to fund implementation activities within the Comprehensive Stormwater Management Plan and other activities related to clean water in Clallam County, which may include implementation of the County's On-Site Septic (OSS) Management Plan. Funds should be used for incentives; public awareness, outreach and education; monitoring; training; compliance; and matching funds for grants. The Work Group recommends that the County consider a variety of financing options, including the establishment of a utility or district that spreads the costs to property owners throughout unincorporated Clallam County and is collected via the property tax collection system. All revenues collected should be dedicated to clean water programs and activities, and should not contribute to the general fund. The County should continue to collect appropriate permit fees to cover the costs of permit processing. The County should also seek grants to fund short-term expenses. *(Immediate/Near-term)*

Stormwater Monitoring

1. The Work Group recommends that Clallam County maintain a comprehensive stormwater monitoring program that collects and analyzes stormwater quality and quantity data throughout Clallam County. In order to track trends in watershed health over time, data analyses should include modeling such as the GIS tool "Nonpoint-Source Pollution and Erosion Comparison Tool" (N-SPECT) .

CLALLAM COUNTY STORMWATER WORK GROUP MEMBERS

NAME	AFFILIATION	NAME	AFFILIATION
Matt Beirne	Lower Elwha Klallam Tribe	Mike Kitz	Clallam Public Utility District
Michael Blanton	Washington Dept. of Fish & Wildlife	Bob Lynette	Protect the Peninsula's Future
Carole Boardman	League of Women Voters	Lyn Muench	East Clallam County citizens
John Cambalik	Puget Sound Partnership	Bill Noel	Makah Tribe
Carol Creasey	Clallam County Dept. of Community Development (DCD)	Terri Partch	City of Port Angeles
Garret DelaBarre	BuiltGreen Clallam County	Derek Rockett	Washington Dept. of Ecology
Gary Dougherty	Clallam Conservation District	Ann Soule	Clallam County Environmental Health
Bruce Emery	Green Crow	Ross Tyler	Clallam County Public Works
David Garlington	Washington Dept. of Transportation	Jesse Waknitz	Port of Port Angeles
Steve Gilchrist	Landscapes Northwest	Roger Wheeler	RJ Services (Excavating)
Paul Haines	Sequim Public Works	Pat Willits	Central Clallam County citizens
Hansi Hals	Jamestown S'Klallam Tribe	Dave Zellar	City of Forks
Danny Hinchan	Quileute Tribe	Steve Zenovic	North Peninsula Builders Association

Appendix C. Actions under the Clean Water Strategy and Detailed Implementation Plan for the Dungeness Bay and Dungeness River/Matriotti Creek TMDLs

The Clean Water Strategy /DIP identifies the following action items needed to meet TMDL requirements, protect public health, restore and maintain water quality, and re-open closed shellfish beds in Dungeness Bay.[68]

Human Waste/Septic Systems

- Expand the septic Operations and Maintenance (O&M) program to include more types of systems and a risk-based management plan.
- Implement an assessment and monitoring program that includes inspections of identified Septics of Concern (SOC) with dye testing as necessary and tracks the follow-up actions for SOCs.
- Establish stable funding sources for the septic O&M program, described above.
- Identify (and distribute) funding to provide cost-share incentives for SOC inspections/corrections.
- Continue River's End buy-out and conservation easements.
- Convert on-site to sewer or community systems where appropriate (Three Crab/Golden Sands area, Carlsborg UGA).
- Septic 101 (basic septic maintenance class) and individual owner education.

Stormwater

- Signs on street drains and ditches about pollution effects.
- Provide treatment for ditch tail waters.
- Continue piping of irrigation ditches, using Clallam Conservation District's prioritization of ditches based on bacterial monitoring.
- Outreach to residents living along irrigation and roadside ditches.
- Develop/implement a Sub-Basin Stormwater Management Plan for the Marine Drive and Three Crabs area that includes recommendations for capital facilities, retrofits, standards for new development, and basic BMPs based on soil characteristics, topography, and development patterns.
- Develop a Small Project Stormwater Management Manual.
- Investigate BMPs for stormwater management specific to local conditions; compile them in a publication.
- Consider comprehensive stormwater planning for sub-areas within the Clean Water District.

