



5-Year Plan (2018 to 2023) Resource Inventory Clallam Conservation District

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GENERAL INFORMATION

Clallam County consists of 1,738 square miles (1,112,960 acres) along the northern portion of the Olympic Peninsula. Average annual precipitation ranges from a low of 17 inches at Sequim to over ten feet near Forks. According to census data, the population of Clallam County in 2016 was estimated to be 74,570, with approximately 59% of the population living in unincorporated areas. The population grew by 3,166 (4.4%) since 2010, with almost all the growth in the eastern third of the county. An unusually high percentage (compared to other counties) of the population is employed in the agriculture/forestry/ fishing/hunting sector at 3.5 percent. The median age is 49. Forty-five percent of the population is over age 55, more than one in four persons being over 65.

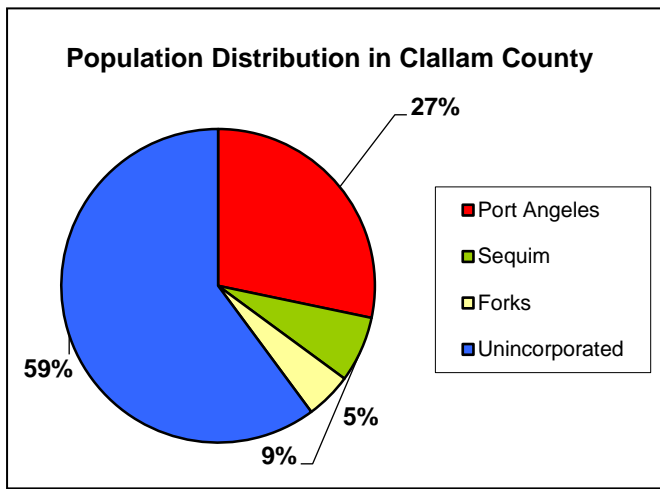


Urban Land Areas in Clallam County*

Unit	Square Miles
Total County	1,762
Port Angeles + UGA	18.18
Sequim + UGA	8.24
Forks + UGA	7.7
Other UGAs	3.61
Unincorporated Area	1,724

Population Distribution of Clallam County

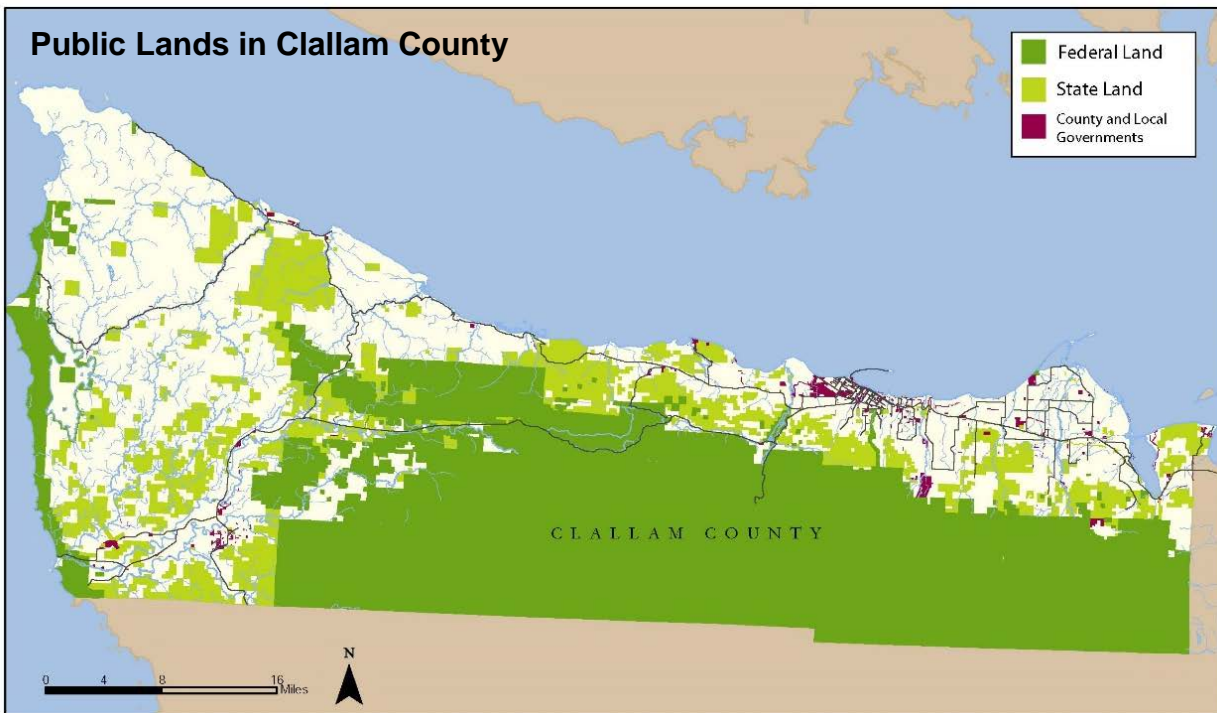
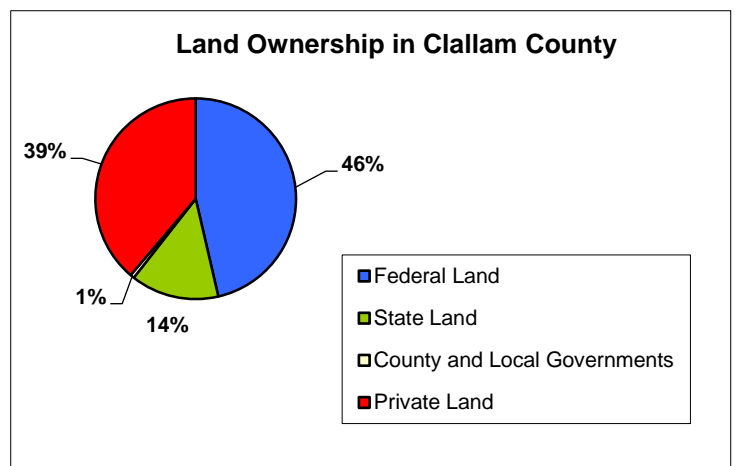
Unit	Population	% County Population
Port Angeles	19,833	27%
Sequim	6,964	9%
Forks	3,783	5%
Unincorporated	43,990	59%



Land Ownership in Clallam County

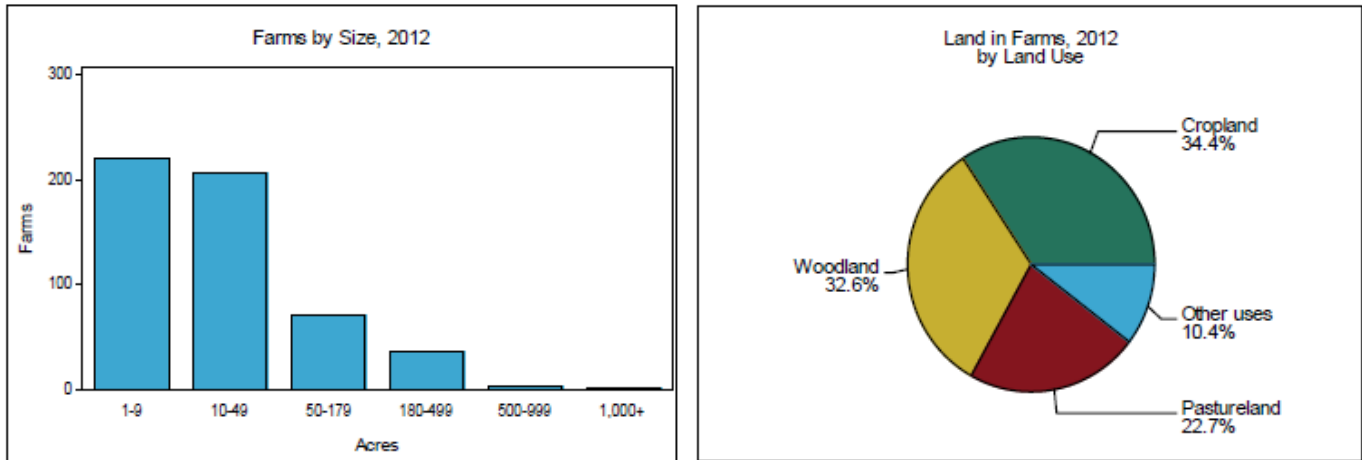
Public land makes up approximately 61% of Clallam County.

Ownership	Acres
Federal Land	523,496
ONP	318,093
ONF	199,209
Other Federal Land	6,194
State Land	160,377
State Forest Board and DNR Lands	154,530
State Parks	2,488
Other	3,359
County and Local Governments	7,350
Total County Land	3,817
County Parks	643
Port of Port Angeles	858
School Districts	344
Other (cities and special districts)	2,331
Private Lands	437,602



Agriculture in Clallam County

According to the USDA Census of Agriculture (https://www.agcensus.usda.gov/Publications/2012/Online_Resources/County_Profiles/Washington/cp53009.pdf), the number of farms in Clallam County in 2012 was 536, a five percent increase from 2007 and 18 percent increase from 2002. Only 21 of these farms reported annual sales of \$100,000, and average net farm income was -\$6,003. Clallam is one of seven counties in Washington to report negative net income. The total market value of products sold decreased by one percent from 2007 to \$10,648,000, and the per farm average decreased six percent to \$19,865.



Clallam County Farms by Size and Land in Farms, 2012. Source: US Census of Agriculture.

The total acreage of farmland in 2012 was 23,640, up four percent from 2007 and six percent from 2002. The average farm size decreased from 45 acres in 2007 to 44 acres (49 acres in 2002). Forty-six percent of farm operators listed farming as their primary occupation, increase from 41 percent in 2007. The average farmer age reported increased from 59.2 years to 62.1.

