



HOOD CANAL COORDINATING COUNCIL

HOOD CANAL REGIONAL POLLUTION IDENTIFICATION AND CORRECTION PROGRAM

PHASE III – IMPLEMENTATION (April 2017 – June 2019)

Final Report

August 2019

Prepared by HCRPIC Program coordinators:

Leslie Banigan, Kitsap Public Health District
Haley Harguth, Hood Canal Coordinating Council
Susan Gulick, Sound Resolutions

Program Partners:

Hood Canal Salmon Enhancement Group
Jefferson County Public Health
Jefferson Conservation District
Kitsap Public Health District
Kitsap Conservation District
Mason County Public Health
Mason Conservation District
Port Gamble S'Klallam Tribe
Skokomish Tribe

Acknowledgements

The Hood Canal Regional Pollution Identification and Correction Program would like to thank our program partners and collaborators for their contributions throughout this project:

Hood Canal Coordinating Council, Washington State Department of Health, Jefferson County Public Health, Kitsap Public Health District, Mason County Public Health, Port Gamble S'Klallam Tribe, Skokomish Tribe, Hood Canal Salmon Enhancement Group, Jefferson Conservation District, Kitsap Conservation District, Mason Conservation District, University of Washington, Tacoma – Puget Sound Institute, Washington State University – Extension, PetersonGIS, Cascadia Consulting Group.

This regional partnership project would not have been possible without funding from the United States Environmental Protection Agency.

More information on the Hood Canal Regional Pollution Identification & Correction Program is available at www.hccc.wa.gov/PIC, and www.OurHoodCanal.org.

This project has been funded wholly or in part by the United States Environmental Protection Agency under assistance agreement PC-01J18001 to Washington Department of Health. The contents of this document do not necessarily reflect the views and policies of the Environmental Protection Agency, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

Table of Contents

BACKGROUND	1
HCRPIC Goals and Objectives	3
Phase I: Planning (2012 – 2014)	3
Phase II: Implementation (2015 – 2017)	4
PHASE III: IMPLEMENTATION (2017-2019)	7
Guidance Group	7
Phase III Field Work Objectives	8
Priority Shoreline Survey Areas	8
Shoreline Surveys, Parcel Surveys, and Investigations.....	10
Pollution Hotspot Parcel Upgrades	13
OSS Failures Analysis.....	13
Ambient Fresh Water Monitoring.....	14
Shellfish Protection Activities.....	15
Mapping	15
Outreach and Education.....	16
Septic System Service Rebates.....	16
Pilot Nutrient Studies	18
Sustainable Funding	18
Related Work Funded by Other Sources.....	19
PHASE III CONCLUSIONS	19
RECOMMENDATIONS	22
REFERENCES.....	23
APPENDICES.....	24
Appendix A: HCRPIC Phase III Maps	25
Appendix B: HCRPIC Phase III Workplan	43
Appendix C: HCRPIC Field Implementation Guide	52
Appendix D: HCRPIC Phase III Hotspot Closures	77
Appendix E: HCRPIC Field Implementation Guide Addendum for Ambient Fresh Water Monitoring Procedures.....	81
Appendix F: HCRPIC Phase III Mapping Methods.....	84
Appendix G: HCRPIC Phase III Outreach Products.....	86

BACKGROUND

Hood Canal is a natural, glacier-carved fjord more than 60 miles long, forming the westernmost waterway and margin of the Puget Sound basin. It begins in the north in Admiralty Inlet and extends southwesterly about 45 miles to the Great Bend at Annas Bay. From there its “hook” extends northeasterly 15 miles to its head at the Union River estuary near Belfair.

The Canal has great cultural, economic, and subsistence value to Washington State residents and tribes. Hood Canal shellfish and finfish resources have important economic and recreational value to the community.

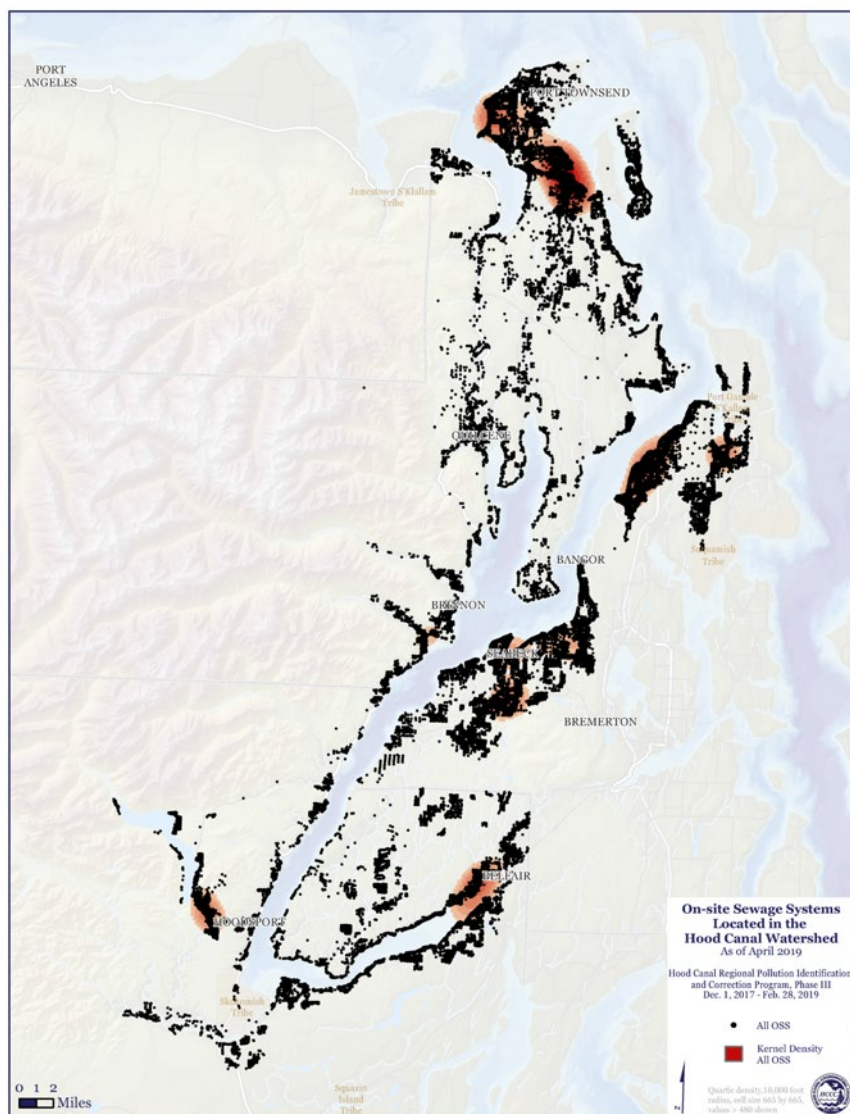


Figure 1: Map of all OSS locations in Hood Canal, with the densest concentration of OSS highlighted in red (Appendix A, Figure A-1)

The Hood Canal region is home to more than 29,000 on-site sewage systems (OSS), which can fail as they age, contributing bacterial pollution to Hood Canal streams and beaches. Many OSS are in close proximity to water bodies (Figure 1; Appendix A, Figure A-1).

Pollution Identification and Correction (PIC) and water quality programs have been essential to protecting public health by reducing bacterial and nutrient pollution sources. A regional approach enables efficient, prioritized, and coordinated responses.

The Hood Canal Regional Pollution Identification and Correction (HCRPIC) Program partners include Jefferson, Kitsap, and Mason Counties, the Port Gamble S'Klallam and Skokomish Tribes, the Hood Canal Salmon Enhancement Group, Jefferson, Kitsap, and Mason Conservation Districts, and the Hood Canal Coordinating Council (HCCC).

The HCRPIC Program plays a critical role keeping Hood Canal waters safe for recreation by preventing and reducing pollution from human and animal waste. Figure 2 (Appendix A: Figure A-2) shows the current water quality status in Hood Canal. The PIC approach involves shoreline surveys to identify pollution that puts Hood Canal at risk. When a pollution hotspot is confirmed, it is tracked up the drainage to its source, where county staff work with the property owner to correct the problem.