Domestic Animals/Pet Waste

- Distribute information about proper pet waste management, through written (i.e., brochures, advertisements) and verbal (i.e., presentations, workshops) means.
- Establish pet waste stations in areas with high pet use next to surface water.

Livestock Waste

- Outreach regarding livestock and water quality impacts (through newsletters, workshops, presentations, etc.)
- Develop individual conservation plans and implement BMPs.
- Ecology enforcement.

Monitoring

- Develop overall freshwater monitoring strategy that includes wet season/storm events/ditches (modify based on research) and continues source identification as well as initiates effectiveness monitoring.

[68] Streeter and Hempleman, 2004.

- Implement freshwater quality monitoring and BMP effectiveness monitoring.
- Continue marine monitoring in Dungeness Bay.
- Perform data analysis of Dungeness area freshwater monitoring on a semi-annual or annual basis.
- Continue Streamkeeper monitoring of bacteria and baseline monitoring of streams.

Research 105

- Conduct Microbial Source Tracking study in both freshwater and marine water.
- Conduct further bay research (including basic ecological studies, nutrients and FC assessments, and wildlife usage).
- Conduct analysis of impervious surfaces using fieldwork/LIDAR/aerial photos/remote sensing.
- Conduct GIS analysis to map fecal and nutrient spatial and temporal trends.
- Conduct comprehensive water quality studies to determine feasible remediation measures in the Meadowbrook/Cooper sub-basins and other targeted sub-basins.

Regulatory and Policy

- Approve and implement a comprehensive stormwater ordinance OR request stormwater sensitive area.
- Provide maps and information on sensitive areas (shellfish beds, ESA listed critical area) to county decision-makers.
- Provide information on low impact approaches to stormwater management in the permitting information packet.
- Conduct a comprehensive review of ordinances and make changes to encourage low impact development, and also look for disincentives in the county's permits and associated fees.

General outreach

- Public workshops.
- Clean Water Herald or newspaper alternative.
- Sequim 7th grade field trip.
- Presentations to local community groups.
- Booths, fairs, and festivals.
- Permanent displays at River Center.

Appendix D. Questionnaire sent to County staff

In June 2010, the following questionnaire was sent to selected staff in Clallam County Department of Community Development (DCD), Road Department, Environmental Health, and Parks, Fair, and Facilities. The Clallam County DCD project manager identified staff to respond to the questionnaire, circulated the questionnaire, and compiled responses for the consultant team.

Clallam County Stormwater Management Comprehensive Plan Questionnaire

Please provide complete responses to the questions below using colored text or track changes. Focus on the areas in the County where the stormwater plan would apply. More detail is better. Where applicable, please identify the relevant references, such as brochures, County Code, or WRIA related documents. If multiple people contribute to responses, please identify who provided responses.

OVERALL PURPOSE OF THE PLAN

1. How does the County intend to use this plan?
2. Which staff from the County will use this plan?
3. What elements of the current stormwater program/approach work well?
4. What elements don't work well, and what changes are recommended?
5. What are the County's top priorities/problems for stormwater management?

PUBLIC EDUCATION AND OUTREACH

6. Does the County currently conduct any stormwater education and outreach?
7. Does the County do any of the following:
    a. Distribute educational brochures?
    b. Stencil storm drains? If so, how many?
    c. Provide water quality educational materials to school districts?
    d. Teach stormwater concepts in schools?
    e. Provide water quality educational materials when requested?
    f. Collaborate with volunteer organizations on education projects? (Which ones?)
    g. Host stormwater discussions (outside of the Work Group)?
    h. Issue stormwater public service announcements or news releases? What media?
    i. Display stormwater exhibits at community locations?
    j. Use an educational booth at public events or festivals?

8. Which County departments have performed public education or assistance in the past? Could the same format be used for stormwater?

PUBLIC INVOLVEMENT AND PARTICIPATION

9. Has the County held public meetings on stormwater issues in the past 5-10 years (if so, please list them)?

10. Outside of the stormwater Work Group, are there other established stakeholder groups that County officials consult with regarding stormwater (if so, please list them)?

11. Does the County have a system (e.g., phone number, website) for the public to log general stormwater related complaints (e.g., drainage problems, construction site runoff)? How is the system advertised? How does the County respond to calls from the public?