Clallam County ranks 32nd out of 39 counties in Washington for total value of agricultural products sold. The highest ranked commodity is aquaculture at 15th statewide, followed by vegetables at number 18, nursery/greenhouse/ floriculture at number 19 and milk from cows at 20th. The main agricultural products reported in order of value are as follows:

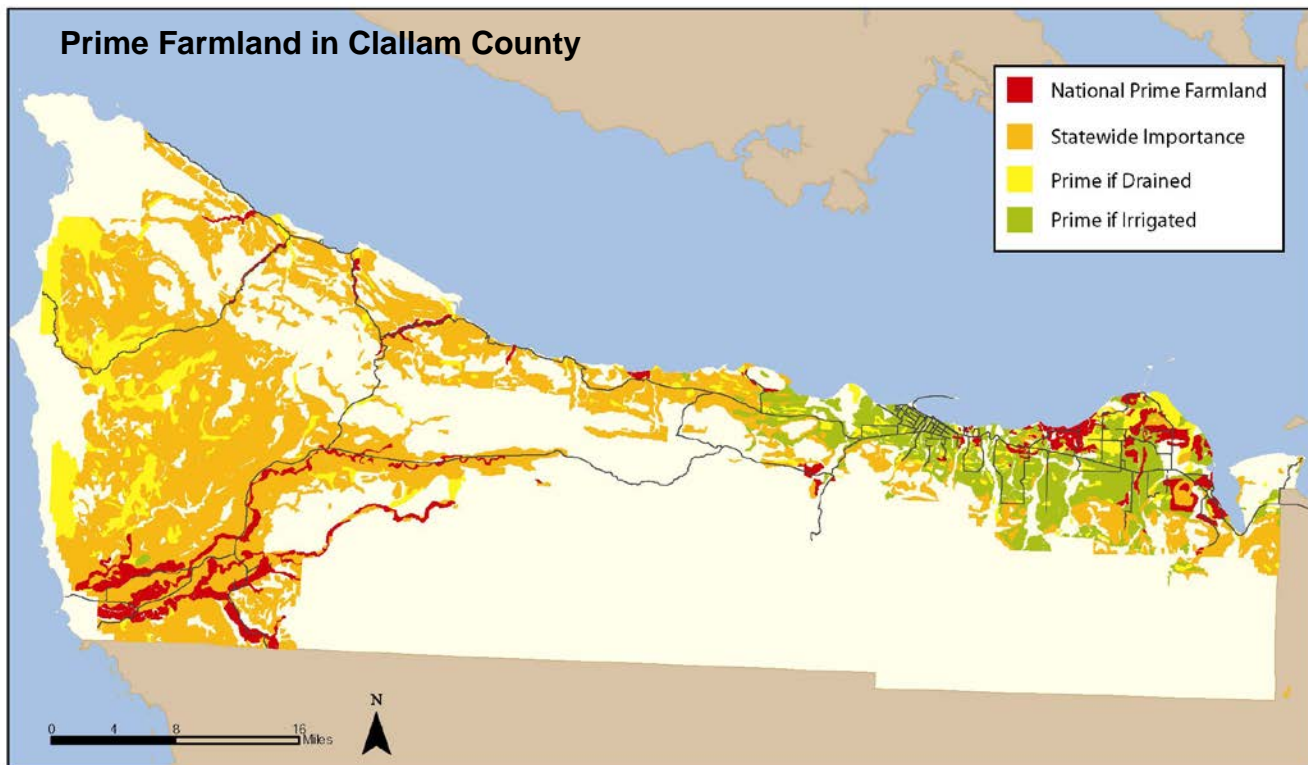
1. Aquaculture (\$2,331,000)
2. Vegetables (\$1,421,000)
3. Nursery, greenhouse, floriculture (\$867,000)
4. Other crops and hay (\$649,000)

Note that due to the small number of operations, data for Cattle and Calves and Dairy were withheld to avoid disclosing data for individual operations. Forage crops make up nearly 90 percent of the farmland.

Although farm acreage has increased over the past decade, the county continues to experience conversion of farmland to residential use. Larger commercial farms tend to get replaced by smaller non-commercial farms – primarily horse operations. Small horse farms account for the majority of the farm conservation plans the Conservation District has produced in recent years.

A total of 32,961 acres of prime farmland and 250,455 acres of farmland of statewide importance are mapped in the *Soil Survey for Clallam County Area, Washington* (<http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>). The map below shows the location of these

farmland soils. A majority of these acres are in the western portion of the county; however, due to high precipitation and the remoteness of the area, there is very little commercial agriculture in this area. Most of these lands are in commercial forestry.



Most commercial agriculture occurs in the Dungeness Valley where roughly 5,000 acres of farmland is irrigated. The vast majority of this farmland is supplied with irrigation water from the Dungeness River through an irrigation water delivery system operated by four irrigation districts and three private irrigation companies. The seven entities are collectively organized under the Dungeness Agricultural Water Users Association.

Farm Inventory and Agricultural Assistance

Farms in Clallam County were last inventoried in 2006. The primary purpose of the inventory was to assess potential agricultural impacts to water quality. Aerial photographs and GIS parcel data were reviewed to determine likely farm locations and the presence of water bodies, and then a field inventory was conducted by vehicle from public and some private roads. The inventory included observations of the following:

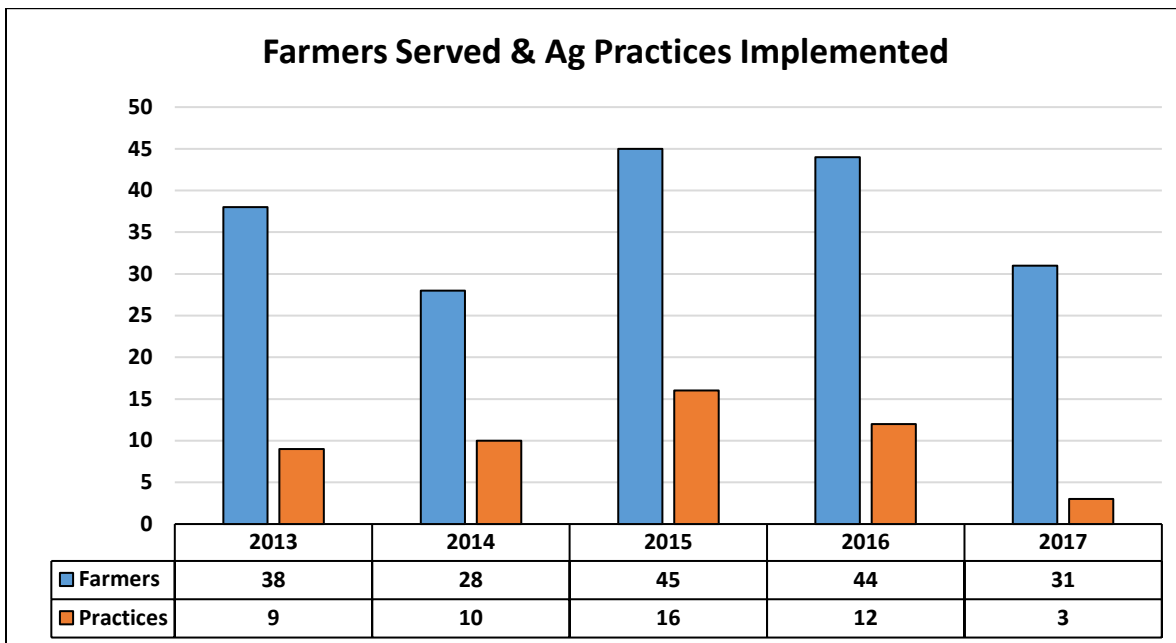
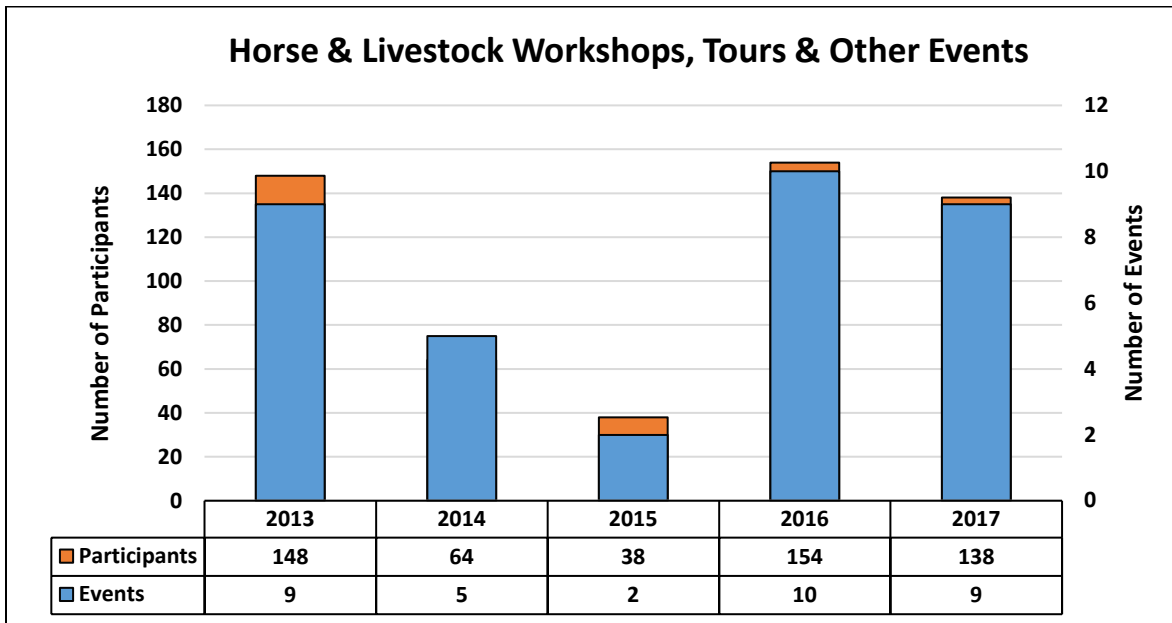
- horse and livestock access to water bodies,
- pasture condition,
- heavy use areas,
- manure storage.

Farms with horses or livestock with access to water bodies, heavily impacted confinement areas or severely overgrazed pastures, or manure stored near water bodies were given a ranking of medium or high potential to adversely impact water quality. All medium and high ranked farms were classified as high priority for outreach efforts.

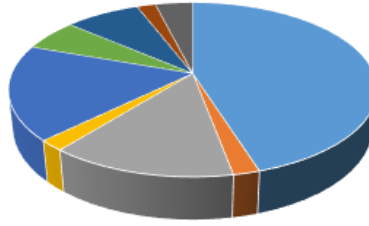
A total of 1,252 farms were inventoried and 117 were classified as high priority farms. The table below shows the geographic distribution of high priority farms and their status as of 2012.

AREA	ORIGINAL	REMOVED	REMAINING
Clean Water District	45	26	19
Port Angeles Area	41	11	30
West of Elwha	31	2	29
TOTALS	117	39	78

Workshops on land and water management for livestock owners were initially held throughout the county and invitations were mailed to all the high priority farms. High priority farm operators did not respond as well as we had hoped to workshop invitations. Typically, very few high priority farms have participated in workshops; however, high priority farm participation has improved in recent years. Over the past five years, efforts have concentrated on general agricultural outreach and education in the Clean Water District and high priority farms have not received focused attention. The charts below show the results of agricultural outreach efforts over the past five years. Note that the 2017 data are incomplete.



