

Big Bend Shellfish Protection District



A committee of citizens, business and government is launching a plan to:

- Reduce water pollution
- Meet state and federal water quality standards
- Ensure that water quality standards are maintained



MASON COUNTY
COMMUNITY SERVICES

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Prepared by Katie Otañez
Environmental Health Specialist
Mason County Public Health
360-427-9670 ext 544 | kotanez@co.mason.wa.us

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Definitions of Acronyms

ECY - Washington State Department of Ecology

FC - Fecal coliform bacteria

FDA - U.S. Food and Drug Administration

HC #6 - Hood Canal #6 commercial shellfish harvest area

HCCC - Hood Canal Coordinating Council

ISSC - Interstate Shellfish Sanitation Conference

LOSS - Large onsite septic system

MC - Mason County

MCD - Mason Conservation District

MCPH - Mason County Public Health

MCPW - Mason County Public Works

NEP - National Estuaries Program

NHD - National Hydrography Dataset

NSSP - National Shellfish Sanitation Program

O & M - Septic system operation and maintenance

OSS - Onsite septic system

PIC - Pollution identification and correction

QAPP - Quality Assurance Project Plan

RCW - Revised Code of Washington

SPD - Shellfish Protection District

WDOH - Washington State Department of Health

WSDOT - Washington State Department of Transportation

A. Purpose of the Big Bend Shellfish Protection District

Background

In September 2015, the Washington State Department of Health (WDOH) downgraded 17 acres in the Big Bend area of Hood Canal from Approved to Conditionally Approved. The recently downgraded areas for commercial shellfish harvest are within the greater Hood Canal #6 growing area. The downgraded sections in question are assigned as G and H (Map 2). This classification change is in response to WDOH Marine Station 292, in lower Hood Canal east of Union Cove, failing the National Shellfish Sanitation Program (NSSP) water quality standards for Approved classification. The NSSP is the federal/state cooperative program recognized by the FDA and ISSC for the sanitary control of shellfish produced and sold for human consumption (ISSC, 2015).

The *Conditionally Approved* classification indicates that harvest of shellfish is not allowed under certain conditions. For Big Bend 0.75 inches of rainfall in 24 hours will trigger a 5 day closure for both G and H sections. Section G is 10 acres and closes after a rain event of 0.75 inches or more of rainfall. Section H is 7 acres closes after a rain event of 0.75 inches or more of rainfall *and* is seasonally closed from May-September due to point source pollution of the nearby marina. Section I overlaps section H and is closed from May-September due to point source pollution of the nearby marina (Map 2). WDOH currently uses the rain gauge at the Taylor Shellfish FLUPSY to measure the rainfall. The FLUPSY is located in Oakland Bay near Shelton WA; 8.3 miles southeast of Station 292.

There are currently 2 commercial shellfish growers affected by this restriction. When a commercial shellfish area's classification is downgraded due to poor water quality, the county authority must create a shellfish protection district (SPD) and implement a program to find and correct the pollution source(s) that are causing water quality to decline. A Shellfish Protection District is a designated region wherein nonpoint pollution threatens the water quality upon which the contamination or restoration of shellfish farming or harvesting is dependant (RCW 90.72, 2008). A Shellfish Protection District program is required to be put in place after a growing area classification is downgraded.

RCW 90.72.045 - The county legislative authority shall create a shellfish protection district and establish a shellfish protection program to address causes of pollution within one hundred eighty days after the department of health, because of water quality degradation due to ongoing nonpoint sources of pollution, has, after June 11, 1992, closed or downgraded the classification of a recreational or commercial shellfish growing area within the boundaries of the county.

Mason County Public Health developed this Shellfish Protection District, in cooperation with a stakeholder advisory group of those affected by the Big Bend downgrade, to provide leadership, planning and foster a shared vision of improving the water quality of Big Bend. Mason County Public Health currently works closely with WDOH and ECY to share water quality efforts including but not limited to delegating area referrals, data sharing, regulation, enforcement and resource support. This Big Bend Shellfish Protection District plan was developed to identify, investigate and monitor fecal contamination from adjacent shoreline and upland runoff affecting Big Bend in order to re-classify the downgraded areas to an "approved" status. The agencies,

businesses, organizations, and stakeholders listed below form the Big Bend Shellfish Protection Advisory Committee. This advisory committee adopted no by-laws and established their representation on their presence and involvement within the SPD boundary.

Stakeholders Represented in the Advisory Committee

- Citizens and businesses of Mason County
- Hood Canal Coordinating Council
- Mason Conservation District
- Mason County Community Services
- Mason County Public Health
- Mason County Shellfish Growers
- Skokomish Tribe
- Washington Sea Grant, University of Washington
- Washington State Department of Ecology
- Washington State Department of Health
- Washington State University- Mason County Extension

B. Background Information and History

Physical Description of the Big Bend SPD Watershed

The Big Bend area is located on the South Shore of Hood Canal around the mouth of Big Bend Creek in Union, WA (Map 1). The marine shoreline is 1.1 miles in length. There are 3 main drainages in the SPD watershed; Big Bend Creek, Dalby Creek and Alderbrook Ridge Creek (Map 3). The Big Bend Creek is the largest stream in the SPD being approximately 2.7 miles in length including major tributaries and the drainage area is about 0.94 square miles. It has an estimated base flow, or flow from groundwater into a channel overtime and the primary source of running water in a stream during dry season excluding all runoff, of one cubic foot per second (Aspect Consulting LLC, 2009). The creek starts in a series of wetlands with the upper reaches being mostly forested, undeveloped land. The Big Bend SPD boundary is directly adjacent to but does not overlap with the Annas Bay Shellfish Protection District to the west but is within the Lower Hood Canal SPD. Depths are up to 150 feet in the main channel of the Hood Canal near Big Bend (Map 2). The conditionally approved shellfish areas being targeted do not exceed depths of 30 feet. The boundary of the SPD is based off the hydrologic connectivity of the nearby drainages to Station 292 though investigations may exceed the boundary line if warranted (Map 3).

Marine Water Quality Monitoring on the Hood Canal

WDOH evaluates, classifies and monitors commercial shellfish growing areas. Hood Canal #6 is regularly monitored throughout the year although not all sampling stations are on the same

monitoring schedule. Station 292 is currently monitored monthly by bacterial marine water sampling for fecal coliform bacteria along with an inventory of environmental conditions.