POLLUTANT SOURCE CONTROL

12. What are the County's priorities for water quality and resource protection (what resources or water bodies)?

13. What do you perceive as the biggest threats to stormwater quality (e.g., runoff from agriculture, pollutants from roadways, sediment from construction sites)?

14. Which of these threats to stormwater quality affect geographic areas with significant natural resource issues (e.g., critical areas, endangered species, water bodies listed above)?

ILLICIT DISCHARGE ELIMINATION

15. Does the County have interest in revising the code to prohibit non-stormwater discharges to the storm sewer?

16. Has the County ever taken enforcement action against a citizen for non-stormwater discharge to the storm drain system?

17. Have there been known or suspected illicit discharges in the County? How were they identified? Has the County taken any action against these offenders?

SPILL RESPONSE

18. Does the County have a spill response plan for public facilities and the storm drain system?

19. Does the County keeps records of historic spills?

CONTROLLING RUNOFF FROM NEW DEVELOPMENT, REDEVELOPMENT AND CONSTRUCTION SITES

20. What type and quantity of development has occurred in Clallam County over the last 10 years (the more detail the better)?

21. What type of development is expected in the next 10 years?

22. What design guidelines do Engineers in the County currently use? (Anything besides the 1992 Washington State Department of Ecology Stormwater Management Manual for the Puget Sound Basin?)

23. How do stormwater designers know which manual to use in Clallam County?

24. If designers do not use a manual, what other design guidelines do they use?

25. Is the County interested in adopting newer and more stringent stormwater requirements? (e.g., Washington Department of Ecology Stormwater Management Manual for Western Washington, 2005).

26. How does the County verify facility performance during plan review (e.g., modeling, calculations, professional judgment)?

27. Are erosion control measures usually implemented correctly?

28. Does the County ensure that maintenance is performed on private stormwater facilities (e.g., stormwater ponds/vaults for housing developments or parking lots)? If so, how is that accomplished (e.g., code, maintenance covenants, plat documents)?

29. Is lack of facility maintenance viewed as a major problem that contributes to flooding and poor water quality in the County?

POLLUTION PREVENTION (SOURCE CONTROL) AND OPERATIONS AND MAINTENANCE FOR MUNICIPAL FACILITIES

30. Does the County maintain an up-to-date list of stormwater facilities (e.g., catch basins, manholes, pipes, detention facilities, water quality BMPs, ditches, streams) in a database or GIS that can be shared and incorporated into stormwater plan figures?

31. Does the County maintain a list of maintenance problem locations (e.g., places that Road Department staff check on during and/or following major storms)?

32. How often do Road Department staff check on these locations?

33. Are stormwater facilities (e.g., ponds, vaults, pipes) ever inspected? Are records kept?

34. How many full time equivalent personnel are currently required to meet County storm drainage system maintenance needs?

35. How much is spent on contractors and equipment to maintain the system?

36. Does the County operate any facilities that could generate pollution (e.g., fleet vehicle yards, maintenance shops, parking garages)? What pollutant generating activities occur at these facilities (e.g., stockpiling, vehicle maintenance, vehicle washing)?

37. Do street and stormwater maintenance staff adhere to any BMPs or guidelines (e.g., perform vehicle maintenance indoors, wash vehicles at a commercial carwash facility, cover material stockpiles) to prevent pollution of the stormwater system? Which ones?

38. Does the County perform street sweeping? Where? How often?

POLLUTION PREVENTION (SOURCE CONTROL) AND OPERATIONS AND MAINTENANCE FOR COUNTY FACILITIES

39. What land uses and industries are viewed as priority sources of stormwater pollution in Clallam County (e.g., commercial composting, animal boarding, concentrated animal feeding, other agriculture, lumber/timber, auto wrecking yards, boat building, other)?

40. Could you provide examples of farmland management plans with good pollutant control sections for review?

41. Could you share any local documents, studies, or anecdotal evidence that indicates farmland as a source of stormwater pollutants?

CAPITAL IMPROVEMENT PROJECTS

42. Does the County maintain a list of stormwater related capital improvement project needs?

43. What projects are needed that are not addressed in this list? What problems will they solve?

44. Does the County have any locations in mind for retrofit or pilot project installations of stormwater treatment BMPs (LID or traditional)?