Agricultural BMPs Implemented



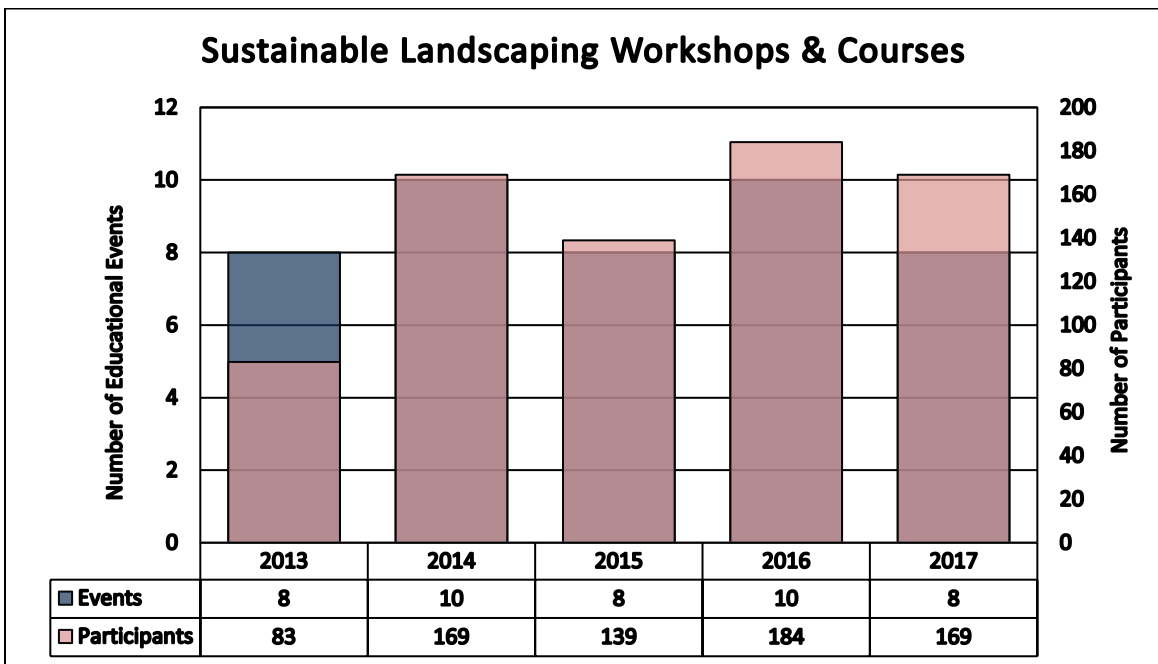
- Heavy Use Area Protection - 23
- Waste Storage Structure - 7
- Pasture Management - 9*
- Roof Runoff System - 4
- Exclusion Fencing - 2
- Hay Planting - 1
- Livestock Crossing - 1
- Nutrient Management - 3*
- Irrigation Water Management - 1*

**Denotes management practices, which were recorded only once during the previous five-year period.*

Sustainable Landscaping

Clallam Conservation District has been promoting sustainable landscaping practices since 1990. Minimal water usage, habitat enhancement, stormwater management, firewise landscaping, and low maintenance are the themes that are promoted. Various educational events, including workshops, presentations and a six-session course are offered annually, typically in both spring and fall. The vast majority of participants are newcomers to Clallam County. The chart below shows number of sustainable landscaping events and participants over the past five years. Note that the 2017 data are incomplete.

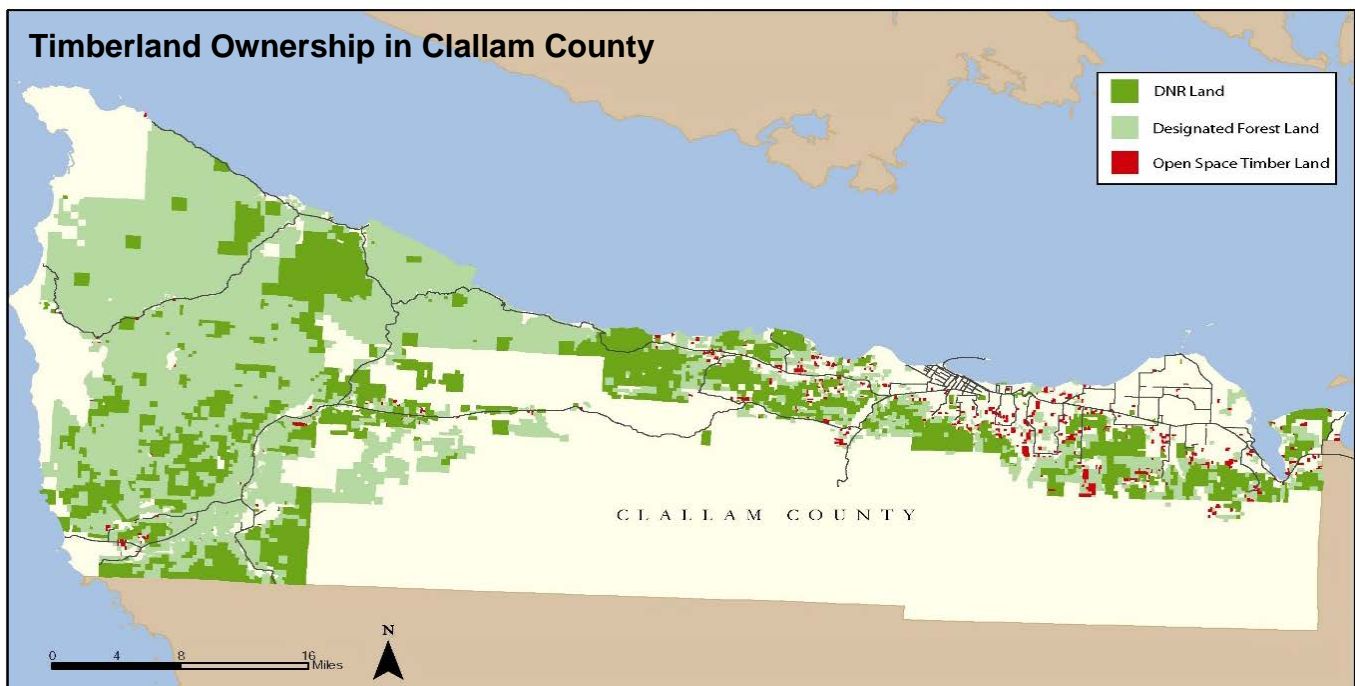
Sustainable Landscaping Workshops & Courses



Timberland in Clallam County

Timber production, mainly large industrial timber production, is the dominant land use in the County. Widespread timber harvesting in the area began in the 1920s and continued intensively through the 1980s, at which time the rate slowed significantly due in part to the listing of the northern spotted owl and marbled murrelet as threatened species under the Endangered Species Act. The Department of Natural Resources manages over 92,000 acres of timberland.

The Forest Practices Act rules were substantially revised following publication of the Forests and Fish Report of 1999. The changes were intended to provide greater protections for federally listed salmon, among other environmental protections associated with the growing and harvesting of timber. Compliance with Forest Practice Act rules provides Endangered Species Act regulatory protection under the 2006 Washington State Forest Practices Habitat Conservation Plan.

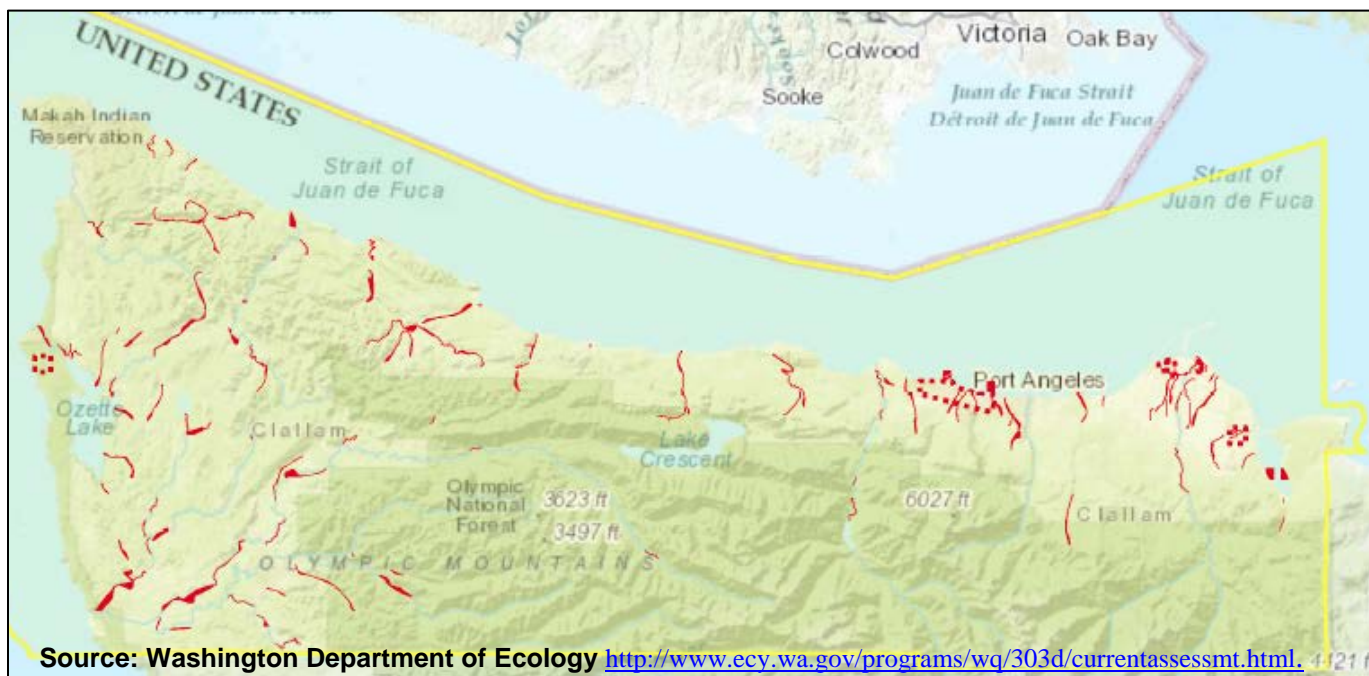


Impaired Water Bodies in Clallam County

The table and map below show the impaired water bodies on the 2016 Clean Water Act 303(d) list that fail to meet water quality standards for bacteria, temperature and dissolved oxygen. Note that listings based on data that are greater than ten years old are not included.

The main water quality parameters not meeting standards in the western portion of the county is high temperatures and dissolved oxygen. High water temperature is typically attributed to a loss of riparian vegetation and shade, often associated with past logging practices in which forest was cleared to the water's edge. Current Forest Practices Act rules, which have been in effect for nearly two decades, provide much greater protections for riparian areas. Low dissolved oxygen commonly results from excess nutrients and subsequent algae growth and die-offs. Fecal coliform bacteria are indicators of waste from warm blooded animals and are typically associated with livestock, failing septic systems and wildlife.

Impaired Water Bodies			
WRIA	Fecal Coliform Bacteria	Temperature	Dissolved Oxygen
17	Jimmycomelately Creek		Jimmycomelately Creek
	Johnson Creek		Sequim Bay
	Sequim Bay		
18	Dungeness Bay	Bell Creek	Bell Creek
	Bell Creek	Cooper Creek	Cassalery Creek
	Cassalery Creek	Golden Sands Slough	Meadowbrook Slough
	Cooper Creek	Meadowbrook Creek	Dungeness River
	Golden Sands Slough	Dungeness River	Matriotti Creek
	Meadowbrook Creek	Peabody Creek	Lotzgesell Creek
	Matriotti Creek	Dry Creek	Siebert Creek (WF)
	Lotzgesell Creek	Elwha River	Lees Creek
	Agnew Creek		Dry Creek
	Lees Creek		
	Peabody Creek		
	Ennis Creek		
	Valley Creek		
	Tumwater Creek		
	Port Angeles Harbor		
	Tumwater Creek		
	Port Angeles Harbor		
19	Strait of Juan de Fuca (Pysht)	Salt Creek	Salt Creek
		West Twin River	Bear Creek
		Deep Creek	Deep Creek
		Pysht River	
		Sekiu River	
20	Dickey River	Dickey River	Ozette River
	Mill Creek	Lake Creek	Lake Creek
		Unnamed trib to Umbrella Creek	Big River
		Bogachiel River	Grimes Creek
		Unnamed trib to Calawah River	Umbrella Creek
			Sooes River
			Coal Creek
		Elk Creek	



Critical Areas Protection

As required by the Washington State Growth Management Act of 1990, each jurisdiction in Clallam County has adopted policies and regulations to protect environmentally sensitive or critical areas (i.e. wetlands, fish and wildlife habitat conservation areas, critical aquifer recharge areas, frequently flooded areas, and geologically hazardous areas). The Clallam County Critical Areas Code can be found at

<http://www.codepublishing.com/WA/ClallamCounty/html/ClallamCounty27/ClallamCounty2712.html#27.12.900>.