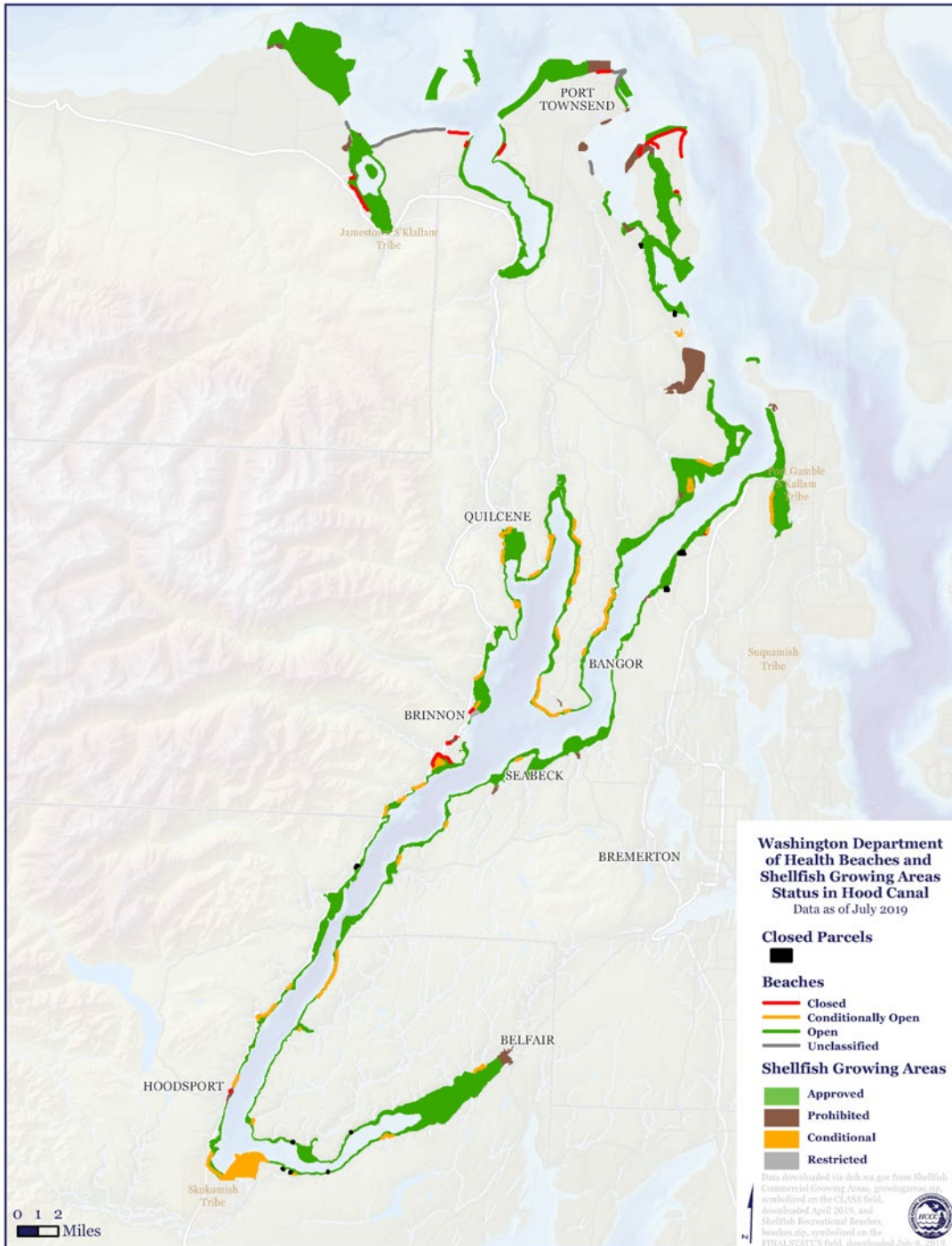


Figure 2: Hood Canal water quality status as of July 2019 (Data source: WSDOH; Appendix A: Figure A-2)

The Hood Canal Coordinating Council has partnered with its member jurisdictions to develop and implement the regional PIC partnership for the Hood Canal Action Area. The program has provided a unique opportunity to combine and share strengths and experience of each of the partners' PIC and water quality programs in order to build a robust regional program. The HCRPIC program was designed to be rolled out in phases.

HCRPIC Goals and Objectives

The goals of the HCRPIC Program are:

- Protect public health and shellfish growing areas and restore water quality by correcting fecal pollution sources
- Restore and protect Hood Canal habitat

The HCRPIC Program improves efficiency and efficacy in each Hood Canal jurisdiction, with the following objectives:

- Coordinate regulatory oversight and policy development
- Coordinate water pollution investigation and cleanup work

Phase I: Planning (2012 – 2014)

HCCC was funded by the U.S. Environmental Protection Agency (EPA) National Estuary Program (NEP) through Washington State Department of Health (WSDOH) to develop the multi-jurisdictional work group and program guidance documents. The HCRPIC program coordinators initially built the work group with representatives from local health jurisdictions and tribal natural resource departments. Local conservation districts were brought in to develop the animal waste strategy and local stormwater and regional planning recommendations were used to develop the stormwater strategy and sustainable funding strategy.

The planning phase was very valuable because it allowed us to develop a regional work group and planning documents to coordinate and guide regional pollution identification and correction work. The regional work group met quarterly and collaborated closely to develop the skills and materials needed for regional implementation work. They developed a coordinated watershed-wide project framework, producing program guidance that include a regional monitoring plan and technical guidance documents.

Development of the regional work group had the side benefit of quickly building inter-jurisdictional relationships. In May 2014, between the planning phase (Phase I) and the implementation phase (Phase II), the Skokomish Tribe recognized an opportunity to work with the HCRPIC Program to assess and improve water quality in a rich shellfish resource area in Hoodsport that is closed due to historical pollution concerns. Kitsap Public Health District (Kitsap Health) and HCCC coordinated Hoodsport early action planning. WSDOH, Mason County Public Health (Mason Health), and the Skokomish Tribe worked together to assess shoreline drainages and marine water in the area and referred bacterial hotspots for PIC work with the long-term goal of documenting bacterial source correction and water quality improvements to support WSDOH opening the Hoodsport shellfish beds for harvest.

The HCCC Aquatic Rehabilitation Technical Advisory Committee Wastewater-OSS Workgroup developed the first phase of a project in 2010 to create GIS maps of wastewater infrastructure (OSS, sewer, planned sewer, and large OSS) in the Hood Canal watershed. During Phase I, local jurisdictions provided current on-site sewage system permit data to update the GIS maps. WSDOH shellfish growing areas

were added to kernel cluster maps showing denser areas of old or unpermitted OSS to inform the prioritization of future work areas.

HCRPIC Program planning documents and meeting minutes are posted on the HCCC website at: www.hccc.wa.gov/PIC.

Phase II: Implementation (2015 – 2017)

In October 2014, HCCC received additional NEP funds to conduct Phase II, the first implementation phase, of the HCRPIC Program. Our unique partnership with WSDOH helped us quickly identify and prioritize Hood Canal shoreline work areas based on their robust marine water data and prior water quality studies. The HCRPIC Guidance Group identified 8.2 priority shoreline miles in Mason County and 8.5 priority shoreline miles in Jefferson County for shoreline surveys. The HCRPIC guidance document defines a shoreline survey as “the inventory and bacterial assessment of all flowing fresh water discharges to the shoreline within a project area.”

The project coordinators submitted the Quality Assurance Program Plan (QAPP) in December 2014 and field work started in February 2015 following QAPP approval.

Guidance Group

Between February 2015 and December 2016, the partners grew the regional work group into an effective Guidance Group, resulting in shared methods, tools and techniques, field work partnerships, problem solving, and networking opportunities. Guidance Group meetings were held quarterly, with an option of joining online, and were well attended by regional team partners.

The HCRPIC program facilitators administered the Phase II program contracts, QAPP, and reporting requirements, allowing local jurisdictions to focus their efforts on pollution identification and correction tasks. Each Phase II Guidance Group meeting included quality assurance reminders about investigating and closing shoreline hotspots, and timely, accurate, and complete field work reporting.