Fecal coliform bacteria occur naturally in the digestive tracts of warm-blooded animals, such as people, livestock, pets, and wildlife, and aid in the digestion of food. The concentration of FC in water is measured to determine the likelihood of contamination of pathogenic organisms. Environmental factors, including temperature, sunlight, salinity, and available nutrients, affect surface water microorganism die-off rates. Fecal coliform bacteria counts are higher in summer than winter signifying seasonal variation (James and Joyce, 2004). Mason County Public Health partners with WDOH to secure consolidated contracts for water quality monitoring and pollution identification and correction. WDOH works with MCPH on closures, reclassifications and areas of concern for further monitoring, investigations and regulation (Figure 2).

In order to meet standards for an “Approved” status the station must have a rolling 90th percentile lower than 43 FC/100 mL (Figure 1). Station 292 is currently meeting water quality standards with a rolling 90th percentile at 37.2 FC 100mL (Table 2). Big Bend is considered a high risk area so reclassification cannot occur until on-the-ground monitoring, investigation, and capacity building has been done. The constructed stormwater conveyance systems, higher presence of older shoreline OSS, and the overall water quality of the Hood Canal contribute to the need for increased risk mitigation.

MCPH has been working with HCCC since 2012 on a pollution identification and correction project targeting the entire Hood Canal, including this SPD. Funding for the Hood Canal PIC work, currently in Phase III, extends to 2019. Funds from the HC PIC program may be used in this area for further pollution investigation and regulation.

Growth and Development

The Big Bend area is largely developed along the marine shoreline and relatively undeveloped in the upper reaches of the watershed. There are 550 parcels in the shellfish protection district excluding road easements and state lands. The use categories are: 276 (50%) residential, 255 (46%) undeveloped/resource and 19 (4%) commercial/trade/recreational. Big Bend Creek development is mostly located within 1,000 feet of the mouth of the creek. There are 296 parcels with an approved and monitored on-site septic or sewer system. According to the MCPH O&M database there are 215 conventional systems, 34 alternative systems, 22 parcels on the Alderbrook sewer, 21 parcels on a LOSS, 3 parcels on a community system, and 1 holding tank (Map 4).

History of Shellfish Harvesting and Water Quality in Big Bend

1992 Big Bend area is classified as prohibited due to Alderbrook Inn waste water treatment plant outfall. Previous classification is not known.

1999 Tertiary treatment (UV disinfection) is added to the Alderbrook wastewater treatment process.

2003 The Alderbrook wastewater treatment plant outfall is extended an additional 1,600 feet out into Hood Canal. This extension creates the potential for a classification upgrade within this portion of the growing area.

2004 Results obtained by EnviroVison during their 2004 evaluation indicate that higher bacteria loading rates occurred in Big Bend Creek during the dry-season sampling events.

2004 *Shoreline Survey of the Hood Canal 6 Shellfish Growing Area* recommends that prior to an upgrade in classification of this area the Department should evaluate the sampling results and flow measurements from Big Bend Creek and create an appropriate Unclassified area around its discharge to the growing area.

2006 Big Bend Cove is upgraded to Approved.

2008 Big Bend Creek is listed as a 303-d stream.

2010-2013 *Hood Canal 303(d) Stream Monitoring and OSS validation and verification –* Study found that Fecal Coliform results from Big Bend Creek did not meet the water quality standard.

2011-2013 Mason County performed dye tests of several of the residences adjacent to Big Bend Creek, none of which were found to be failing.

A Large On-site Septic System transport line that runs through Big Bend creek is investigated. It is found to be cracked. The transport line is a mile long and it connected to the Blue Heron Condo's Large On-site Septic System (LOSS). This pipe was repaired.

2015- In *Annual Growing Area Review for 2014* Marine Station 292 fails to meet NSSP water quality standards.

May 11, 2015 - A rain event produces a significant spike in fecal coliform contributing to a rolling 90th percentile well beyond the NSSP limit.

2015- September 9th 17 acres around Marine Station 292 receive downgrade from Approved to Conditionally Approved for shellfish harvest. 0.75 inches of rainfall in 24 hours will trigger a 5 day closure.

2016- In *Annual Growing Area Review for 2015* Marine Station 292 now meets NSSP water quality standards.

C. Strategy for Improving the Water Quality in the Big Bend Area

Goal: To take immediate steps to:

- **Reduce water pollution**
 - **Meet state and federal water quality standards**
 - **Ensure that water quality standards are maintained**
1. Identify accountable agencies, create a shellfish protection district advisory team
 2. Identify the boundary of the Big Bend Area SPD, create a map
 3. Create a Draft Closure Response Plan
 4. Ordinance creating SPD adopted by Commissioners
 5. Monitor Big Bend Area
 6. Identify Agriculture sites- currently none known
 7. Monitor On-site Sewage Systems
 8. Education and Capacity Building
 9. Identify and develop strategies to correct other non-point contamination sources.
 10. Enforcement
 11. Identify land use and planning needs in the area

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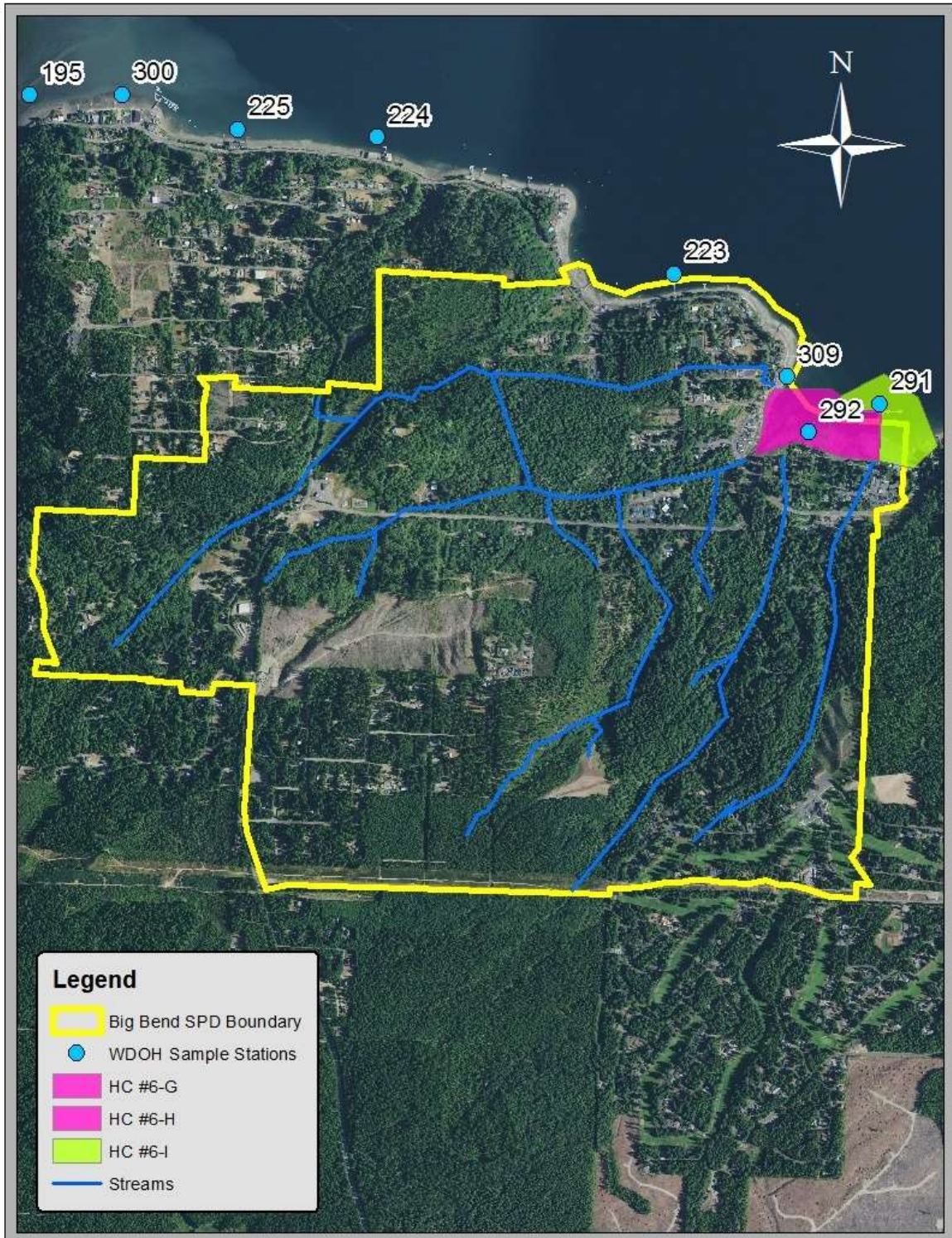
References