Existing and ongoing agriculture may deviate from critical areas protection requirements by enrolling in an alternate program intended to both protect critical areas while conserving agricultural lands. Beginning in 2017, enrollment in the program requires completion of a risk assessment and may require development and implementation of a farm conservation plan. It is anticipated that the conservation district will be looked to for technical assistance for farm conservation plan development.

Shoreline Management Program

The update of the Clallam County Shoreline Management Program is scheduled for adoption in late 2017. The updated program consolidates shorelines protection regulations with relevant critical areas protection regulations. It also includes stormwater management policies and regulations that pertain to shorelines.

Stormwater Management

Due to the rural nature of Clallam County, state and federal standards for stormwater management only apply to the City of Port Angeles. The city is required to comply with a *Western Washington Phase II Municipal Stormwater Permit*. The city has taken great strides to prevent combined sewer and stormwater overflow (CSO) events over the past several years. They continue to offer rebates as incentives for installation of rain gardens and other stormwater management practices.

In 2011, Clallam County prepared a *Draft Comprehensive Stormwater Management Plan* (http://www.clallam.net/realestate/assets/applets/Clallam_CSWMP_Draft_for_Public_Review_4_15_11.pdf), as well as a draft public outreach plan and stormwater management brochure. As of 2017, those plans remain in draft form. In 2007, Clallam Conservation District prepared a *Draft Clallam County Small Project Drainage Requirements and Technical Guidance Manual* (<http://www.clallam.net/LandUse/smallprojectdrain.html>) for Clallam County. The manual includes pre-engineered stormwater management practices applicable for rural residential development. The intent of the manual was to lessen the engineering burden for typical residential construction projects throughout the county; however, it remains in draft form and has not been implemented by Clallam County. Preparation of engineered stormwater management plans is required for all major new development, as well as any minor new development within the jurisdiction of critical areas, except critical aquifer recharge areas.

Threatened, Endangered and Species of Concern in Clallam County

The table below lists the fish and wildlife species listed as endangered (FE), threatened (FT), of concern (FC) and candidate for listing (FSC) under the federal Endangered Species Act, as well as the state species of concern (SC) and sensitive species (SS). Of the species listed, those generally most susceptible to human activities are the fish. In addition, the marbled murrelet and northern spotted owl are old growth coniferous forest dependent species, thus timber harvesting activities impact their habitat.

MAMMALS		BIRDS		INSECTS	
Blue Whale	FE	Marbled Murrelet	FT	Taylor's Checkerspot	FC
Fin Whale	FE	Northern Spotted Owl	FT	Makah Copper	FSC
Humpback Whale	FE	Streaked Horned Lark	FC	Valley Silverspot	FSC
Orca Whale	FE	Bald Eagle	FSC	Johnson's Hairstreak	SC
Northern Pacific Right Whale	FE	Peregrine Falcon	FSC	Puget Blue	SC
Sei Whale	FE	Tufted Puffin	SC	Sand-Verbena Moth	SC
Sperm Whale	FT	Common Loon	SS		
Sea Otter	FC	Yellow-Billed Cuckoo	FT	MOLLUSKS	
Fisher	FC	FISH		California Floater	FSC
Mazama Pocket Gopher	FSC	Chinook Salmon	FT	Northern Abalone	FSC
Steller Sea Lion	FSC	Chum Salmon	FT	Olympia Oyster	SC
Townsend's Big-eared Bat	SC	Ozette Sockeye Salmon	FT		
Keen's Myotis	SC	Steelhead	FT	REPTILES	
Olympic Marmot	SS	Bull Trout	FT	Leatherback Sea Turtle	FE
Gray Whale		Pygmy Whitefish	FSC	Loggerhead Sea Turtle	FE
		Olympic Mudminnow	SS	Green Sea Turtle	FT
STATUS LEGEND					
<i>Federal Endangered</i>	FE	<i>Federal Candidate</i>	FC	<i>State Candidate</i>	SC
<i>Federal Threatened</i>	FT	<i>Federal Species of Concern</i>	FSC	<i>State Sensitive</i>	SS

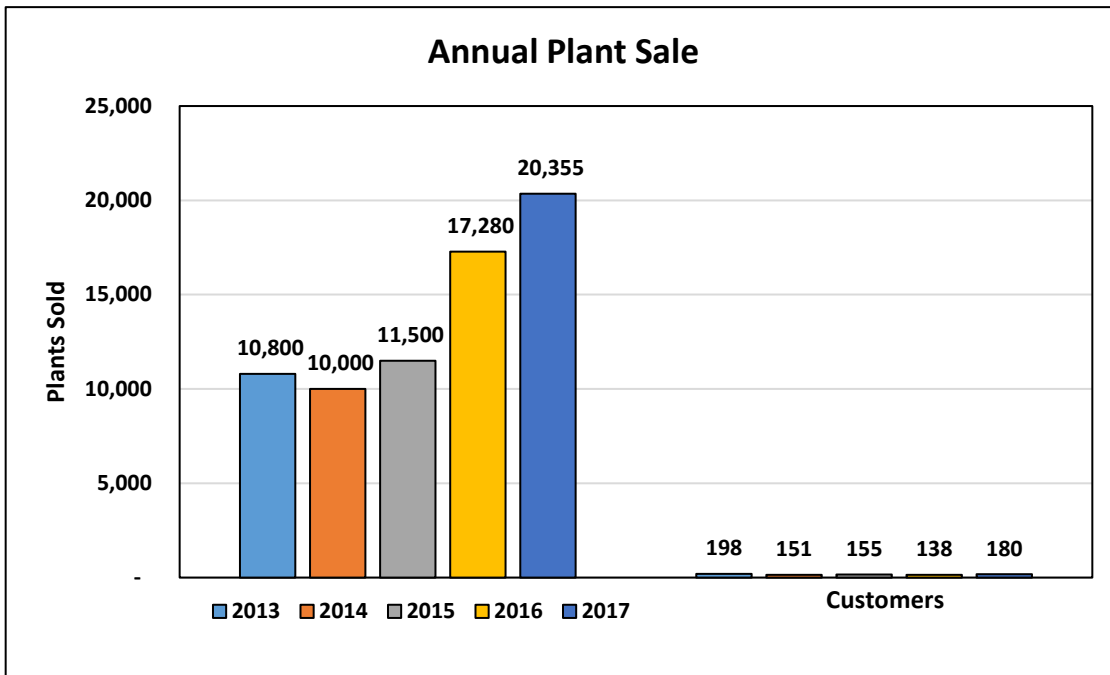
Salmon Restoration

In 2012, the Elwha Dam located at river mile 4.9 on the Elwha River was demolished, which had been a barrier to fish migration since the early 1900s. Two years later the Glines Canyon Dam located at river mile 13 was demolished. Now anadromous salmonids have access to nearly 70 miles of previously inaccessible habitat.

Since 2013, Clallam Conservation District has sponsored five Family Forest Fish Passage projects that have opened up 6.95 miles of previously inaccessible stream habitat. Over this same time period, 1.69 stream miles (14.44 acres) have benefited from riparian restoration through the Conservation Reserve Enhancement Program.

Other Habitat Restoration

Clallam Conservation District has been selling native trees and shrubs since 1990. The goal of the program is to make promote the planting of native trees and shrubs by making them available at affordable prices. In an effort to avoid competing with local nurseries, seedlings are sold in bundles of ten and 25 (conifers). The chart below shows sales from 2012 through 2017.



Climate Change and Potential Sea Level Rise

In 2015, the North Olympic Resource Conservation and Development Council prepared a Climate Change Preparedness Plan for the North Olympic Peninsula (<http://kaffeld.wixsite.com/noprkd/about2>). In addition, climate change and sea level rise studies have been conducted for the North Olympic Peninsula in recent years (http://www.jamestowntribe.org/programs/nrs/nrs_climchg.htm, https://www.fs.fed.us/pnw/pubs/pnw_gtr844.pdf). The area that has received the most scrutiny for sea level rise is the Dungeness Delta where sea level is projected to rise anywhere from just under one foot to five feet, with a best estimate of just over two feet by 2100. In late 2017, Washington Sea Grant performed an analysis of parcel-scale flood risk in the Dungeness and Three Crabs area to support efforts to increase the resilience of the area to present and future flood impacts.

WATERSHED RESOURCE INVENTORY AREAS

Four Water Resource Inventory Areas (WRIAs) comprise the County, each corresponding to major watershed basins. The WRIAs are the basis for state-mandated watershed planning. The WRIAs in Clallam County include:

- WRIA 17- the Quilcene-Snow watershed
- WRIA 18- the Elwha- Dungeness Watershed
- WRIA 19- the Lyre-Hoko watershed
- WRIA 20- the Soleduck-Hoh watershed



The plans being developed through the watershed planning process in Clallam County are in various stages of completion, adoption and implementation. The WRIA 18 plan was adopted in 2005 (<http://www.clallam.net/environment/ewhadungenesswria.html>) and is being implemented, including the adoption of an instream flow rule in 2013 that established minimum instream flows for the eastern half of WRIA 18. A final draft of a WRIA 19 plan has not been completed and approved and the planning group has not met for nearly a decade. The WRIA 20 plan was adopted in 2008. A watershed plan was completed for the Jefferson County portion WRIA 17 but not the Clallam County portion. Much of the information included in this inventory is taken from the three completed watershed planning documents. Below is a table that summarizes watershed statistics for each WRIA [2012 data].

WRIA	Total Acres	Percent Acres of County	Population	Percent Population of County
WRIA 17/18	383,508	34.0	58,184	88
WRIA 19	244,723	21.7	2,156	3
WRIA 20	500,561	44.3	6,019	9

Land Classification by Tax Assessor Information

Many of the rural residential landowners in the County opt to put their acreage into an open space tax relief program. There are three land classifications in the program, Open Space Land, Farm and Agricultural Land, and Timber Land. The data in the tables below are from 2006. While the numbers may have changed somewhat, the general proportions remain largely unchanged.