The Port Gamble S’Klallam Tribe (PGST) and the Skokomish Tribe are long-time supporters of a regional PIC program and have been very active partners in the HCRPIC Guidance Group under their own funding. The PGST science and technical staff conducted research and tested investigative techniques to find new PIC tools. The Skokomish Tribe provided valuable knowledge about Mason County’s Hood Canal shoreline. They mentored Mason Health staff and conducted supplementary field work with their own funding.

PGST developed the concept of “PIC Plus” water quality research to provide new tools to help identify fecal pollution sources in areas where traditional PIC methods have not been successful:

- PGST coordinated *E. coli* sample collection over a 24-hour period, testing for temporal variation in sample results, using a portable autosampler to collect a water sample every hour. Staff also collected samples every six hours over a 72-hour period. Results showed that *E. coli* levels varied significantly with time of day.
- PGST used a Turner Designs Cyclops 7 Submersible Fluorometer with tryptophan and optical brightener sensors to determine their usefulness for identifying fecal pollution hotspots. Tryptophan, as an amino acid, is one of the building blocks of life. Coliform bacteria synthesize high levels of tryptophan in their cells, making tryptophan a useful biomarker of fecal contamination in water. Optical brighteners are present in detergent whiteners and color-

correcting or brightening additives in cosmetic formulas. At one of the three study sites, there was a weak correlation between *E. coli* and tryptophan. There was no correlation between optical brighteners and *E. coli* at the three sites where the fluorometer was deployed.

- It is valuable for PIC programs to be able to distinguish between human and animal fecal sources because of the different investigation and remediation strategies for sewage and animal waste. PGST conducted a literature review of published methods used to identify microbial sources and developed a DNA-based microbial source tracking study, under separate funding.

The Skokomish Tribe was an important contributor to the development of the regional PIC concept and the Phase I program guidance materials. They utilized their Phase II program funds to target implementation in and around their reservation lands.

The Skokomish Tribal natural resource team alerted the regional PIC team to rich shellfish resources in the Hoodspout area that are closed to harvesting based on the age of development and historical pollution concerns. They conducted early action work in partnership with HCRPIC facilitators, WSDOH, and Mason Health before and during the Phase II implementation phase. The tribe worked in partnership with Mason Health to assess shoreline drainages and receiving marine waters and referred bacterial hotspots for PIC work.

Shoreline Surveys and Parcel Surveys and Investigations

Between February 2015 and December 2016, Jefferson, Kitsap, and Mason Counties conducted priority shoreline surveys, parcel surveys, and investigations as summarized in Table 1. The jurisdictions were able to conduct 55% more shoreline survey miles than committed, and 177% more parcel surveys than committed.

Table 1: HCRPIC Phase II Implementation Work

Agency	Shoreline Surveys		Parcel Surveys		OSS Failures	OSS Repairs
	Miles Committed	Miles Conducted	Number Committed	Number Conducted	Number Identified	Number Completed
Jefferson County Public Health	8.5	25.5	140	353	46	42
Kitsap Public Health District	25.9	25.9	0	282	14	14
Mason County Public Health	8.2	13.1	140	143	16	11
Port Gamble S'Klallam Tribe	0	1.6	0	0	0	0
Total	42.6	66.1	280	778	76	67

During Phase II, PGST developed and implemented their own PIC program, based on HCRPIC, to identify and correct nonpoint pollution on Hood Canal tribal lands. They conducted shoreline surveys of the 1.6 miles of tribal reservation shoreline in Port Gamble Bay and investigated a confirmed hotspot in partnership with Kitsap Health, completing the assessment of all Kitsap Peninsula shorelines. Kitsap Health provided access to and trained PGST to use Kitsap’s cloud-based water quality database and entered the PGST shoreline sample data.

PGST also conducted an investigation in response to an overflow of their sewer system. Kitsap Health provided technical assistance to develop a dye-testing strategy. PGST conducted the dye-testing campaign, and identified and corrected collection system leaks.

Septic Tank Service Rebates

HCRPIC Skokomish tribal partners chose to use their Phase II funding to provide septic tank service rebate vouchers for high-priority Mason County Hood Canal properties. to provide incentives for homeowners to maintain their septic systems. The Guidance Group developed a pilot rebate incentive program for Phase II. More than 40 percent (43.5%) of the 46 properties that redeemed vouchers had no record of current maintenance.

The HCCC funded complementary outreach in late 2016 through the Hood Canal Local Integrating Organization's Puget Sound Action Agenda Near Term Action funding. During the 36-day eligibility window, 17 rebates were utilized in Hood Canal. Nearly a quarter (4 of the 17; 23.5%) of the participating parcels corrected deficient conditions.

The HCRPIC Guidance Group found the rebates very useful to encourage OSS maintenance and assess OSS functional status. This confirmed Phase II audience research that found the most popular incentive for a site visit was a rebate or coupon for septic system maintenance. As a result, the HCRPIC program developed a rebate program element for Phase III.

OSS GIS Mapping

The HCRPIC Phase II project updated the Hood Canal OSS GIS Maps illustrating OSS locations categorized by type, age, and permit status. Shellfish harvesting areas and confirmed shoreline bacterial hotspots were mapped and clusters of potentially problematic OSS were analyzed to help the HCRPIC team prioritize field work.

A mapping component was added to illustrate Phase III field work: shorelines sampled, hotspots investigated, parcels surveyed, and OSS failures identified and repaired.

Pilot Nutrient Studies

During Phase II, the HCRPIC program worked with University of Washington's Puget Sound Institute (Puget Sound Institute) to design and conduct a pilot study to evaluate whether seepage pits located on Mason County nearshore parcels are a significant source of bacteria or nitrogen to the Hood Canal shoreline.

Thirty seepage pits within 100 feet of the Mason County shoreline were identified and sampled in 2016 during the wet weather season and the dry weather season. Only six of the 30 sites (20%) could be used in this study: many sites had no shoreline flows or were tidally influenced. Sites were sampled for fecal coliform bacteria, ammonia nitrogen, nitrate/nitrite nitrogen, chloride, phosphate, and sulfate and results were compared to reference data derived from work conducted in Hood Canal between 2007 and 2011.

When compared to other sites in southern Hood Canal, the seepage pit-associated sites were not significantly greater sources of bacteria or nutrients to the shoreline and were not more likely to have shoreline discharges. The findings were limited by the number of sample sites. More research is needed to make conclusive recommendations about seepage pit use in Hood Canal.

Outreach and Education

HCRPIC worked with Washington State University Extension – Jefferson County (WSU-Ext) to build on social marketing outreach and education work conducted in 2015 by WSU-Ext and the Washington Conservation Commission (Joy et al. 2015). Follow-up interviews for the 2015 project were conducted approximately two months after the site visit to measure whether the recommended best management

practices (BMPs) were implemented and what barriers may have prevented implementation. A key finding was that follow-up interviews were conducted too soon.

During Phase II, WSU-Ext. conducted supplemental follow-up interviews one year after the 2015 site visits and gathered audience research information to design and implement effective outreach methods to encourage BMP adoption. They found the common need for follow-up, and the primary barriers to implementation were physical limitations and the need for information or assistance.

WSU-Ext. utilized the audience research to design and conduct audience research with 15 Hood Canal shoreline landowners. They gathered information about barriers to and motivations for accepting a water quality advisor site visit, and how best to communicate about water quality issues.

Most of the participants were interested in site visits once they understood what a site visit entailed. They were most motivated because of water quality and health concerns. Most participants were concerned about runoff and how to control it. Respondents wanted to know that site visits would be conducted by qualified organizations and that regulatory agencies would not receive any information from the site visit. The most popular incentive for a site visit was a rebate or coupon for septic system maintenance. The most preferred methods of contact were letters or phone calls. However, door-to-door visits have been more effective in practice and have resulted in more diverse participants.

WSU-Ext. also conducted outreach and education in shellfish growing area Hood Canal 6, making 464 visits and offering water quality advisor site assessments. Of the 119 residents that were at home, 40 agreed to site visits. Almost all the site visits in North Shore and Hoodspout had severe stormwater impacts from very steep uplands. A clear need for stormwater technical assistance was identified.