- Aspect Consulting LLC. WRIA 16 Planning Unit. (2009) River and Stream Impairment Analysis: WRIA 16 and 14b, Skokomish-Dosiwallips Planning Area. (Project No. 080261-001-03).
- “Community and Environment.” *Washington State Department of Health*. WDOH, n.d. Web. 04 Apr. 2017.
- ISSC. U.S. Food and Drug Administration. (2015). Guide for the Control of Molluscan Shellfish: 2015 Revision.
- James, E., and M. Joyce. “Assessment and Management of Watershed Microbial Contaminants.” *Critical Reviews in Environmental Science and Technology* 34.2 (2004): 109-39. Web.
- RCW 90.72. Shellfish Protection Districts. Washington State Legislature: 2008.

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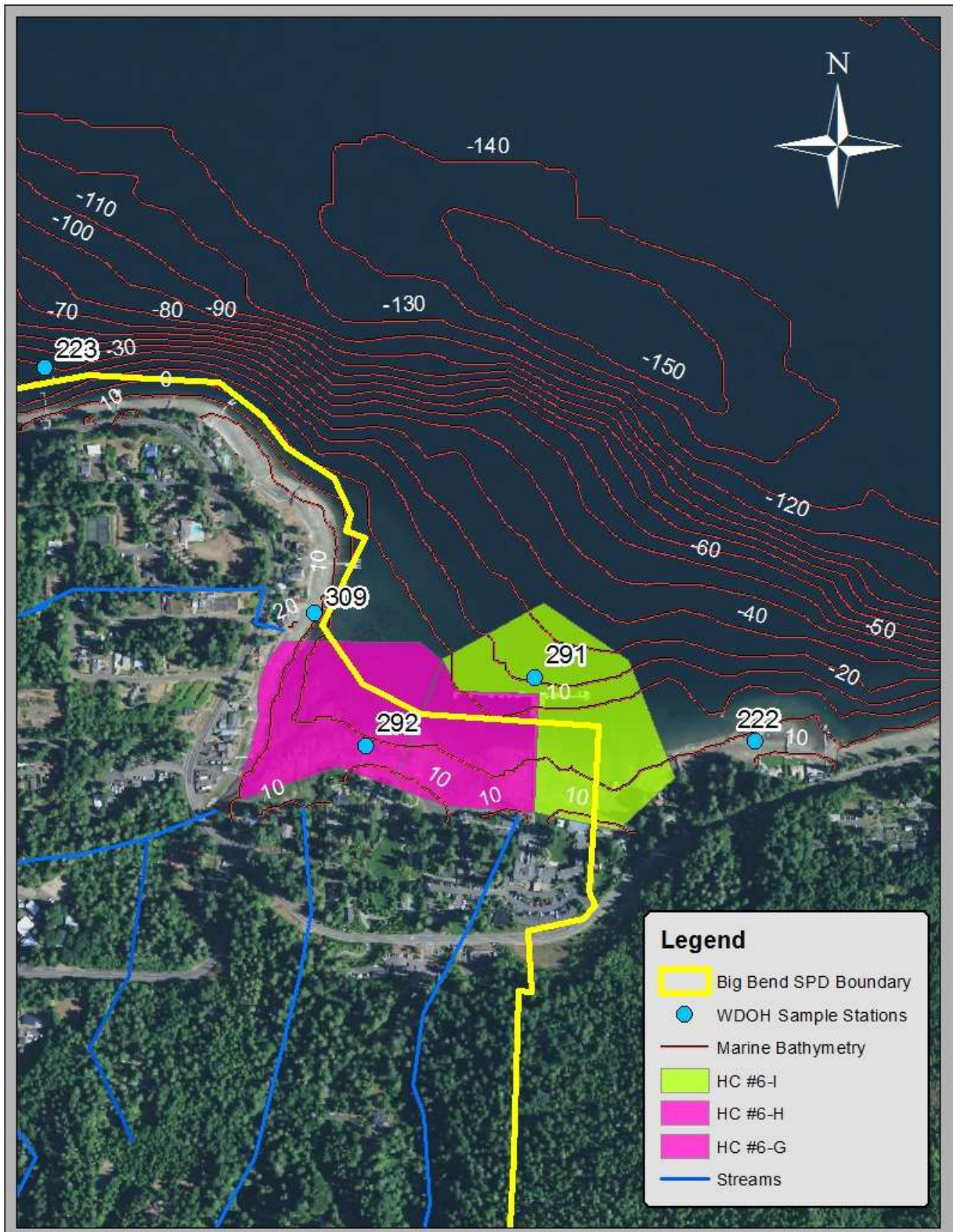
Appendix A: Maps