Open Space AGRICULTURE Taxed land by WRIA in Clallam County

Clallam WRIs	Open Space Agriculture Landowners	Acres of Open Space Agriculture	Average OS Agriculture size
WRIA 17/18	420	13,528	31
WRIA 19	61	1,916	12
WRIA 20	35	1,776	15
TOTALS	516	17,220	

Open Space TIMBER LAND (Small Forest Landowners) by WRIA in Clallam County

Clallam WRIs	Approximate number landowners with Open Space Timber	Acres of Open Space Timber	Average OS Timber holding size
WRIA 17/18	355	5,747	16
WRIA 19	120	1,332	13
WRIA 20	74	1,157	16
TOTALS	549	8,236	

Designated TIMBER LAND by WRIA in Clallam County

Clallam WRIs	Approximate number landowners with Designated Timber Land	Acres of Designated Timber Land	Average Designated Timber Land size
WRIA 17/18	265	26,819	101
WRIA 19	148	141,174	953
WRIA 20	134	219,245	1636
TOTALS	547	387,238	

STRAIT ECOSYSTEM RECOVERY NETWORK (WRIA 17, 18 & 19)

The Strait Ecosystem Recovery Network (ERN) is the local integrating organization for the Puget Sound Partnership's Action Agenda. Agencies and organizations from throughout the northern portion of Clallam County and eastern Jefferson County comprise the Strait ERN. In 2017, an Ecosystem Protection and Recovery Plan was completed for the ERN

(<https://pspwa.app.box.com/s/vs0bhkgi6tivp0fqd2ysuyvm0kudxm1r/folder/32634328646>). The plan outlines the local strategies for Puget Sound recovery. Recovery efforts are focused on salmon recovery, water quality for shellfish, and stormwater management, and includes the following 13 strategies along with recovery goals:

- A. Drift Cell and Shoreline Conservation and Restoration
- B. Estuary Protection and Restoration
- C. Floodplain Conservation and Restoration
- D. Improve Riparian Corridor Management and Instream Habitat
- E. Eliminate Fish Passage Barriers and Excess Sediment
- F. Enhance Native Fish and Shellfish Populations
- G. Implement Local Water Resource Management Programs and Rules
- H. Enhance Ongoing Implementation of Local Shoreline and Land Use Management, Protection, and Incentive Programs and Plans
- I. Implement Climate Change Adaptation and Mitigation Strategies for the North Olympic Peninsula

- J. Implement Local Stormwater Management and Pollution Source Control Programs using a Watershed Management Approach
- K. Enhance Implementation of Water Quality Clean Up Plans
- L. Enhance Support for Oil Spill Preparedness, Prevention, and Response
- M. Enhance Local Communication, Education, Behavior Change, and Public Involvement Programs

In addition to these strategies, the plan identifies 39 data gaps and 52 barriers, including three barriers that apply to all strategies: lack of funding, limited staff capacity, and limited coordination capacity. Insufficient funding is the most commonly listed barrier, followed by a need for political/policy support.

WRIA 17 & 18 LAND USE DESCRIPTION

Most of the recent population growth in Clallam County has occurred in WRIA 18, in the Sequim and Port Angeles areas. From 1990 to 2000, the population in the eastern portion of the county grew by over 2,500 people and from 2000 to 2010 it increased by nearly 7,500. Population growth has since tapered some, but this area of the county continues to experience more growth than elsewhere. Much of the growth in the eastern region has been occurring in unincorporated areas, converting open farmland into low-density residential development.

Port Angeles and Sequim are the population centers in WRIA 18. The estimated population of Port Angeles in 2016 was 19,833. The city covers an area of 10.7 square miles of land. The Sequim population in 2016 was estimated to be 6,964, covering 6.37 square miles; however, the population of the Sequim School District boundaries (eastern county line to Siebert Creek) totaled 29,736. Most of Sequim is within WRIA 18, with a small portion in WRIA 17.

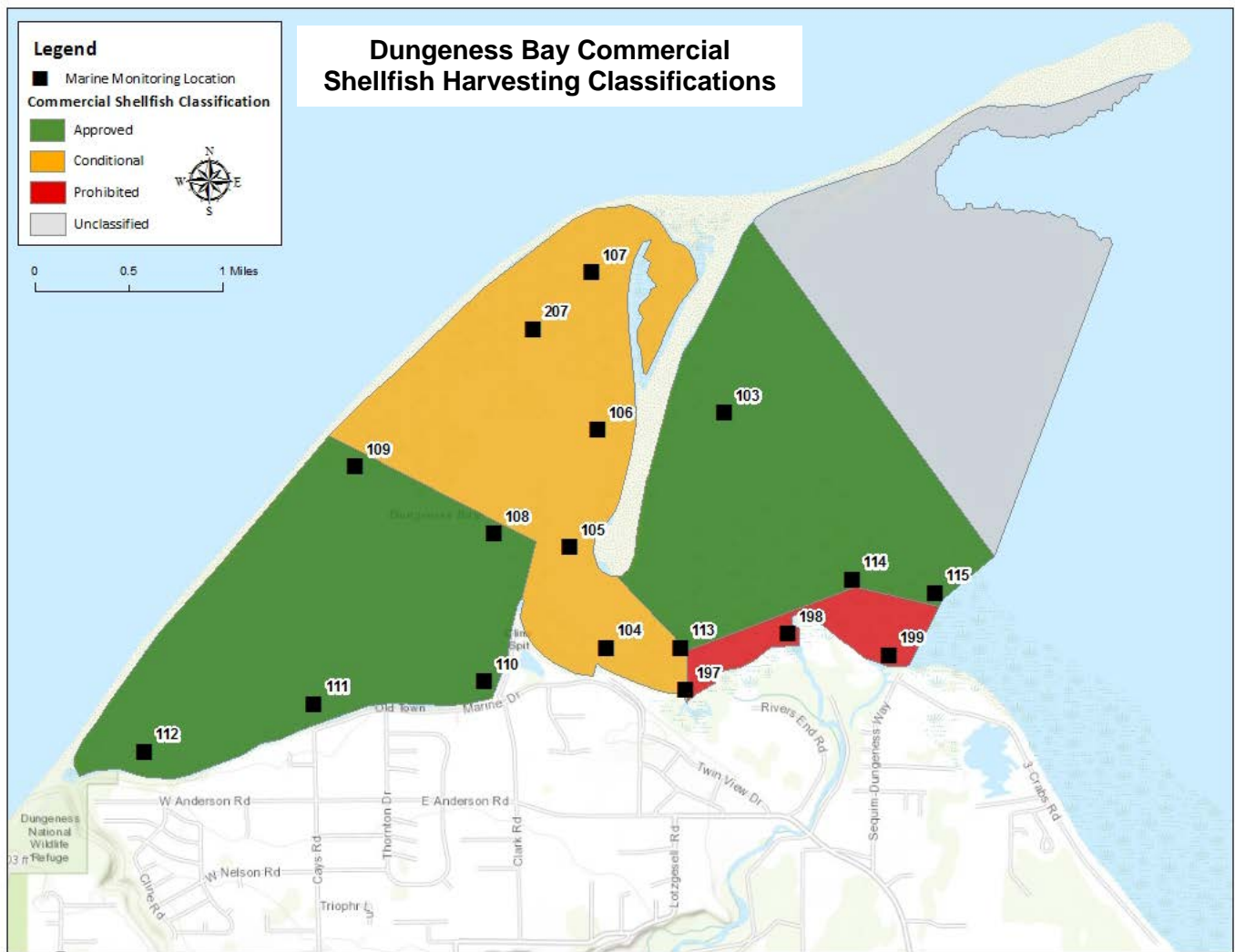
The main water bodies within WRIA 18 are the Elwha River and the Dungeness River. Numerous other independent streams drain to the Strait of Juan de Fuca. Johnson, Jimmycomelately and Chicken Coop creeks are the main streams in WRIA 17. They all drain to Sequim Bay, which is an important shellfish growing area.

WRIA 17 & 18 Major Natural Resource Issues and Opportunities

Water quality and quantity are major natural resource issues in WRIs 17 and 18, most notably, shellfish harvesting closures in Dungeness Bay due to fecal coliform contamination and low stream flows in the Dungeness River. Puget Sound Chinook, Hood Canal summer chum, Puget Sound steelhead and bull trout, each of which can be found in the Dungeness River, are listed as threatened species.

Water Quality

The Sequim Bay-Dungeness Watershed Clean Water District was established in 2000 following a commercial shellfish harvesting downgraded in Dungeness Bay due to fecal coliform contamination. The Clean Water District includes the area of Clallam County east of the Morse Creek watershed to and including the Sequim Bay watershed. From 2000 to 2003, 1,700 acres of shellfish harvest area in Dungeness Bay were downgraded due to bacterial pollution. Water quality improvements in the bay have resulted in upgrades of 1,400 acres since 2011. The image below shows the 2017 status of shellfish harvesting in Dungeness Bay.

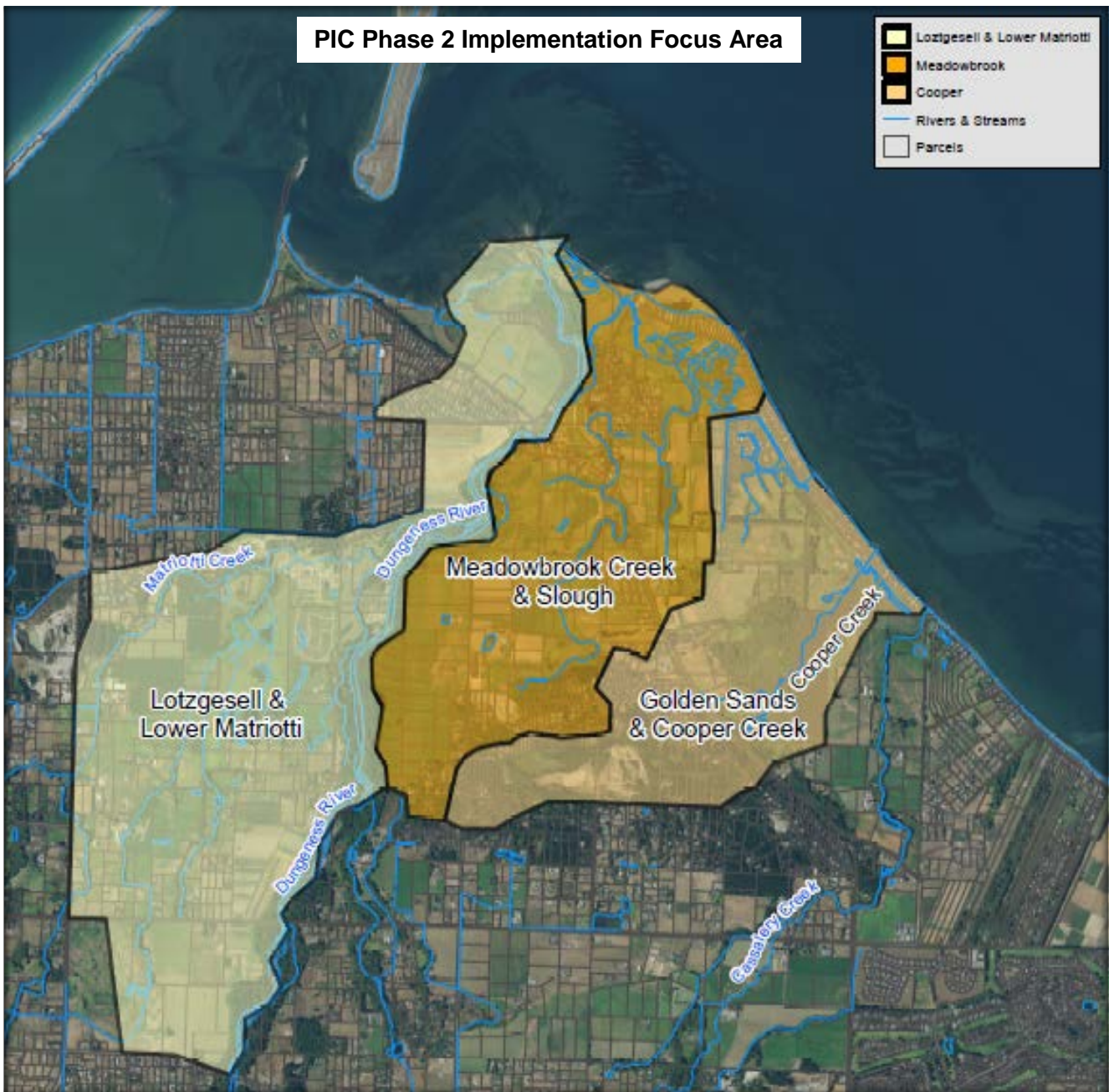


In 2014, Clallam Conservation District led an effort to develop a Pollution Identification & Correction (PIC) Plan (<http://clallamcd.org/conservation-by-the-bay/>). The PIC plan spells out the procedures for strategically identifying and correcting bacterial pollution in the Clallam County Marine Recovery Area (Bagley Creek watershed east to County line). Clallam County Environmental Health Services (EHS) is responsible for leading PIC implementation efforts. They started PIC implementation in 2015 with a pilot project focused on Golden Sands Slough and Meadowbrook Creek and Slough. To date, onsite septic systems have been identified as the primary source of bacterial contamination in the PIC focus area.