WSU Ext. produced a two-page handout summarizing HCRPIC Phase II highlights for decision-makers and a four-page public report that was distributed to Hood Canal shoreline properties. Reports and materials for HCRPIC Phase II audience research and outreach efforts are included in Appendices C, D, E, and F of the HCRPIC Phase II Final Report, [linked here](#).

PHASE III: IMPLEMENTATION (2017-2019)

HCCC was awarded additional NEP funding in early 2017 to conduct Phase III, the second HCRPIC implementation phase. The draft QAPP was submitted June 1, 2017 and the final QAPP was approved August 21, 2017.

Guidance Group

Seven quarterly Guidance Group meetings were held during Phase III. Participants had the option of joining the meetings through phone or internet and the meetings were well attended.

The Port Gamble S'Klallam Tribe (PGST) has been a very active Guidance Group partner in planning, development, and implementation of the HCRPIC program since its inception. Their long-term, natural resource perspective enhances the regional partnership. PGST extended the breadth of the HCRPIC program by researching and piloting potential tools to identify fecal pollution sources in areas where PIC programs have been unsuccessful.

The Skokomish Tribe has also been very active in the HCRPIC Program Guidance Group and the development and implementation of the regional PIC program. They expended their own resources to review the regional plans and hotspot investigations. They alerted the regional team to rich shellfish resources in Hoodspout and helped build and implement a PIC strategy, including collecting water samples, to improve water quality so that shellfish harvesting can be approved for the first time.

The Skokomish Tribe shared important knowledge about the Annas Bay shellfish growing area to help Mason Health build a response plan to the early warning from WSDOH that water quality in the area is threatened by high fecal coliform results.

Phase III Field Work Objectives

Field work objectives were identified for the local health jurisdictions funded under the Phase III grant. Objectives vary for each jurisdiction depending on funding provided in the HCRPIC Phase III NEP grant. Additionally, all open pollution hotspots identified in Phase II were to be followed up on for confirmation sampling and/or investigations. See Appendix B for the full HCRPIC Phase III Workplan.

Mason County Public Health Field Work Objectives

- 100 parcel surveys
- Shoreline surveys in priority areas
- 4 hotspots identified and corrected
- 4 OSS failures identified and corrected
- Any agricultural issues identified and corrected

Kitsap Public Health District Field Work Objectives

- 10 parcel surveys
- Shoreline surveys in priority areas
- 1 hotspot identified and corrected
- 1 OSS failure identified and corrected
- Any agricultural issues identified and corrected

Ambient Stream Monitoring Objectives

- 12 priority streams monitored 17 times
- 200 water samples collected and analyzed

Priority Shoreline Survey Areas

HCRPIC Program partners worked closely with WSDOH to develop the Phase III Workplan (Appendix B) with remaining Phase II priority work and new shoreline priority work areas based on updated marine water data. Twenty-three priority areas were identified in Mason County, eleven priority areas in Jefferson County, and eight priority areas in Kitsap County (Table 2);

Table 2: HCRPIC Phase III Priority Shoreline Survey Areas

Location	Status
Mason County	
Hood Canal 4 – Mike’s Beach Resort	Parcel closure
Hood Canal 5 – Lilliwaup	Parcel closure
Hood Canal 6 – Summertide Resort	Parcel closure
Hood Canal 6 – Hoodspout	Prohibited

Hood Canal 6 – Hoodsport (Ph. II Hotspot: DOH-033)	Prohibited
Hood Canal 6 – Hoodsport (Ph. II Hotspot: DOH-035)	Prohibited
Hood Canal 6 – Hoodsport (Ph. II Hotspot: DOH-036)	Prohibited
Hood Canal 6 – Hoodsport (Skokomish ID: SS 127/DOH ID: 43)	Prohibited
Hood Canal 6 – Hoodsport (Skokomish ID: SS 128/DOH ID: 44)	Prohibited
Hood Canal 6 – S. Hoodsport (Ph. II Hotspot: HS-036)	Prohibited
Hood Canal 6 – S. Hoodsport (Ph. II Hotspot: HS-039)	Prohibited
Hood Canal 6 – Big Bend	Conditional area
Hood Canal 6 – Big Bend (Calm Cove; Ph. II Hotspot: MCPH ID: I-042/DOH ID: 99)	Parcel closures
Hood Canal 6 – Big Bend (Mason Ave.; Ph. II Hotspot: MCPH ID: I-055/DOH ID: 106)	Parcel closures
Hood Canal 7 – South Shore (east of Alderbrook)	Parcel closures
Hood Canal 7 – North Shore	Parcel closures
Hood Canal 8 – Ph. II Hotspot: R-036A	Approved
Annas Bay	
Hood Canal 9 – Ph. II Hotspot: T-089	Approved
Hood Canal 9 – Ph. II Hotspot: T-113	Approved
Hood Canal 9 – Ph. II Hotspot: T-114	Approved
Hood Canal 9 – Ph. II Hotspot: T-124	Approved
Hood Canal 9 – Ph. II Hotspot: T-126	Approved
Hood Canal 9 – Ph. II Hotspot: T-127	Approved
Hood Canal 9 – Ph. II Hotspot: U-075	Approved
Jefferson County	
Hood Canal 3 – Duckabush	Conditional
Hood Canal 3 – Dosewallips	Restricted, beach closure
Hood Canal 3 – Pleasant Harbor	Prohibited, beach closure (marina)
Hood Canal 3 – Fulton Creek	Approved
Hood Canal 3 – Jackson Cove	Approved
Quilcene Bay	Approved
Dabob Bay	Approved
Oak Bay – Little Goose Creek	Parcels closures
Oak Bay – S. Bay Way	Approved
Port Townsend - Irondale/Chimacum Creeks	Beach closure
Hood Canal 1 – Paradise Bay	
Kitsap County	
Hood Canal 1 – Lofall Creek	Prohibited area
Hood Canal 1 – Kinman Creek	Prohibited area
Hood Canal 1 – Vinland Creek	Parcels closures
Hood Canal 1	Parcels closures
Hood Canal 1	Parcels closures
Hood Canal 2	Prohibited area
Hood Canal 4 – LH34	
Hood Canal 4 – LH76	
Hood Canal public complaints and deficient tank pumping reports	Hood Canal shoreline

Shoreline Surveys, Parcel Surveys, and Investigations

Kitsap Health developed a field training manual based on the HCRPIC Guidance Document: [HCRPIC Field Implementation Guide \(Appendix C\)](#), and conducted a field training for Mason Health staff with office and field components on December 21, 2017. Kitsap Health conducted a field training review at Jefferson County Public Health on January 19, 2018.

HCRPIC Phase III field work began in November 2017 and was conducted through February 28, 2019. Figure 3 shows the shoreline areas surveyed (Appendix A, Figure A-3). Appendix A: Figure A-4 shows a detailed map atlas of shoreline areas monitored and parcel surveys conducted throughout Phase III.



Figure 3: Map of HCRPIC Phase III shoreline survey areas monitored (Appendix A: Figure A-3)

The team conducted greater than three times more parcel surveys than committed, and found 11 times the number of failures than estimated. The greater efficiency in finding failures illustrates that the HCRPIC team is fully trained and functional. Failures were found on more than 14 percent of the parcels surveyed (55 of 380; 14.5%). Table 3 summarizes the field work conducted. The results are displayed in Figure 4 below, an index grid of detail maps available in Appendix A: Figure A-5.

Kitsap Health developed a cloud-based water quality database and provided access and training for Jefferson, HCSEG, and Mason during Phase III. All water quality data, entered by Phase III partners that met quality standards specified in the approved QAPP was uploaded to the EPA STORET database in May 2019.