Map 1- Big Bend Area



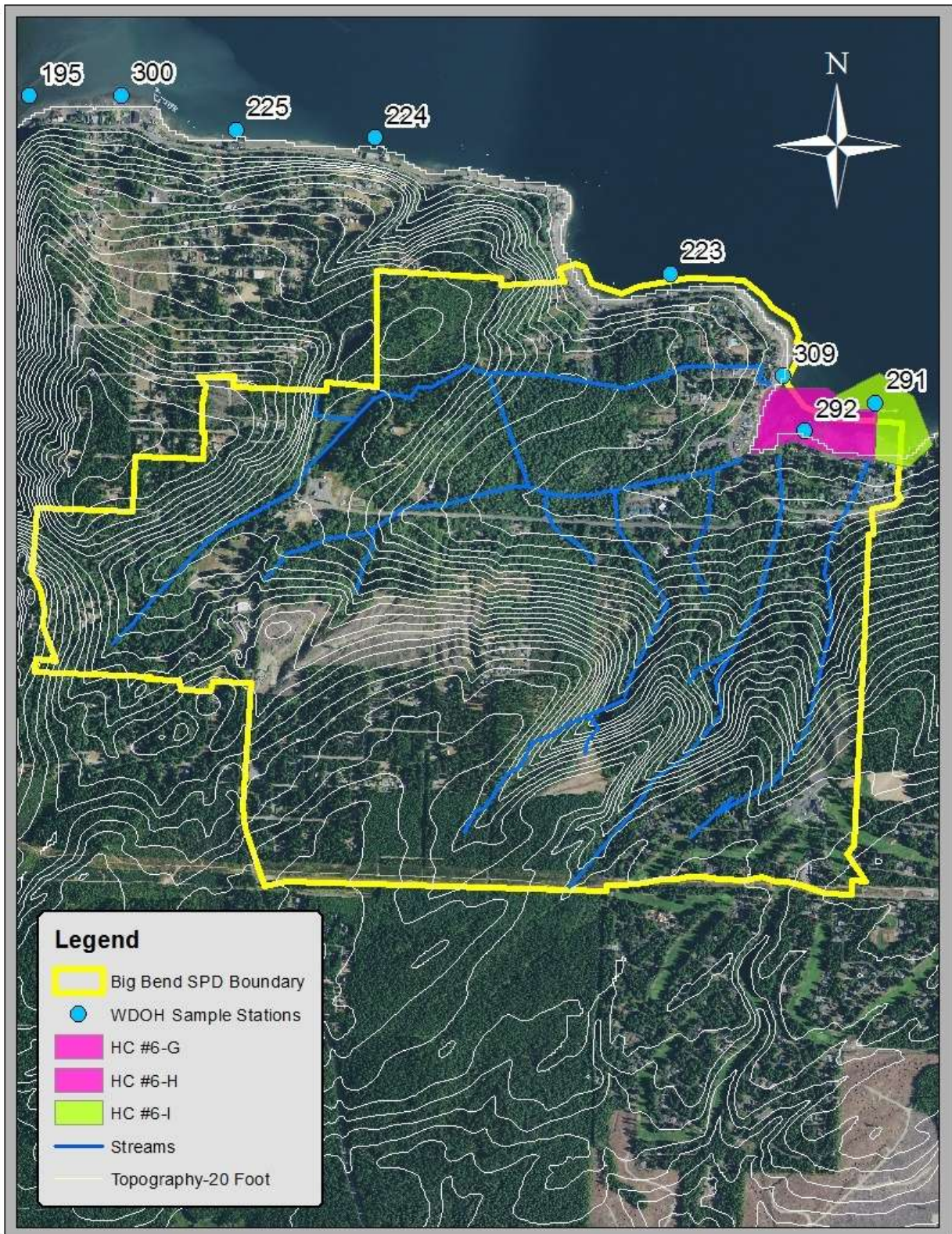
Note: The SPD boundary lines were determined based on survey information from WDOH and *ground-truthing* the drainages that have a hydrologic connection to Station 292.

Map 2 – Big Bend Bathymetry – 10 ft



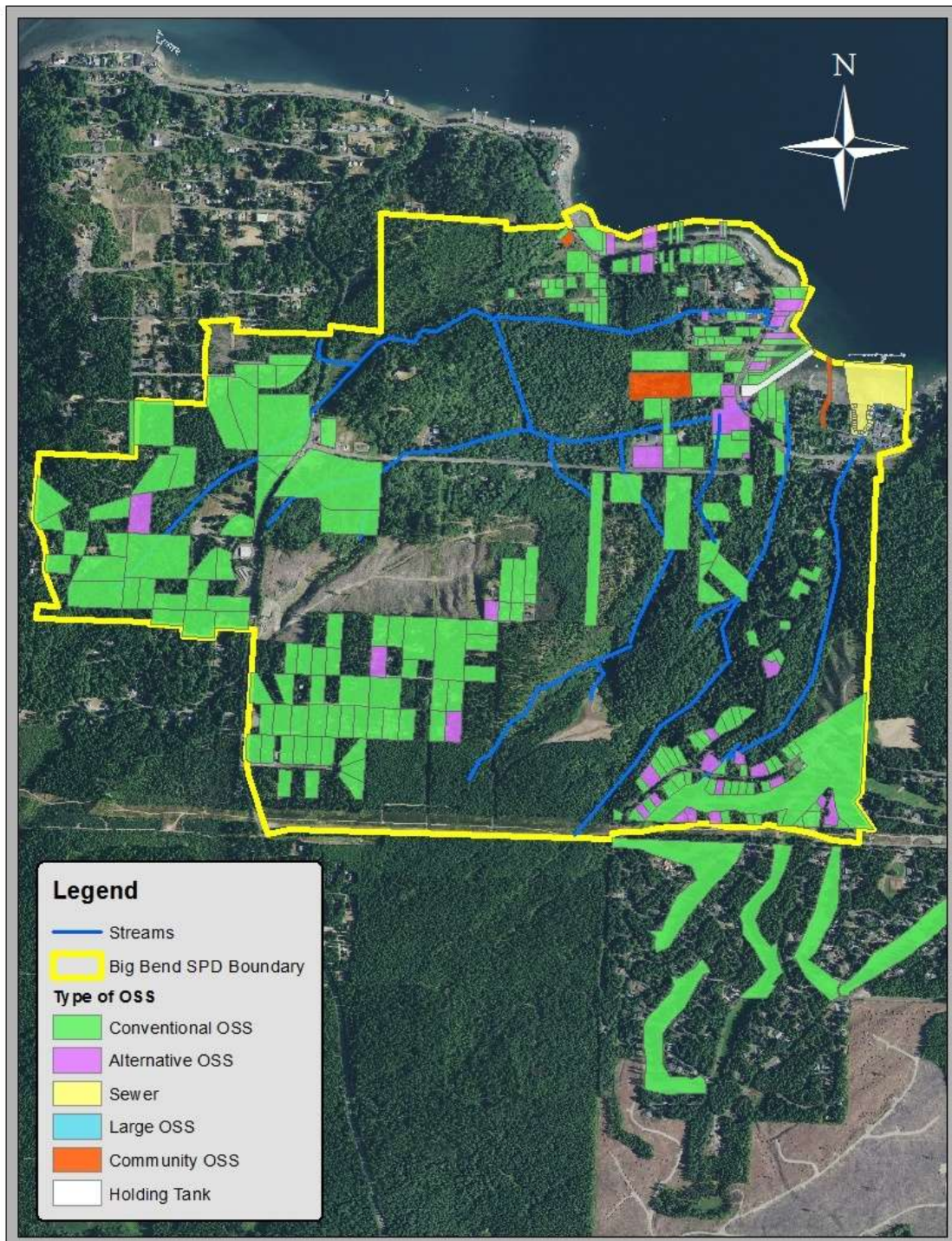
Note: Bathymetry ranges from sea level to a depth of 150 ft offshore of Station 292.