45. Does the County have any locations in mind for installation of "regional" stormwater facilities that would address flow control or water quality issues from existing or future development?

PROGRAM STAFFING AND FUNDING

46. How much County or contract staff time is allocated to stormwater management, including stormwater design plan review?

47. How much County or contract staff time is currently allocated to operation and maintenance of the stormwater system?

48. Which of the following funding sources are currently used to fund stormwater management program activities? (Stormwater utility, grants, loans, development review (permit) fees, revenue bonds for CIP projects, fee in-lieu of on-site stormwater control (to pay for regional stormwater facilities), general fund, special purpose/local improvement district(s), drainage or flood control zone district(s), system development charges, intergovernmental coordination/leveraging, other)

WELLHEAD PROTECTION

49. Is water table drawdown a concern? Are there data to support this?

50. Are there any known sources of wellhead contamination?

51. Are there any known stormwater facilities (i.e. ponds, trenches, or dry wells that could be potential pollutant sources) near drinking water wells?

ENDANGERED SPECIES ACT (ESA)

52. Does the County assess stormwater impacts on listed species when making land use decisions?

53. Do ESA issues seem to be a major concern to stakeholder groups?

54. What challenges do ESA considerations create for stormwater management in Clallam County?

55. Does the County coordinate its ESA compliance strategy with other agencies (e.g., neighboring counties, neighboring cities, WDFW)?

OTHER ENVIRONMENTAL RESOURCES

56. What are other environmental resources of concern in Clallam County that should be mentioned in the stormwater plan (e.g., shellfish)?

57. How does/can stormwater affect these resources?

MAPPING

58. Does Clallam County have GIS map that includes basin boundaries for all the drainage basins?

59. Does Clallam County have a GIS map of the stormwater system (pipes and ditches)?

Appendix E. Clallam County Stormwater Public Outreach Plan

This plan may be accessed at http://www.clallam.net/LandUse/stormwater.html

Appendix F. Sample Drainage Facility Maintenance Covenant

Return Address:
Clallam County Department of Community Development
223 E. 4th St., Suite 5
Port Angeles, WA 98362
Reference #: _____

Drainage Facility Maintenance Covenant

Grantor(s) hereinafter referred to as **Grantor:**

1.

2.

3.

Grantee: Clallam County, hereinafter referred to as **County,** a Political Subdivision under the Laws of the State of Washington.

Legal Description of property encumbered by covenant**:**
Abbreviated:
(if applicable, insert lot, Block, Plat Name), and/or as described in Exhibit(s) " " *(typically Exhibit A).*

Located in *qtr./ qtr*. Sec. Twp. N., Rge. E., W.M.

Reference Number(s) of documents assigned, released, or modified:

Assessor's Parcel Number (APN) of property(s) encumbered by the drainage covenant:

Grantor has a record interest in the property identified by this covenant and agrees that the obligations of Grantor shall be binding upon the heirs, successors, and assigns. Grantor agrees that this covenant involves the land described in the attached legal description and shall run with the land.

Grantor by execution of this covenant acknowledges that the benefits of this covenant include, downstream property owners and the general public. The County as third-party beneficiary of this covenant has the right, but not the obligation, to enforce this covenant on behalf of downstream property owners and the general public. The County requires this covenant to protect private and public property, private and public drainage infrastructure, and natural resources of downstream property owners and the general public.

Grantor in consideration of the approval of County development permit No. _____, relating to the real property described in the attached legal description hereby acknowledges that regular maintenance shall be performed on the drainage facilities installed, or to be installed, upon Grantor's property. As applicable, the system shall include the stormwater conveyance system pipes, ditches, swales, and catch basins; stormwater flow regulation system detention ponds, vaults, pipes, retention ponds, flow regulation and control structures; infiltration systems and water quality control system.

The scope of this covenant and right of entry shall be adequate to provide for the access, inspection, and maintenance of the stormwater drainage system, and shall be subject to the following terms and conditions:

1. The County shall have the perpetual right of entry, pursuant to Title 20, Clallam County Code, across adjacent lands of the Grantor for purposes of inspecting, auditing, or conducting required maintenance of the drainage facility.