Table 3: HCRPIC Phase III Implementation Work

Agency	Shoreline Surveys (Miles)	Parcel Surveys		OSS Failures		OSS Repairs
		Number Committed	Number Conducted	Number Committed	Number Identified	Completed
Jefferson County Public Health	59.5	0	190	0	41	21
Kitsap Public Health District	0.8	10	88	1	5	4
Mason County Public Health	6.3	100	102	4	9	3
Total	66.6	110	380	5	55	28

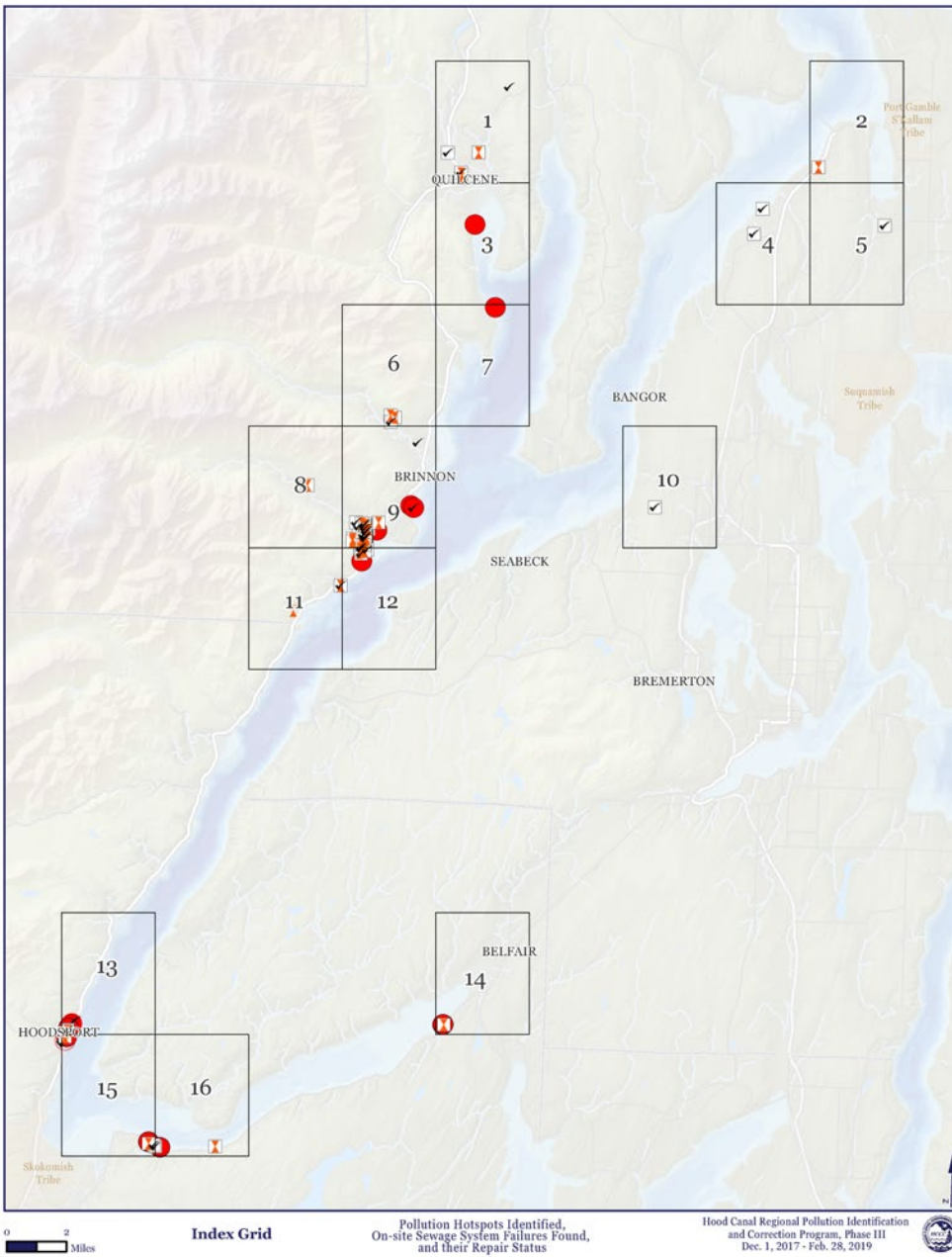


Figure 4: Index grid of HCRPIC Phase III work conducted. Detailed maps available in Appendix A: Figure A-5).

Phase III Focus Area: Hoodspport

Mason Health focused early PIC efforts in Hoodspport based on the Skokomish Tribe’s interest in rich shellfish resources in the area.

During the HCRPIC implementation phases, Mason Health identified seven OSS failures in Hoodspport. Two have been corrected and five are in the correction process. Figure 5 (Appendix A: Figure A-6)



displays the PIC work conducted and current status of OSS corrective actions in the Hoodspport area. Mason Health reported corrective actions and monitoring data to WSDOH, resulting in closure of six shoreline hotspots (see Appendix D for hotspot closure supporting materials). Only three of the nine shoreline hotspots remain. After the remaining five OSS failures are corrected, we expect post-corrective monitoring to show that water quality has improved to the point that shellfish beds in the Hoodspport area can be classified for the first time as approved for harvest.

Figure 5: HCRPIC corrective actions in Hoodspport, WA (Appendix A: Figure A-6)

Pollution Hotspot Parcel Upgrades

Mason Health's HCRPIC field work resulted in WSDOH upgrading individual shoreline parcels at the following locations:

- Upgrade of one closed parcel in Lilliwaup
- Mason Health reported the corrections and post-corrective monitoring of two OSS failures in the Big Bend shellfish bed closure area to WSDOH, and they are on track to re-open the Big Bend area to shellfish harvesting in Fall 2019

Jefferson Health identified and repaired failing OSS and conducted extensive outreach in Irondale Creek area. As a result, WSDOH was able to upgrade the shellfish beds from Chimacum Creek south.

OSS Failures Analysis

Assessing OSS failure causes can help craft better outreach efforts to prevent premature OSS failures. Figure 6 summarizes the failure causes found in Phase III. Failure conditions were grouped into three categories: Poor OSS design/installation, Poor OSS maintenance, and Poor OSS operation.

More than half of the failure conditions reported (37 of 55; 67.3%) were related to poor OSS operation, including: no OSS, occupied RVs, building or parking on the drainfield, and using a holding tank, outhouse, or pit privy. Nearly all the failure conditions related to poor OSS operation (35 of 37; 94.6%) were identified on Jefferson County parcels with no OSS permit records.

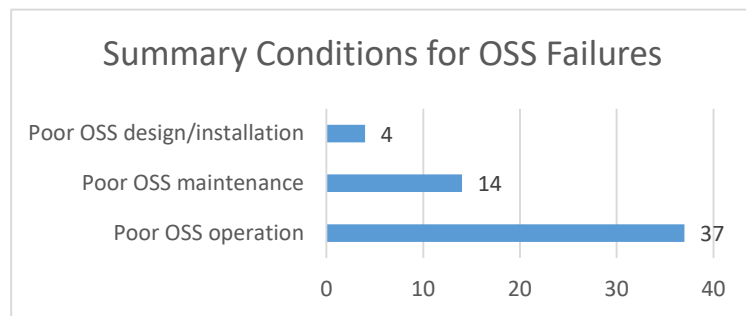


Figure 6: Summary conditions for OSS failures identified across Jefferson, Kitsap, and Mason Counties during parcel surveys

One quarter (14 of 55; 25.4%) were related to poor OSS maintenance, including surfacing sewage or greywater, saturated drainfield, unpermitted repairs, no maintenance, and unsecured tanks.

Four of the failure conditions (7.3%) were related to poor OSS design/installation due to proximity to surface water.

Figure 7 summarizes the rating criteria for the parcels that were rated Suspect, Concern, or Violation. Multiple conditions were reported for many of these parcels.

Nearly one quarter of the conditions (37 of 154; 24%) identified have high potential for sewage discharge: 32 parcels (20.8%) had evidence of occupation but no OSS (recreational vehicles, portable toilets, and outhouses); five (3.2%) of the parcels had greywater discharge violations.