Map 3 – Big Bend Topography – 20 ft



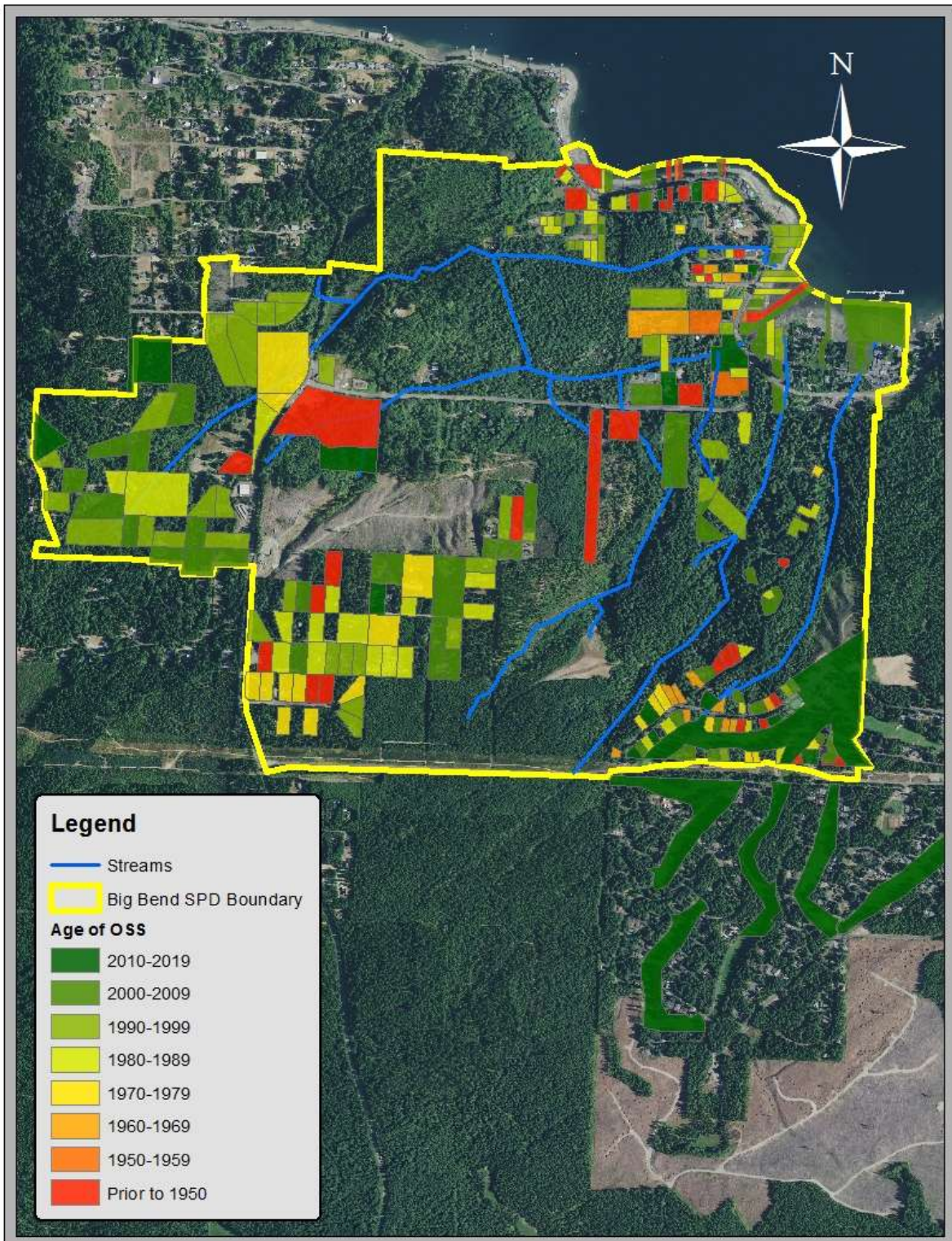
Note: Elevation ranges from sea level to 540 ft at the SW corner of the district.

Map 4 – Big Bend OSS Type



Note: The figure above was created from a 4/4/2017 report. Conventional OSS comprises of a tank and drainfield and often a pressure tank and relies on the availability of soil for effluent treatment. Alternative OSSs are lacking sufficient soil for effluent treatment and must include alternative treatment methods. Community OSSs comprises of individual septic tanks and a shared drainfield. Holding tanks are septic tanks with no drainfield and must be pumped as needed. LOSSs have individual tanks and a shared drainfield that services over 3500 gal/day. LOSSs are regulated by WDOH. Sewers systems wastewater treatment facilities and are regulated by ECY.