The pilot implementation project was followed up in 2017 by expanding the focus area to include lower Matriotti Creek and Lotzgesell Creek (<http://www.clallam.net/hhs/EnvironmentalHealth/PICProject.html>). Lotzgesell Creek is a tributary to Matriotti Creek, which is a tributary to the Dungeness River.

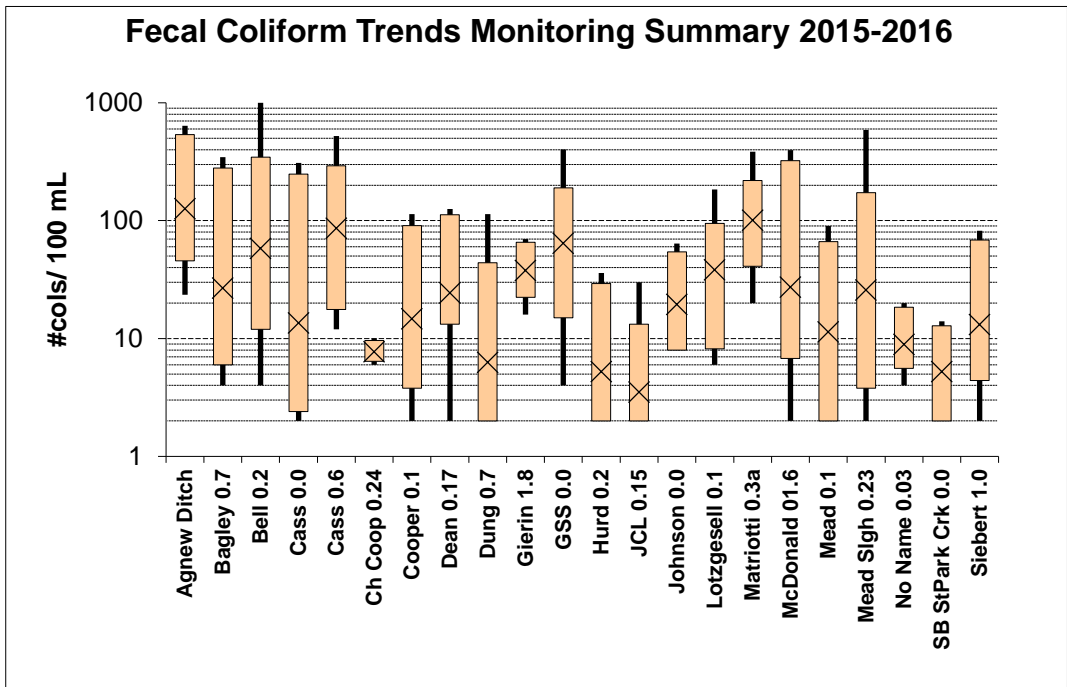


2015 Pollution Identification & Correction Pilot Project Area.



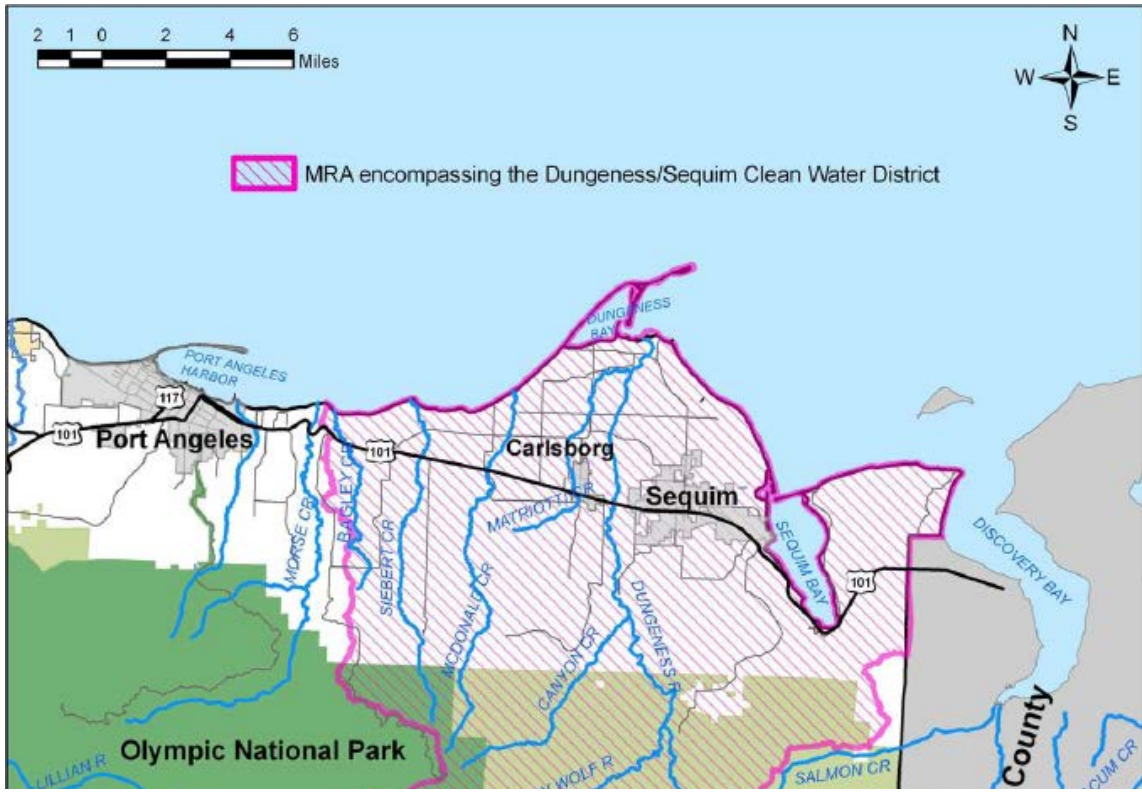
2017 Pollution Identification & Correction Phase II Project Area.

The chart below shows the 2015-2016 summary of PIC trends monitoring for all streams in the PIC area. Water quality trends data are the basis for selection of PIC focus areas, which according to the PIC plan, should be selected annually.



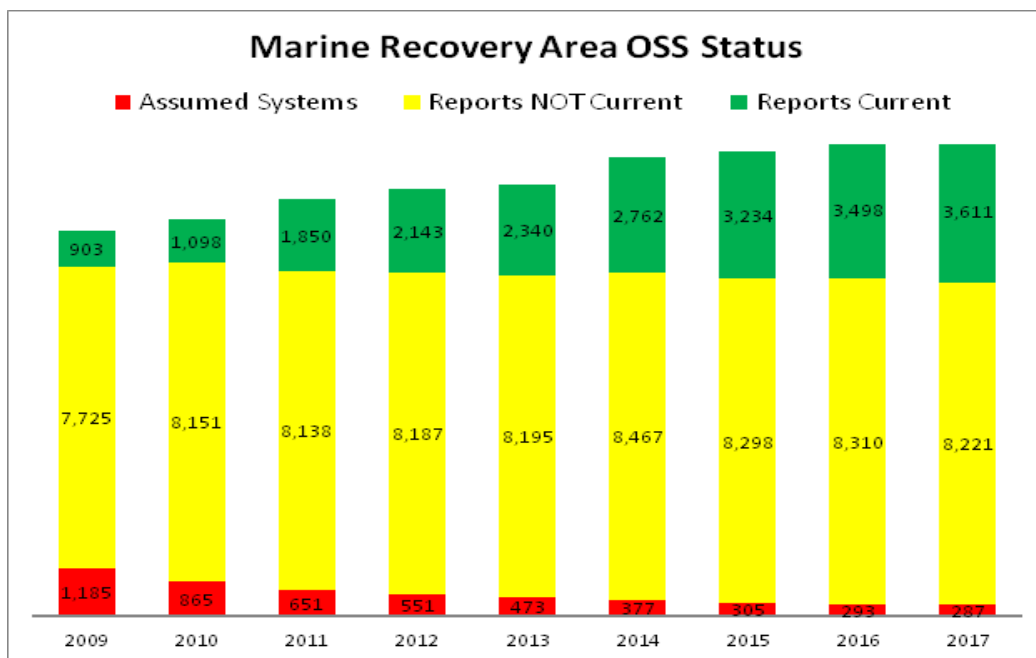
On-Site Septic System Operation and Maintenance

On-site septic systems (OSS) are potential sources of contamination of both surface and ground water. In 2007, the EHS identified a Marine Recovery Area (MRA) where OSS pose an increased public-health risk to marine waters and developed a plan for finding and repairing all failing OSS within MRA (<http://www.clallam.net/oss/OSSApprovedManagementPlanWithMapsJuly07.pdf>). The map below shows the MRA area.



The MRA plan requires an inspection once every three years for conventional gravity systems and annual inspections for all other systems. Given proper training, system owners are allowed to perform their own inspections. The EHS offers OSS operation and maintenance classes, subject to availability of grant funding.

The Clallam County EHS reports in their database there are 20,382 on-site septic systems in Clallam County, approximately 60 percent of which are in the MRA. Twenty-nine percent of the MRA systems have current inspection reports on file with the County, 69 percent do not, and two percent are assumed to exist but do not have permits or inspection permits on file. Countywide, 70 percent of the permitted systems do not have current reports on file.



Source: Clallam County Environmental Health Services

In 2014, Clallam Conservation District initiated a cost sharing program to repair failing onsite septic systems. The program was designed after the district’s agricultural conservation practices cost sharing program and paid up to 75 percent of the cost of repairing or replacing failing septic system identified as impacting water quality. The grant funding source was targeted at improving water quality for shellfish harvesting; therefore, the focus of the cost sharing program was the MRA. Over a two and one-half year period from 2014 to 2017, eight septic systems were repaired/replaced through the program, six of which were located near Dungeness Bay. In 2016, a focus group of septic designers, installers, County onsite personnel, Craft3 lending institute, a past cost-share recipient and others was formed to refine program policies in an effort to more strategically target limited funds; however, as of late 2017, no significant policy changes have been made. Furthermore, grant funding for the program is not currently available.

In an attempt to identify the sources of bacterial contamination, two microbial source tracking studies were performed in the lower Dungeness watershed and bay in 2007 and 2008 (<http://www.clallamcd.org/conservation-by-the-bay/?SSScrollPosition=0>). The results represent typical nonpoint source pollution. A total of 34 species or groups were identified in 1,164 analyzed isolates. Frequently identified species included the following with their frequency in parentheses: avian (19.6%), gull (12.5%), waterfowl (9.7%), raccoon (9.2%), unknown (7.3%), human-derived (7.1%), rodent (6.3%) and dog (4.3%). When combined into groups, birds totaled 42% and wild mammals totaled 26% of samples. Domestic sources (dogs and cats) comprised 7.4%. Farm animals (bovine, equine, goats, sheep, llamas, swine, and poultry) comprised 6.9%, with bovine totaling less than 3% and equine less than 2%.