More than half (96 of 154; 62.3%) of the concern conditions were related to poor OSS maintenance, and nearly

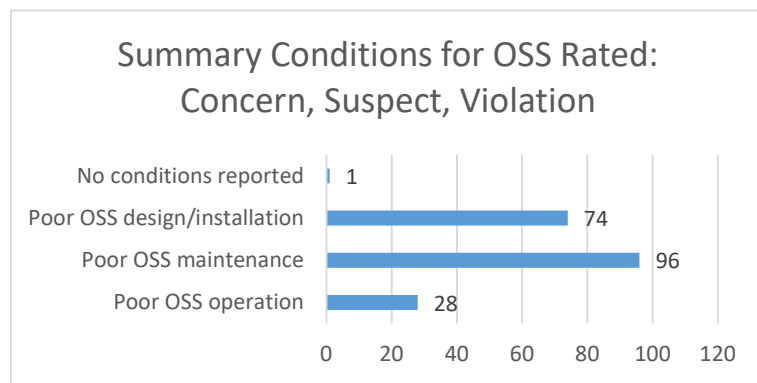


Figure 7: Summary conditions for parcel surveys rated: concern, suspect, or violation, across Jefferson, Kitsap, and Mason Counties

half of the parcels (74 of 154; 48%) had conditions related to poor OSS design/installation. Twenty-eight (18.2%) of the concern conditions were related to poor OSS operation.

One third of the parcels surveyed during Phase III (129 of 380; 33.9%) had serious conditions that can cause premature OSS failure:

- 57 are very old
- 53 are near surface water
- 27 experience seasonal flooding
- 15 have past due maintenance
- 12 have a deficient tank inspection report
- 11 have parking, buildings, or burning on the drainfield
- 10 have excess vegetation over the drainfield
- 6 are over-capacity

Ambient Fresh Water Monitoring

Phase III incorporated a fresh water monitoring element in priority areas to improve program effectiveness. Twelve priority streams were identified in Mason County for ambient water monitoring (Appendix A: Figure A-7):

- Lilliwaup Creek
- Finch Creek
- Big Bend Creek
- Alderbrook Creek
- Mulburg Creek
- Trails End Creek
- Deveraux Creek – wet season only
- Union River
- Big Mission Creek
- Little Mission Creek
- Tahuya River
- Dewatto River

The HCRPIC program formed a new partnership with the Hood Canal Salmon Enhancement Group (HCSEG) that proved very successful in training volunteers to conduct ambient fresh water monitoring in priority Hood Canal streams. They conducted 26 percent more monitoring events (252) than the 200 events committed. HCSEG utilized 31 volunteers, who volunteered a total of 217.75 hours. These results show strong community support for the HCRPIC Program as HCSEG’s volunteers are trained, committed, and motivated to participate in future HCRPIC projects.



Figure 8: Kitsap Public Health District staff training HCSEG volunteers how to collect water samples

The Guidance Group worked with HCSEG to develop and implement the fresh water ambient monitoring plan and QAPP. HCSEG worked with Mason Health, where their volunteers live, to select priority fresh water streams. Kitsap Health developed and implemented field training based on the HCRPIC Guidance Document: [HCRPIC Field Implementation Guide](#) (Appendix C) and a [Field Implementation Guide Addendum for Ambient Fresh Water Monitoring Procedures](#) (Appendix E). On December 21, 2017, Kitsap Health provided field training for HCSEG volunteers.

The volunteers conducted monthly monitoring for fecal coliform bacteria, temperature, pH, dissolved oxygen, and salinity on 12 high priority streams in Mason County, and the HCSEG laboratory analyzed the fecal coliform samples pursuant to the approved QAPP. HCSEG entered the ambient water quality data into Kitsap Health’s water quality database for upload to EPA’s STORET database.

Water quality data collected for the project is presented in Table 4 below. Deveraux Creek and Lilliwaup Creek were not flowing during four of the monitoring events. Ten of the streams had excellent water quality, meeting both parts of Washington state’s fecal coliform (FC) standard. Deveraux Creek and Union River met only Part 1 of the FC standard (geometric mean ≤ 50 FC/100 ml). Union River and Deveraux Creek exceeded Part 2 of the FC standard (not more than 10% of all samples > 100 FC/100 ml). Part 2 of the FC standard for the Union River was 19% and Deveraux Creek was 11.7%.

Table 4: HCRPIC Phase III Ambient Fresh Water Monitoring Summary

Stream	Number of Samples	Geometric mean (FC/100ml)	FC Standard	
			Meets Part 1	Meets Part 2
Big Mission Creek	21	14	Yes	Yes
Dewatto Creek	21	8	Yes	Yes
Deveraux Creek	17	11	Yes	No
Finch Creek	21	5	Yes	Yes
Big Bend Creek	21	10	Yes	Yes
Alderbrook Creek	21	9	Yes	Yes
Lilliwaup Creek	17	6	Yes	Yes
Little Mission	21	11	Yes	Yes
Mulburg Creek	21	12	Yes	Yes
Tahuya River	21	12	Yes	Yes
Trails End Creek	21	9	Yes	Yes
Union River	21	24	Yes	No
FC Standard: Part 1: ≤ 50 FC/100 ml (geometric mean) Part 2: Not more than 10% of all samples > 100 FC/100 ml.				

Shellfish Protection Activities

The HCRPIC Program provided Mason Health with the funding and a framework to quickly craft a shellfish warning response plan for Annas Bay (Annas Bay Shellfish Protection District Closure Response Plan [linked here](#)). The Skokomish Tribe shared detailed knowledge about Annas Bay. Mason Health would not have been able to develop the plan without an alternative funding source. The funding and tribal technical assistance allowed Mason Health to quickly develop and implement the plan. Early action has been shown to reduce the response time and cost.

Mapping

The HCRPIC team worked with a GIS mapping consultant (PetersonGIS) to update the HCRPIC OSS GIS Maps for Phase III (Appendix A). Local Hood Canal Jurisdictions provided updated OSS permit data and

implementation work locations including shoreline surveys, shoreline hotspots, parcel surveys, and OSS failures identified and repaired. The updated maps illustrate the locations of all Hood Canal OSS categorized by OSS type (Appendix A: Figures A-8 – A-13) and age (Appendix A: Figure A-14 – A-17), and identifies clusters of potentially problematic OSS, such as those over 20 and 30 years old (Appendix A: Figures A-15 and A-16, respectively), to help prioritize HCRPIC field work.

Phase III mapping included a pilot map of HCRPIC work conducted in Hoodsport (Figure 3, Appendix A-6) that will be useful to report Hoodsport source correction to WSDOH for shellfish area assessments and classifications.

The maps will be provided to the jurisdictions to inform work planning for future Hood Canal PIC work and will be available on the HCCC website. HCRPIC mapping data is best viewed using the interactive web maps found on HCCC’s HCRPIC Program website, hccc.wa.gov/PIC.

GIS mapping methods are described in Appendix F.

Outreach and Education

The HCRPIC Program selected Cascadia Consulting Group to provide Phase III outreach objectives aimed at demonstrating and sharing program success to convey to decision-makers and the community:

- The importance of clean water to the health of Hood Canal residents, and
- The urgent need for sustainable funding to ensure the continuation of the PIC work needed to protect Hood Canal water quality.

Cascadia was instrumental in helping define specific audience focus and core messages with key visual components that clarified and illustrated the messages.