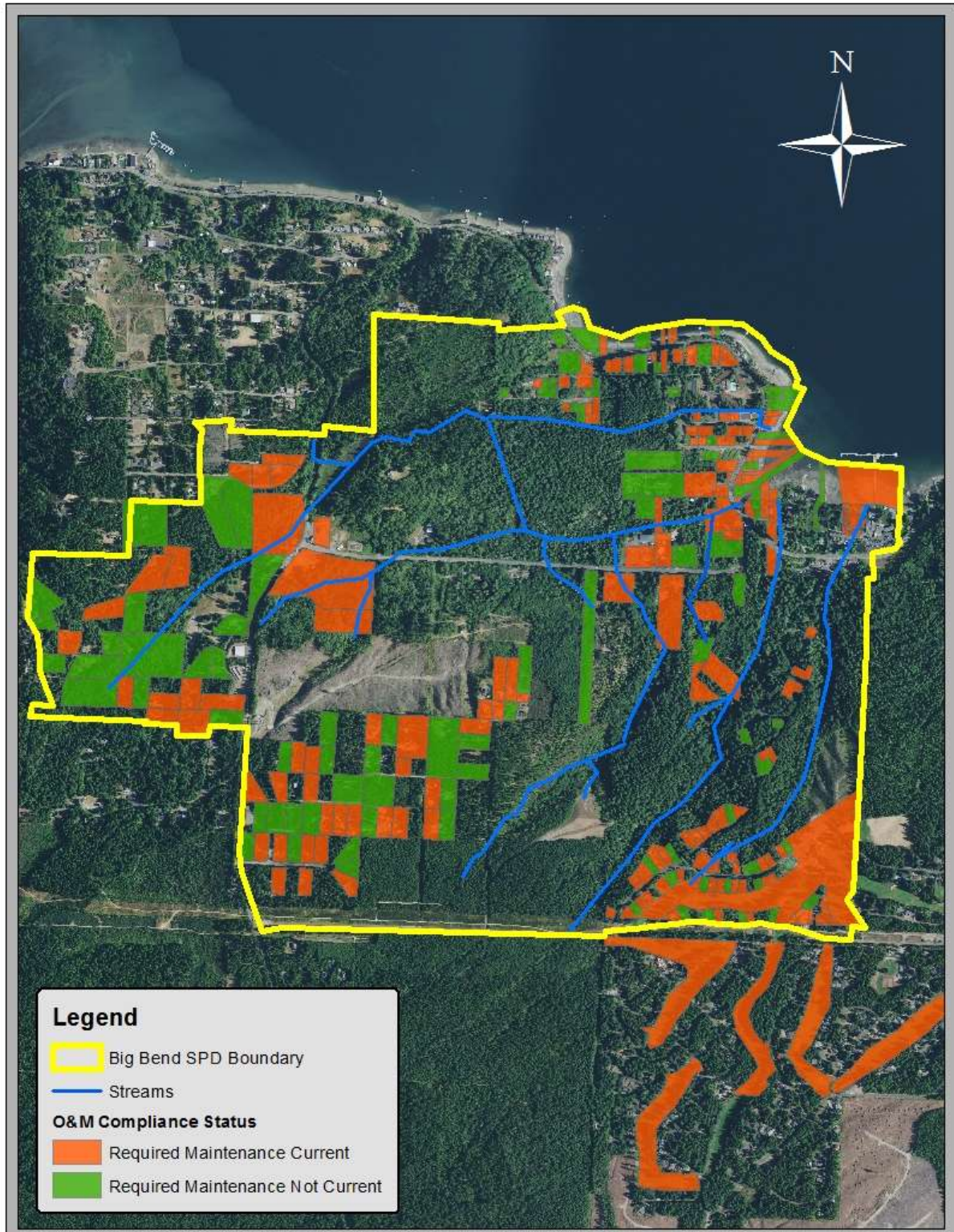
Map 5 – Big Bend OSS Age



Note: The figure above was created from a 4/4/2017 report.

2010-2019	2000 - 2009	1990 - 1999	1980 - 1989	1970 - 1979	1960 - 1969	1950 - 1959	Prior to 1950
19%	26%	18%	15%	17%	4%	1%	13%

Map 6: Big Bend OSS Operation and Maintenance Status



Note: The figure above was created from a 4/4/2017 report. Of the OSS within the Big Bend SPD boundary that are tracked, 65% are in compliance with the state maintenance schedule (Table 1). The schedule, as well as who is authorized to inspect the OSS, is contingent on the type of system.

Appendix B: Tables and Figures

Table 1: OSS Maintenance Schedule

Septic System Types						
Conventional Gravity	Conventional Pressure & Open Bottom Sand Filter	Mound & Sandfilter	ATU, Glendon, Recirculating Gravel Filter, Sub Surf. Drip & Community Drainfield	Non-Residential & Commercial	Large OSS	Sewer
Inspection Frequency						
Every 3 years	Annually	Annually	Annually	Annually, Testing may be required	Annually	Annually
Approved Service Providers						
Homeowner, Pumper, O&M Specialist	Homeowner, Pumper, O&M Specialist	Homeowner, O&M Specialist	O&M Specialist, Proprietary Device Licensee	O&M Specialist	WDOH	ECY