Because of years of outreach and technical assistance, most livestock operations in the Dungeness Bay drainage are implementing best management practices to protect water quality. Small horse and livestock operations in the western portion of WRIA 18 have received considerably less attention.

Water Quantity and the Dungeness Water Rule

In January 2013, the Department of Ecology approved the Dungeness Water Rule (<http://www.ecy.wa.gov/programs/wr/instream-flows/dungeness.html>). The rule places restrictions on new water uses in east WRIA 18 (Bagley Creek to Bell Creek watersheds), including restrictions on new permit exempt wells. All new water uses must be mitigated. For permit exempt wells, a one-time mitigation fee must be paid and indoor water use should not exceed 150 gallons per day. Outdoor water is also severely restricted and must be mitigated. The table below illustrates the mitigation packages that are offered by Washington Water Trust, the administrator of the Dungeness Water Exchange. More information about the Dungeness Water Exchange can be found at <http://www.washingtonwatertrust.org/dungeness-water-exchange-faqs>.

Mitigation Package Descriptions				
Package Description	Average Amount of Indoor Use (Gallons/Day)	Average Amount of Outdoor Use (Gallons/Day)	Amount of Irrigated Lawn Area (Square Feet)	Amount of Irrigated Lawn Area (Acres)
Indoor Only Package (minimal incidental outdoor use only) \$1,000	150* (average)	0	0	0
Indoor with Basic Outdoor Package \$2,000	150* (average)	89	2,500 sq. ft. (approx. 50 x 50 ft.)	.06 acres
Indoor with Extended Outdoor Package \$3,000	150* (average)	200	5,625 sq. ft. (approx. 75 x 75 ft.)	.13 acres

*Note: The Exchange accounts for domestic mitigation using a standard average daily amount of 150 gallons (WAC 173-518-080 (b)). This is the annual amount of water that the Exchange and the mitigation certificate purchaser agree upon as the basis for their transaction.

More efficient use of limited water resources, including capturing and storing roof runoff and low water-use landscaping is imperative, as is mitigating water usage through aquifer recharge.

Aquifer Recharge

New water uses in the Dungeness Water Rule area are mitigated primarily through aquifer recharge projects. Aquifer recharge projects utilize on the irrigation network to deliver Dungeness River water to sites that are conducive to infiltration into the shallow aquifer and benefit the streams that are impacted by groundwater pumping. Water may be taken from the river for aquifer recharge when it is running consistently high, typically May 15 to July 15. As of May 2017, Clallam Conservation District oversaw the construction of four aquifer recharge projects, two on each side of the Dungeness River. Three of the projects fulfill mitigation requirements, while one on the west side of the Dungeness River is too close to the river to provide significant benefits to other streams, thus is being implemented for river flow restoration purposes.

Irrigation in the Dungeness Valley

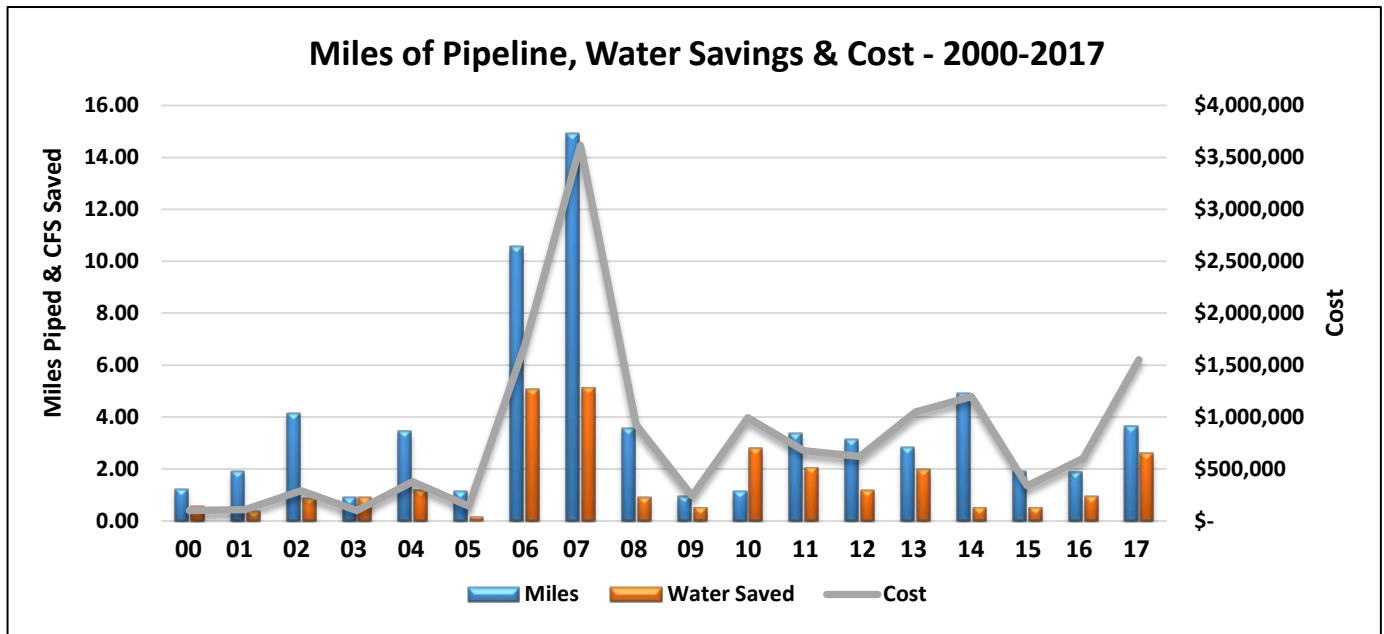
The vast majority of agriculture in Clallam County occurs in the Dungeness Valley. Due to low rainfall (15-20 inches per year) in the valley, irrigation is essential for commercial agriculture. An extensive system of

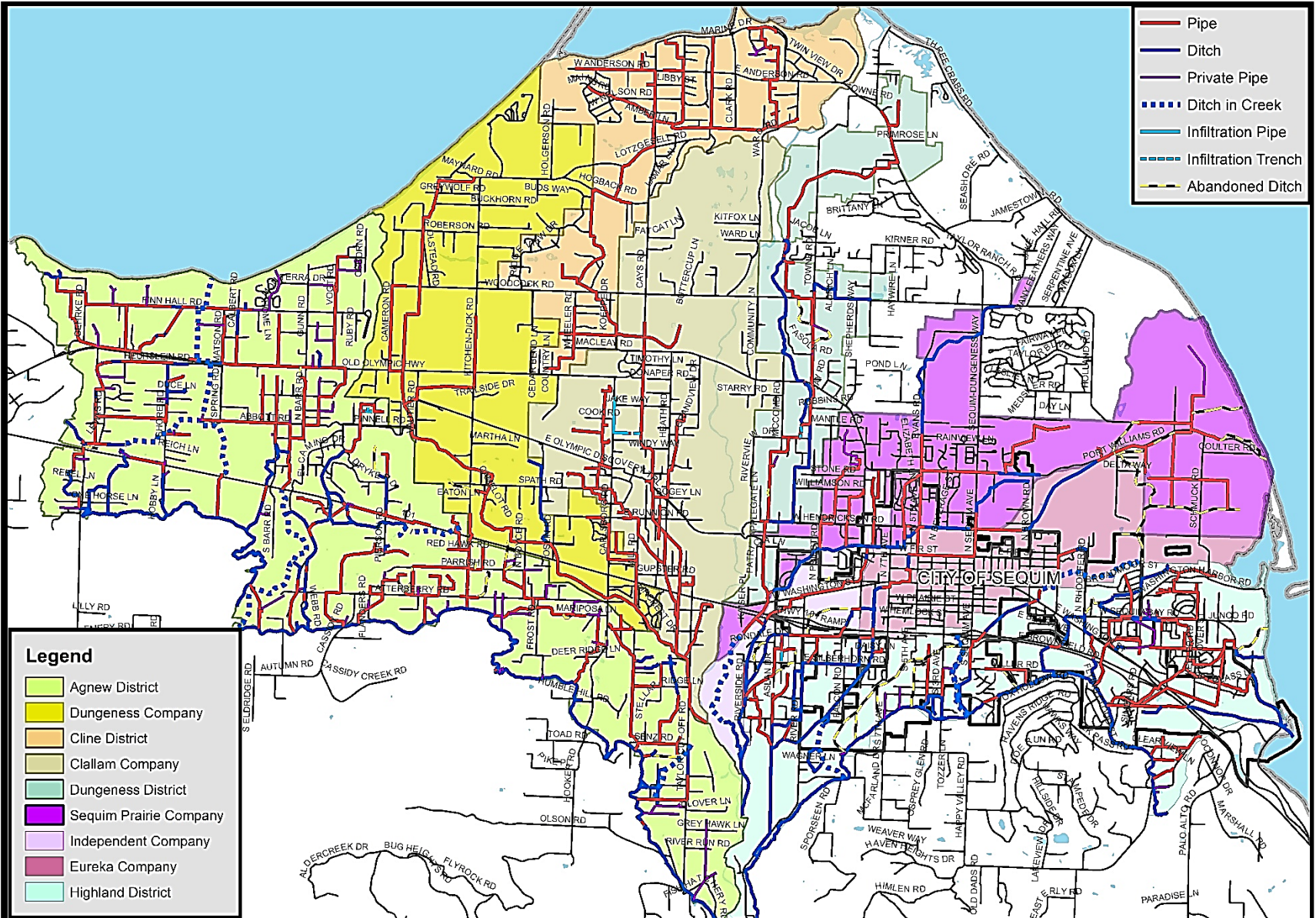
irrigation water conveyance ditches and pipelines delivers water from the Dungeness River to irrigated lands. The map below shows the boundaries of the seven irrigation districts and companies in the Dungeness Valley and the current distribution of irrigation ditches and pipelines. Irrigated acres total approximately 7,000. There are approximately 183 miles of distribution canals, ditches and pipelines, approximately two-thirds of which are now pipelines.

Well over half of the irrigation ditch piping has occurred following the 1999 federal listings of the Puget Sound Chinook Hood Canal summer chum salmon as threatened. The irrigation districts and companies had a *Comprehensive Water Conservation Plan* prepared that same year. Bull trout and steelhead have since been added to the ESA list. Various measures intended to reduce water withdrawals from the Dungeness River are identified in the plan. The vast majority of proposed projects are piping of open ditches. The total estimated water savings range from 33.42 cubic feet per second (cfs) to 38.36. An environmental impact statement was prepared for the plan in 2003. A Comprehensive Irrigation District Management Plan (CIDMP) was prepared in 2006 (<http://www.clallamcd.org/publications/>) in an effort to secure ESA and Clean Water Act protections; however, the proposed actions were not formally adopted by the irrigation districts and companies.

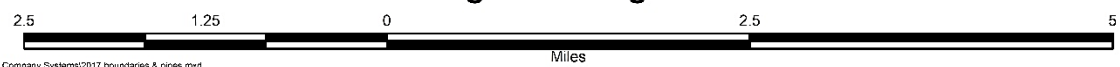
In 2012 the Department of Ecology issued the irrigation districts and companies superseding water rights certificates that reflect their current irrigation water requirements. Their water rights have been reduced from the 1924 adjudicated amount of 516 cfs to the more realistic present amount of 93.5 cfs. The irrigators have also agreed to never take more than 50 percent of the river’s flow and not allow the flows to go below 60 cfs.