Three public outreach tools were produced: an HCRPIC project update for Hood Canal residents, an update for decision-makers focusing on the value of the HCRPIC program and the need for sustainable funding, and a story map that can be used to illustrate the program achievements on the program website and at public presentations throughout Hood Canal:

- “Hood Canal...a way of life” (Appendix G-1) is a two-page brochure for Hood Canal residents describing the benefits of clean water, HCRPIC program accomplishments, and the need for ongoing pollution correction work to protect public health. This handout was distributed to all Hood Canal shoreline residences within the Hood Canal LIO area boundary.
- The two-page Phase III Accomplishments & Highlights handout for decision-makers and community groups (Appendix G-2) included detailed program needs and successes. This was distributed to the Hood Canal Coordinating Council Board of Directors and digitally shared with local community groups. Each jurisdiction received copies for distribution.
- The HCRPIC Story Map illustrates the importance of the HCRPIC program and highlights achievements and will be available on hccc.wa.gov/PIC

Septic System Service Rebates

The HCRPIC Guidance Group found the Phase II OSS maintenance rebates to be a helpful incentive that successfully encouraged property owners to service septic systems in high priority areas. The HCRPIC Guidance Group developed guidelines and added them to the Phase III workplan in March 2018, including:

- Eligible to parcels in Phase III work plan priority areas that have not received rebates since July 2015, and high priority parcels under investigation in the Hood Canal watershed based on age, lack of OSS records, OSS maintenance history, or prior violations
- Reimbursement up to \$250 per recipient
- One rebate per septic system
- Rebate can be used for tank inspections, pumping, installing watertight risers, and other minor tank repairs by a licensed OSS maintenance provider (tank sealing, baffles, filters)
- Funding is distributed in the order that applications were received
- Provide water quality messaging about the importance of maintaining septic systems:
 - o Leaking septic systems are a significant source of beach pollution that can make people sick
 - o The Hood Canal community relies on clean beaches for swimming, fishing, and shellfish harvesting
 - o Clean water requires everyone’s help

During Phase III, the jurisdictions redeemed 44.3% more rebate vouchers than were committed (140 redeemed, 97 committed). Many of the OSS were well past the three-year recommended inspection period. Fourteen tank deficiencies were identified and corrected through the program. Table 5 below summarizes the rebate vouchers redeemed during Phase III.

Table 5: Septic Tank Service Rebate Summary

Agency	Septic Tank Maintenance Rebates					
	Number Committed	Number Utilized	> 11 years since service		Corrections	
			Number	Percent	Number	Percent
Jefferson County Public Health	30	60	Unknown	Unknown	Unknown	Unknown
Kitsap Public Health District	47	48	26	54.2%	12	25.0%
Mason County Public Health	20	32	8	25.0%	3	9.4%
Total	97	140	34		15	

Kitsap Public Health OSS service rebate program results

- Redeemed 48 of 450 (10.7%) rebate vouchers distributed
- More than half of the inspections (26 of 48; 54.2%) identified and corrected at least one deficiency or concern
- Nearly 40 percent of the systems serviced (19 of 48; 39.6%) had moderate (20-23”) or high (≥ 24”) levels of solids, indicating that tank service was past due
- Six (12.5%) tank baffles were replaced: 3 inlets, two center, and one outlet
- Two (4.2%) corrected root intrusion in the tank
- One (2.1%) replaced a broken tank lid
- One (2.1%) removed a tree over the tank lid
- One (2.1%) old permit was finalized
- One (2.1%) leaky toilet was identified and corrected

Mason County OSS service rebate program results:

- 32 rebates redeemed
- Three (9.4%) replaced inlet baffles

- Two (6.2%) installed watertight risers
- Two (6.2%) were pumped for repair

Kitsap and Mason County rebate vouchers were analyzed for the amount of time since prior tank service. More than three-quarters (62 of 80; 77.5%) of the Kitsap and Mason County septic tanks serviced (61 of 80; 76.2%) were past the recommended three-year inspection period:

- 34 (42.5%) were serviced more than 11 years ago
- 28 (35.0%) were serviced 5-10 years ago
- 13 (16.3%) were serviced at least 1 year but less than 5 years ago
- 5 (6.2%) were undergoing repairs and were serviced less than 1 year ago

Jefferson Health chose to offer rebates of \$100 to install a watertight tank riser, \$150 for a septic system inspection, and \$250 for a riser and inspection. Jefferson County OSS service rebate program results:

- 60 rebates redeemed
- 14 installed tank risers
- 22 septic systems were inspected
- 24 installed risers and had tank inspections

The HCRPIC Program OSS service rebate program has proven to be valuable for encouraging compliance with OSS maintenance requirements and protecting water quality in priority areas. Our findings have shown that the rebates:

- Encourage site survey participation and OSS service
- Target systems with no OSS information or past due maintenance
- Direct efforts toward parcels that have not participated in the past
- Identify and correct small problems before they become large ones
- Motivate homeowners to service their OSS when otherwise little funding is available, while OSS service costs continue to increase

Pilot Nutrient Studies

During Phase III, the Guidance Group reviewed the pilot nutrient studies with the goal of ensuring that any future nutrient studies will build on, and further nutrient research in Hood Canal. The Guidance Group determined, at the November 15, 2017 meeting, that they are satisfied with Phase II findings because they answered the questions that were originally posed about seepage pits' nutrient contributions to Hood Canal. The group does not recommend expending further funding on this task and decided to re-appropriate the funds to higher priority tasks.

Sustainable Funding

The HCRPIC program developed preliminary groundwork for sustainable funding during the planning phase. The Guidance Group developed a HCRPIC Sustainable Funding Strategy to assess implementation funding options. The long-term goal is to develop sustainable funding for ongoing HCRPIC Program planning and implementation. The strategy noted that:

- The economic climate in the region has been challenging since the 2008 recession. Even when the Washington State economy was strong and healthy, it was difficult to fund water quality projects locally.
- Local jurisdictions have cobbled together a patchwork of grant funding for water quality projects.

- Ongoing, stable funding is essential to a strong, ongoing, and coordinated regional PIC partnership in Hood Canal. It supports a trained and capable staff and robust process that will result in the water quality improvements necessary to protect public health, recreation, and shellfish harvesting in Hood Canal.

During Phase III, the Guidance Group discussed current local PIC funding and funding gaps:

- Jefferson Health has some funding through a shellfish projection district, but they are continuously chasing grants
- Kitsap Health has sustainable funding for PIC work but can only use that funding in unincorporated Kitsap and has not been able to fund tank service rebates.
- Mason Health does not currently have any sustainable funding source for water quality work and relies on grants to fill funding gaps

The HCRPIC coordinators and HCCC staff met with HCRPIC Program partners, health department managers, and the county commissioners that make up HCCC's board of directors to explore current funding needs and sustainable funding ideas.

Jefferson County has a Clean Water District fee of \$25 per parcel for the eastside of the county and the city, and an OSS Operation and Maintenance fee of \$35 for OSS management.

They are currently managing multiple WA Department of Ecology grants and are in the process of increase efficiency by creating a new county-wide grant project to replace multiple smaller projects. They would like to become free of grant funding requirements but would need to increase their Clean Water District fee in order to do so. Their political climate, and local Clean Water District and OSS management fees may make it harder to be part of a Hood Canal-wide funding effort. They will need to demonstrate a strong need in order for their decision-makers to increase current fees but remain very interested in exploring Hood Canal sustainable funding ideas.

Mason Health is currently reliant on HCRPIC Program grants to conduct PIC work in Hood Canal. Mason Health is exploring the feasibility of a county-wide clean water assessment to fund their PIC program. In addition, Mason County was a key leader in advocating that the Washington State legislature define and fund foundational public health services, including environmental health. This bill (SSHB 1497) passed the legislature in the 2019 legislative session and was signed by the Governor. Although the funding provided for this new law was minimal, it does provide a framework for ongoing state funding for local PIC and OSS management efforts if additional appropriations can be secured.

Local jurisdictions have watched other Puget Sound counties' recent attempts to approve an OSS maintenance fee with little success and are wary of the public response to such efforts locally.

[Related Work Funded by Other Sources](#)

Kitsap Health supplemented regional HCRPIC Program funding with Clean Water Kitsap funding. Jefferson Health utilized multiple grants to fund Hood Canal PIC work.

PHASE III CONCLUSIONS

[Strategic Partnerships Leverage Resources for Greater Outcomes](#)

Since 2012, the HCRPIC Program has developed unique partnerships to share and leverage resources, resulting in strategic partnerships, and inter-jurisdictional field work including sharing resources,

conducting joint shoreline surveys and investigations, developing dye testing campaigns, and refining reporting techniques. The HCRPIC Program's partnership with WSDOH allows us to quickly identify and rank high priority areas for PIC work. And HCCC provides streamlined grant management and reporting, decreasing the administrative burden for program partners.

Jefferson Health grew their PIC program and increased their Hood Canal footprint through grant awards in multiple watersheds, successfully expanding their clean water assessment program. Jefferson Health staff attended multiple PIC training opportunities and participated actively in Guidance Group meetings.