Table 2: Station 292 Historical Data

**WDOH Marine Water Quality Summary
Growing Area: Hood Canal #6**

Station: 292

Classification: *Conditionally Approved*

Method: SRS

Total Samples: 30

Date Range: 01/02/2014 – 01/12/2017

Range (FC/100 mL): 1.7-350.0

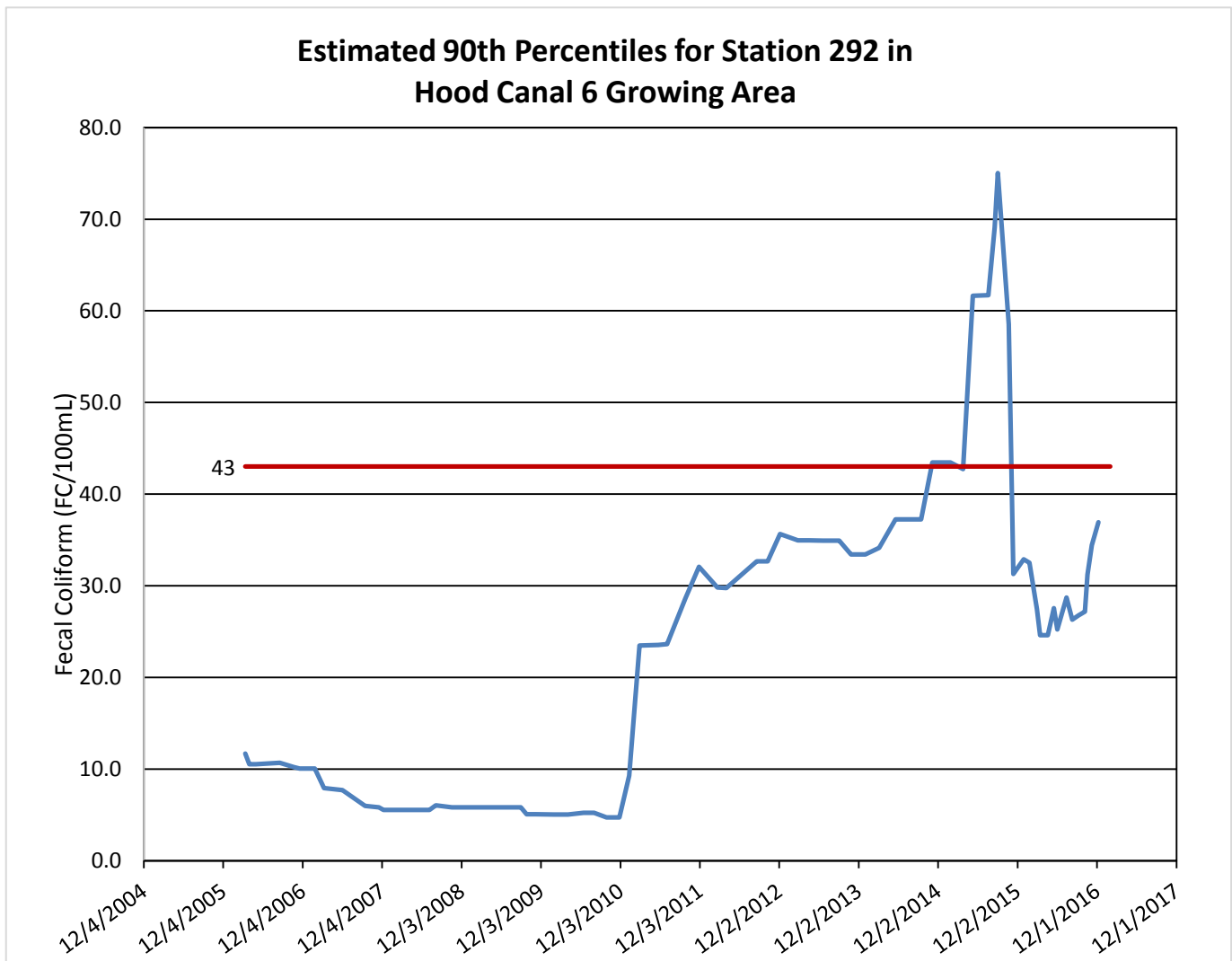
E90th (FC/100 mL): 37.2

Geometric Mean (FC/100 mL) 6.3

Meets Standards: Y

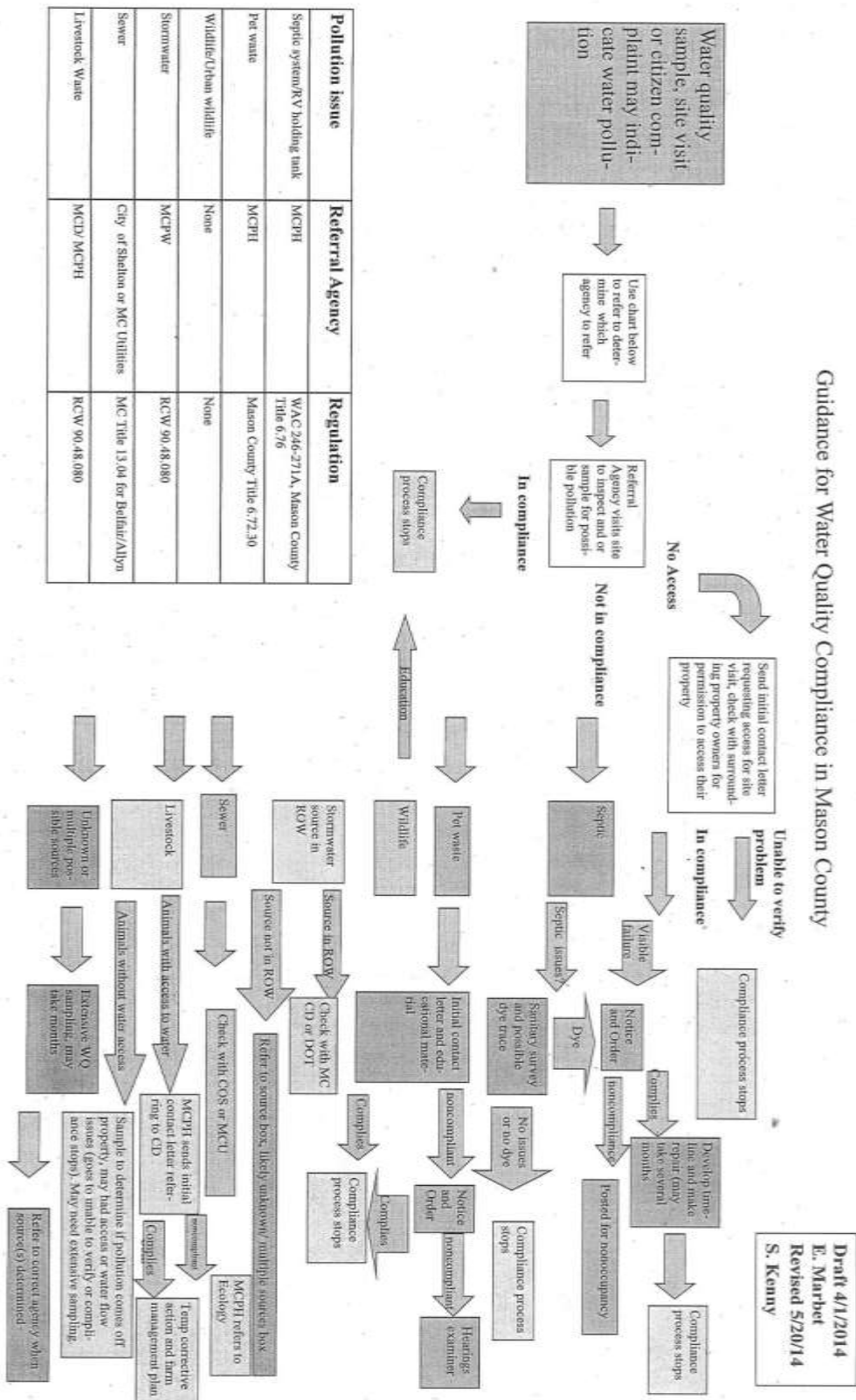
Sample Date	Event Type	Time	Tide	SWT	Salinity	Fecal Coliform	Rainfall
01/02/2014	Regulatory	10:33	Ebb	9	22	2	
03/06/2014	Regulatory	11:02	Ebb	9	14	4.5	
05/20/2014	Regulatory	11:06	Ebb	16	13	17	
06/09/2014	Regulatory	14:31	Flood	19	20	1.7	
07/22/2014	Regulatory	12:56	Flood	18	20	1.7	
09/15/2014	Regulatory	09:31	Flood	15	18	2	
11/05/2014	Regulatory	10:35	Flood	11	5	49	
01/27/2015	Regulatory	09:44	Flood	10	14	1.7	
03/26/2015	Regulatory	11:34	Ebb	11	20	1.8	
05/11/2015	Regulatory	13:08	Ebb	15	11	350	
07/21/2015	Regulatory	11:31	Ebb	19	28	2	
08/19/2015	Regulatory	10:56	Ebb	20	15	33	
09/02/2015	Regulatory	10:44	Ebb	14	25	23	
10/22/2015	Regulatory	13:15	Flood	13	13	4.5	
11/12/2015	Regulatory	09:29	Ebb	11	8	6.8	
12/30/2015	Regulatory	11:03	Ebb	5	10	11	
01/25/2016	Regulatory	12:11	Ebb	8	5	2	
02/29/2016	Regulatory	10:40	Ebb	10	14	2	
03/15/2016	Regulatory	12:23	Ebb	9	15	1.7	
04/19/2016	Regulatory	14:25	Flood	17	17	1.8	
05/17/2016	Regulatory	11:36	Flood	17	9	23	
06/01/2016	Regulatory	13:17	Flood	19	18	2	
07/14/2016	Regulatory	11:21	Flood	18	17	33	
08/09/2016	Regulatory	10:43	Flood	18	25	2	
09/07/2016	Regulatory	12:23	Ebb	16	20	4.5	
10/06/2016	Regulatory	11:09	Ebb	14	20	4.5	
10/18/2016	Regulatory	10:34	Ebb	12	12	33	
11/07/2016	Regulatory	11:18	Ebb	12	3	23	
12/08/2016	Regulatory	11:04	Flood	4	7	17	
01/12/2017	Regulatory	13:08	Flood	7	0	4.5	