2. If County inspection determines that maintenance is not being performed, the County shall endeavor to provide Grantor reasonable advance notification of the need to perform the maintenance and a reasonable opportunity for the Grantor to perform it. In the event that Grantor fails to complete the required maintenance within a reasonable time period, the County shall have the right to perform or contract with others to perform it at the sole expense of the Grantor. If the County in its sole discretion determines that an imminent or present danger exists, required maintenance and/or repair may begin immediately at Grantor's expense without prior notice to Grantor. In such event, the County shall provide Grantor with a written statement and accounting of all work performed and the fees, charges, and expenses incurred in making such repairs. Grantor shall agree to reimburse the County or pay the County's vendors directly for all reasonable fees, charges, and expenses identified in the County's statement.

3. If the County is required to act as a result of Grantor's failure to comply with this covenant, the County may remove any obstructions and/or interferences that in the sole opinion of the County impair the operation of the drainage facility or the maintenance thereof. Grantor agrees to hold the County, its officers, employees, and agents harmless from any and all claims, actions, suits, liability, loss, expenses, damages and judgments of any nature whatsoever, including costs and attorney's fees, incurred by the removal of vegetation or physical interference from the drainage facility.

4. Grantor covenants that the owners of the property described herein are the person or persons identified on page 1 of this covenant as Grantors, that they have the right to grant this covenant on the property, and that the title to the property is free and clear of any encumbrances which would interfere with the ability to grant this covenant.

Executed this _____ day of _____

Grantors:

Signature(s): _____ _____

Printed
Name(s): _____ _____

Title of Authorized Representative(s):
(if signing on behalf of a corporation)

_____ _____

Drainage Facility Maintenance Covenant
APN_____

Additional Signatures (if needed)

_____

_____

Note: Signature(s) of Grantor(s) must be acknowledged by appropriate Notary

Accepted and approved
For Clallam County:

_____ Date:_____
Director
Clallam County
Department of Community
Development

CONSENT TO AND APPROVAL OF
DRAINAGE MAINTENANCE COVENANT

_____ *(lender)*, the current Beneficiary of a Deed of

Trust recorded under APN _____, records of Clallam County, which deed of trust encumbers the real estate described in the attached legal description of the attached Drainage Maintenance Covenant, does hereby consent to the establishment of said covenant.

Signed:_____

Title: _____

Date: _____

REPRESENTATIVE ACKNOWLEDGMENT

STATE OF WASHINGTON)
) ss
COUNTY OF CLALLAM)

I certify that I know or have satisfactory evidence that
_____ is the person who appeared before me, and said person acknowledged that (he/she/they) signed this instrument , on oath stated that (he/she/they) was/were authorized to execute the instrument and acknowledged it as the
_____ of _____
to be the free and voluntary act of such party for the uses and purposes mentioned in the instrument.

Dated: _____

Signature: _____

(print name) _____

(Seal or stamp)

NOTARY PUBLIC IN AND FOR THE STATE OF WASHINGTON

My appointment expires _____

INDIVIDUAL ACKNOWLEDGMENT

STATE OF WASHINGTON)
) ss
COUNTY OF SNOHOMISH)

I certify that I know or have satisfactory evidence that _____is/are the person(s) who appeared before me, and said person(s) acknowledged that (he/she/they) signed this instrument and acknowledged it to be (his/her/their) free and voluntary act for the uses and purposes mentioned in the instrument.

Dated: _____

Signature: _____

(print name) _____

(Seal or stamp)

NOTARY PUBLIC IN AND FOR THE STATE OF WASHINGTON
My appointment expires _____

_____

REPRESENTATIVE ACKNOWLEDGMENT

STATE OF WASHINGTON)
) ss
COUNTY OF SNOHOMISH)

I certify that I know or have satisfactory evidence that _____ is the person who appeared before me, and said person acknowledged that (he/she/they) signed this instrument , on oath stated that (he/she/they) was/were authorized to execute the instrument and acknowledged it as the _____ of _____
to be the free and voluntary act of such party for the uses and purposes mentioned in the instrument.
Dated: _____

Signature: _____
(print name) _____

(Seal or stamp)

NOTARY PUBLIC IN AND FOR THE STATE OF WASHINGTON

My appointment expires _____