By the end of the 2017 irrigation season, over 50 irrigation efficiencies projects had been implemented resulting in total estimated water savings in excess of 28 cfs, or about three-quarters of the target savings. The chart below shows the estimated annual water savings in cubic feet per second in comparison to miles of pipeline installed and cost.





Dungeness Irrigation Network



DISCLAIMER: While every precaution was taken in preparing this map, the publisher disclaims any warranty of fitness or accuracy of the data. The map is approximate in nature, based on compilation of data from multiple

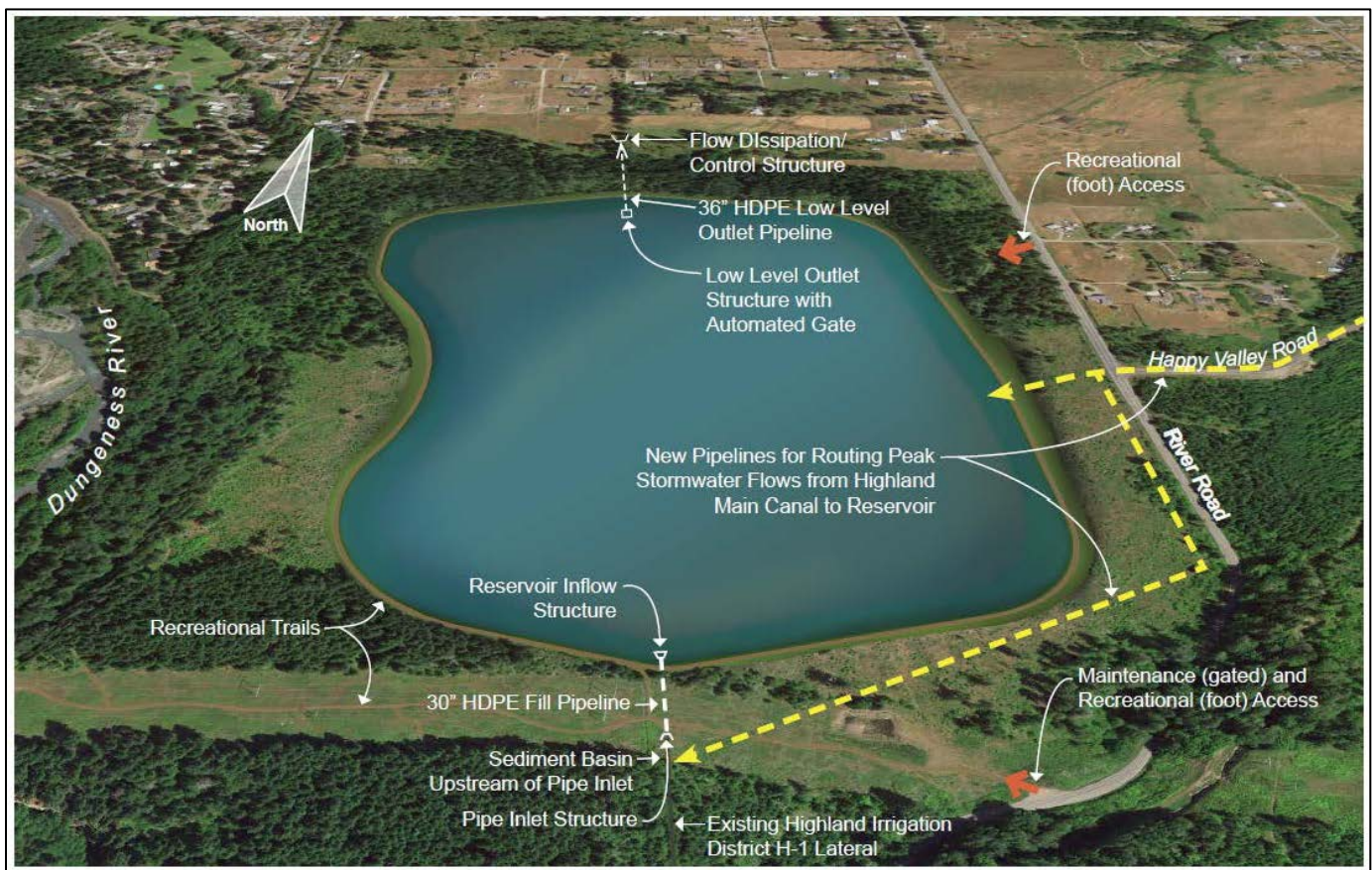
9/27/2017 Cartographer: Joe Holtrop

Document Path: G:\GIS_Projects\Irrigation\District & Company Systems\2017 boundaries & pipes.mxd

Irrigation Water Storage

A feasibility study for irrigation water storage was conducted in 2015. The intent of the study was to identify sites for small scale reservoirs throughout the Dungeness Valley. This followed an ill-fated effort in 2007 to develop a large reservoir uphill of the Agnew Irrigation District main canal. In addition to the projected costs of construction, the ongoing annual operation (pumping from the canal to fill the reservoir) and maintenance costs, mainly the land lease from the Department of Natural Resources, killed the project. It was concluded from the 2015 feasibility study that many smaller reservoirs were also impractical for a variety of reasons. The scale of small reservoirs in the more densely populated valley results in much larger acre-foot storage costs. Also, suitable sites for reservoirs are limited, thus the benefits are as well.

However, a suitable site for a large reservoir was identified on DNR land south of the City of Sequim, and preliminary planning was conducted. This site is relatively flat with a Highland Irrigation District irrigation ditch running through the middle of it, and could support the construction of an 80 plus acre reservoir that could store over 1,500 acre-feet of water. In addition to being supplied with water from the irrigation system during the spring snow-melt period, winter runoff water that currently overwhelms irrigation ditches in the City of Sequim could be easily diverted into the reservoir, thus serving the dual purpose of storing water for late summer irrigation and reducing winter flooding. As much as two-thirds of the irrigation water demand on the east side of the Dungeness River could be supplied by this reservoir during the last four to six weeks of irrigation season. This is the period in which the Dungeness River is at its lowest; therefore, diversions from the river would be reduced substantially and in-stream habitat could improve significantly. The DNR manages the land for timber production but it is low productivity, and the DNR has expressed a desire to liquidate it. Planning and fund-raising work for a large reservoir has continued since 2015 with a broad group of stakeholders. To date, there has been good public support for the project; however, the estimated of project construction exceeds \$20 million. The image below shows the conceptual plan for the reservoir.



WRIA 19 LAND USE DESCRIPTION

Approximately 4,500 people live in WRIA 19. There are no cities in WRIA 19; Clallam Bay and Neah Bay are the most urban population centers. However, over half the people in the WRIA live in the Joyce area west of Port Angeles. This area is the only part of WRIA 19 that has experienced significant population growth in recent years. Due to its proximity to Port Angeles, it will likely continue to experience population growth. The Makah Reservation totals about 9,234 acres of land in the northwestern tip of WRIA 19.

Commercial timber is the prominent land use in the WRIA. Seventy-six percent of the WRIA is zoned commercial forestry, of which 53 percent is privately owned, 24 percent is state trust land, and 19 percent managed by federal agencies.

Agriculture in WRIA 19 is mostly in the eastern portion of WRIA 19, in the Salt Creek basin, an area of glacial outwash that drains a series of low hills. A couple of small organic produce farms located in the Salt Creek area have done direct sales and one has operated a Community Supported Agriculture (CSA) farm.

Numerous small, independent streams drain to the Strait of Juan de Fuca in WRIA 19, the most prominent of which are Salt Creek, Lyre River, East Twin River, West Twin River, Deep Creek, Pysht River, Clallam River, Hoko River, and the Sekiu River. Lake Crescent is also in WRIA 19.

WRIA 19 Major Natural Resource Issues and Opportunities

Bull trout, a threatened species, is present throughout WRIA 19. The combination of forest roads for timber production and state and county roads crossing the numerous streams contribute to numerous culverts that are barriers to fish passage. Clallam Conservation District has sponsored ten Family Forest Fish Passage Program (FFFPP) projects in WRIA 19.

In addition, numerous streams are classified as impaired due to high water temperatures and sedimentation, although the data that these classifications are based on are outdated. Water temperature and sedimentation impairments are typically associated with historic timber harvesting practices (e.g. harvesting trees within riparian areas) and forest road construction and maintenance. Current forest practices regulations, including road maintenance and abandonment plans are intended to prevent these impacts.

Clallam Conservation District has sponsored six CREP projects in WRIA 19; two on the Pysht River and one each on Nelson Creek, Bear Creek, Salt Creek and the Clallam River.

A prioritized list of salmon habitat conservation and recovery actions for WRIA 19 was prepared in 2012; however, the focus of the action plan is habitat preservation through acquisition.

WRIA 20 LAND USE DESCRIPTION

Forks is the only incorporated city within WRIA 20. The city covers a land area of 3.65 square miles and the 2016 population was 3,783.

WRIA 20 includes four Indian reservations: the Quileute, Hoh, Ozette and Makah. The Ozette Reservation is under treaty jurisdiction of the Makah Tribe and is currently managed as wilderness. Olympic National Park makes up 127,299 acres, or 25.4% of WRIA 20.

Commercial timber harvesting is the dominant land use in the area. There are approximately 158,452 acres in large commercial timber holdings within WRIA 20. This is 31.6% of the land area in the WRIA.

Much of the initial agricultural settlement of the area was located in and around the Forks Prairie, where lack of trees and fertile soil made farming a viable option. Today, agriculture in WRIA 20 is sparse and mostly limited to pasture and hay production for small-scale beef operations.

Like many areas on the Olympic Peninsula, WRIA 20 has seen a continued growth in recreational use of public lands. These lands are being promoted as an increasing source of economic development for the rural communities of the area. Among the many recreational activities are hiking, camping, sport fishing, hunting, bird watching, and mountain biking. As recreational use continues to increase, so too will the impacts these activities have on the land.

Major water bodies of WRIA 20 include the Sol Duc, Calawah, Bogachiel, Dickey and Quillayute rivers, and Lake Ozette and Lake Pleasant.

WRIA 20 Major Natural Resource Issues and Opportunities

The Lake Ozette sockeye salmon and bull trout are listed as threatened species. Like WRIA 19, culverts that are barriers to fish passage are a major natural resource issue in WRIA 20. In addition, inadequately maintained forest roads, mainly on US Forest Service land, are subject to mass wasting due to deteriorated or undersized culverts, and the Forest Service lacks funding for road maintenance and culvert upgrades. Numerous streams are classified as impaired due to high water temperatures.

Clallam Conservation District has sponsored four FFFPP projects in the WRIA since 2006. In addition, the district partnered with the US Forest Service on a major road maintenance project that involved removal and replacement of numerous undersized culverts in the Goodman Creek basin (Sol Duc River tributary). The district is partnering on another USFS road project in the Sitkum River basin (Calawah River tributary) to design properly sized drainage structures to remove the risk of mass wasting events that deliver large amounts of sediment into the Sitkum River tributaries and main stem. This project is in the planning stage.

There have been two CREP projects in WRIA 20, both on Lake Ozette tributaries; one on the Big River and one on Trout Creek. Outreach efforts are underway with landowners on the Bogachiel River to restore riparian vegetation.