Figure 1: Rolling Estimated 90th Percentile of Marine Station 292 from 2005-2017



Note: The above graph shows the water quality at Station 292 compared to the NSSP Limit of 43 FC/100 mL. The calculation is “rolling” because it is based off of the most current 30 samples (See Table 2). It is “estimated” because data is variable. A 90th percentile means that 90 % of the sample results are below that number and 10 % are above.

Figure 2. Guidance for Water Quality Compliance in Mason County



Task	Subtasks	Lead group/agency	Participating groups/agencies	Deliverable	Progress	Due date	Date completed	Comments
1. Identify accountable agencies and create a SPD advisory team.	Identify stakeholders for initial meeting	MCPH		List of stakeholders	Done	11/55/2015	2/1/2016	
	Set date for first meeting	MCPH		Meeting date	Done		3/3/2016	
	Agree upon representation	MCPH	Advisory committee	Description of representation	Done		3/3/2016	
	Create membership list.	MCPH		Membership list	Done		3/3/2016	

2. Identify the boundaries of the Big Bend SPD, create map.	Identify drainage area	MCPH	Advisory Committee	Boundary area	Done	11/15/2015	3/3/2017	Done
	Take map to Commission for adoption	MCPH		map	Done		2/16/2016	Done

3. Create a Draft Closure Response Plan	Create first draft	MCPH		Draft Plan	Done	2/16/2016		
	Review and revise drafts with Advisory Committee Meeting	MCPH	Advisory Committee		On-going at SPD meetings			
	Bring draft to vote, approve final version.	MCPH	Advisory Committee			5/1/2017		
	Take final version to Commissioners.	MCPH						

Task	Subtasks	Lead group/agency	Participating groups/agencies	Deliverable	Progress	Due date	Date completed	Comments
4. Ordinance creating SPD adopted by Commissioners	Take draft ordinance to commissioners for approval	MCPH			Done	12/1/2015	Passed 2/9/16	

5. Monitor Big Bend	WDOH will collect marine samples monthly	WDOH		Data set	ongoing	10/30/2017		
	Mason County will sample streams in coordination with WDOH marine sampling.	MCPH	WDOH	Data set	Starting May 2017	10/30/2017		Funding will be released after SPD plan is approved. Includes bracket sampling, rainfall events, and peak use sampling.
	Mason County will sample bulkhead and shoreline seeps.	MCPH		Data set	Starting May 2017	10/30/2017		Will use 2016 data for prioritizing monitoring.
	WDOH assess the feasibility of installing a Hood Canal based rain gauge.	WDOH		Feasibility Report		10/30/2017		

Task	Subtasks	Lead group/agency	Participating groups/agencies	Deliverable	Progress	Due date	Date completed	Comments
6. Identify Agricultural sites, referral to MCD for correction	Financing to MCD for conservation plans	MCPH	MCD	Number plans implemented with funding.		10/30/2017		
	Reporting	MCD		Number of farm plans and conservation plans implemented		10/30/2017		Conservation plans information can be shared. Farm plans are confidential.
	Post correction sampling after installed BMPs	MCPH		Data set		10/30/2017		
	Farm inventory	MCPH	MCD	Data set of number of parcels with presence and type of agricultural activity		10/30/2017		

7. Monitor On-site sewage systems	Mailings	MCPH		Number of mailings	Summer 2017	10/1/2017		Mailing can include O&M reminders, educational materials and events.
	Incentives	MCPH		Number of rebates used	Summer 2017	10/1/2017		MCPH will offer a \$200 rebate for O&M or pumping and a second \$200 for installing risers or filters

Task	Subtasks	Lead group/agency	Participating groups/agencies	Deliverable	Progress	Due date	Date completed	Comments
	Evaluations (surveys and dye traces)	MCPH		a) Number of parcel Evaluations b) Number of dye tests	Summer 2017	10/1/2017		Identifying: system uses, land use, OSS age, compliance, presence of sanicans, etc.
	As-built creation	MCPH		Number of after-the-fact as-built submitted	Summer 2017	10/1/2017		
	Post correction sampling	MCPH		Data set	Summer 2017	10/1/2017		

8. Education	MCPH will participate in 2 educational events in the SPD. Sea Grant and WSU will participate as their schedule allows.	MCPH	Sea Grant/WSU	Number of events MCPH, Sea Grant, and WSU participated in.		10/30/2017		O&M classes, shoreline living classes, educational booths, etc. Sea Grant and WSU schedule not available at this time.
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9. Identify other non-point water quality contamination sources. Develop strategies to correct	MCPH will coordinate with Mason County Public Works and WA DOT on stormwater improvement projects and historical data.	MCPH/MCPW /WSDOT		Report on stormwater efforts by MCPW and WSDOT.		10/30/2017		
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Task	Subtasks	Lead group/agency	Participating groups/agencies	Deliverable	Progress	Due date	Date completed	Comments
	MCPH will offer up to 10 pet waste stations to SPD	MCPH		No. of pet waste stations installed		10/30/2017		Offer will extend to businesses, HOA, etc.
	MCPH will inventory wildlife sighted	MCPH	Sea Grant			10/30/2017		Sea Grant will provide MCPH with seal and bird inventories.
10. Enforcement	Onsite and Non-point pollution enforcement	MCPH	ECY	No. of ECY enforcement cases No. of houses posted for non-occupancy		10/30/2017		MCPH will enforce on-site regulations and ECY will enforce non-point source pollution
11. Identify land use needs in the area	Investigate the effect of growth on water quality in the area. Investigate what build-out would be.	Mason County Community Services	Advisory Committee			10/30/2017		