Mason Health has focused PIC efforts in high priority shellfish closure areas like Big Bend and Union, the Annas Bay threatened area, and the rich shellfish resource in Hoodsport. They carefully directed their HCRPIC Program funding to parcels with the highest potential to impact the Hood Canal shoreline. Phase III funding and our Skokomish tribal partner allowed Mason Health to quickly respond to threatened water quality in Annas Bay and our Skokomish tribal partner provided their considerable watershed knowledge to help develop the response plan. Phase III also saw the Skokomish Tribe-funded pilot OSS maintenance rebate program grow into a successful regional incentive program.

The Port Gamble S'Klallam Tribe (PGST) and the Skokomish Tribe are long-time supporters of the HCRPIC program and have been valuable and active partners in the HCRPIC Guidance Group under their own funding. PGST science and technical staff conducted research and tested investigative techniques to find new PIC tools in areas of Jefferson, Kitsap, and Mason Counties where the PIC approach has not been successful. The Skokomish Tribe shared their extensive knowledge of Mason County shoreline drainages and shellfish resources. They mentored Mason Health staff and conducted supplementary field work with their own funding.

HCRPIC Program partners are constantly leveraging locally-funded related field work and outreach and education efforts to expand their reach and work toward common goals.

[Coordinated Efforts Lead to Better Results](#)

Phase III results demonstrate that the HCRPIC team is fully trained and efficient in finding OSS failures. During Phase III, the team again exceeded field work commitments. Collectively, HCRPIC partners:

- Found OSS failures on 14.5% (55 of 380) of the parcels surveyed
- Conducted greater than three times more parcel surveys than committed (380 completed and 110 committed, 345%)
- Identified 11 times more failures than estimated (55 found, 5 committed)

One third of all Phase III parcels surveyed (129 of 380, 33.9%) had serious conditions that can cause premature OSS failure including: very old, proximity to surface water, seasonal flooding, past due maintenance, deficient OSS inspection, driving or burning or excess vegetation on drainfield, residence over-capacity.

Assessing failure causes can help us craft better outreach efforts to prevent premature OSS failures:

- More than half of the failure conditions reported during Phase III were related to poor OSS operation including no OSS, occupied RVs, building or parking on drainfields, or using holding tanks, outhouses, or pit privies.
- One quarter of the failure conditions were related to poor OSS maintenance including surfacing sewage or greywater, saturated drainfield, unpermitted repairs, no maintenance, and unsecured tanks.

Significant Progress Toward Long Sought Water Quality Upgrades in Hoodspport

HCRPIC implementation work in Hoodspport resulted in the identification of seven failing OSS. Two have been corrected and the remaining have corrections in progress. We expect that when the source corrections are complete, post-corrective monitoring will show that water quality has improved to the point that shellfish beds in the Hoodspport area can be classified for the first time as approved for harvest.

This coordinated work is the result of the strong inter-jurisdictional relationships that the HCRPIC Program built. Between the planning phase and the first implementation phase, the Skokomish Tribe alerted HCRPIC about a rich shellfish resource in Hoodspport that is closed due to historical pollution concerns. The partners used their own funding to conduct Hoodspport PIC planning until the Phase II QAPP was approved. WSDOH, Mason Health and the Skokomish Tribe developed and implemented a coordinated plan to assess Hoodspport shoreline drainages and refer bacterial hotspots to HCRPIC Program partners.

Community Partnerships Utilized to Expand Monitoring Efforts

The HCRPIC Phase III partnership with the Hood Canal Salmon Enhancement Group (HCSEG) was a great success. HCSEG and its volunteer team conducted twenty-six percent more monitoring events (252) than the 200 events committed. HCSEG utilized 31 volunteers, who volunteered a total of 217.75 hours. The volunteers conducted monthly ambient fresh water monitoring for fecal coliform bacteria, temperature, pH, dissolved oxygen, and salinity on 12 high priority fresh water streams in Mason County. HCSEG entered the ambient data into Kitsap Health's water quality database for upload to EPA's STORET database

OSS Service Rebates Protect Water Quality

The septic tank service rebate vouchers were an incentive that successfully encouraged property owners to maintain septic tanks in high priority areas. They also gave the jurisdictions information about the OSS functional status.

- During Phase II, the rebates resulted in 61 OSS inspections on systems well past the 3-year recommended inspection period. At least 26 deficiencies or concerns were identified and corrected. Phase II audience research found the most popular incentive for a site visit was a rebate or coupon for septic system maintenance.
- During Phase III, the jurisdictions redeemed 140 service rebate vouchers, 44.3% more than were committed (140 redeemed, 97 committed). Many of the OSS were well past the three-year recommended inspection period. Fourteen tank deficiencies (10%) were identified and corrected through the program.
- More than half of the rebate inspections in Kitsap (26 of 48; 54.2%) identified and corrected at least one deficiency or concern.
- More than three-quarters (62 of 80, 77.5%) of the rebate services in Kitsap and Mason were past the 3-year inspection period. Thirty-four of the eighty tanks (42.5%) were serviced more than eleven years ago.

Data Guided Priority-Setting

HCRPIC program jurisdictions can use updated OSS GIS maps to prioritize future work by identifying areas where clusters of potentially problematic OSS coincide with water quality concerns. These maps also report field work locations and results to the public and decision-makers. The Hoodspport map is a

valuable tool that illustrates Hoodsport PIC work and fecal source corrections. It will be useful to report source corrections and post-corrective monitoring to WSDOH for Hoodsport shellfish classification.

RECOMMENDATIONS

The HCRPIC Program partners have grown the program over the past eight years and are looking forward to Phase IV of the HCRPIC Program. Lessons learned from previous phases and newly gathered information have resulted in the following recommendations:

- The Hood Canal region should brainstorm sustainable funding options and where and how to focus limited Hood Canal grant funding. Ongoing, stable funding is essential to a strong, ongoing, and coordinated regional PIC partnership in Hood Canal. It supports a trained and capable staff and robust process that will result in the water quality improvements necessary to protect public health, recreation, and shellfish harvesting in Hood Canal.
- HCRPIC Program partners should continue to repair OSS failures identified during Phase III
- HCRPIC partners should utilize the data and mapping analysis from Phase III to prioritize future work
- The HCRPIC partners should continue to find ways to streamline project reporting.
- Field partners should consistently conduct quality assurance and quality control data review pursuant to the approved QAPP before data is submitted. Technical reporting is more robust and less time-consuming when regional field work and reporting consistently meet QA/QC measures.
- HCRPIC partners should continue to develop effective outreach materials for the public and decision-makers. They should brainstorm how to celebrate successes with partners and the public.
- The HCRPIC Program should continue to fund OSS service rebates to encourage maintenance of priority gravity septic systems without current service, and to assess OSS functional status. HCRPIC Phase II audience research identified tank service rebates as the number one incentive for a site visit.
- The Guidance Group should work with local stormwater agencies to develop strong stormwater programs and recommendations. During Phase II, WSU-Ext found many challenging drainage issues in Hoodsport, Union, and the North Shore of Tahuya.

In addition to these recommendations, several key findings should also be noted:

- HCRPIC found that a field training workshop and field work guide based on important QA/QC considerations (survey ratings and criteria) expedited PIC field work.
- Existing regional organizations can effectively lead a regional effort because of their established structure and relationships with their jurisdictions.
- Regional PIC implementation can be more affordable because the preparation of the grant application, contracts, quality assurance plans and reporting are coordinated and submitted once. The regional approach also provides additional resources and experience that can be leveraged in addressing challenging PIC problems. As grant funding diminishes, it becomes more difficult to fund the coordination and field work components of regional implementation.
- Regional projects benefit from a planning phase to develop a work group and program guidance. HCRPIC quarterly Guidance Group meetings were well attended and the partners found them valuable.

REFERENCES

This report and its appendices can be found on HCCC's HCRPIC Program website:

www.hccc.wa.gov/PIC

Banigan, Leslie. *Quality Assurance Project Plan: Hood Canal Regional Pollution Identification and Correction Phase 3 – Implementation*. Poulsbo: Hood Canal Coordinating Council, August 2017.

Banigan, Leslie. Harguth, Haley. *Hood Canal Regional Pollution Identification and Correction Program, Phase II – Implementation (October 2014 – December 2016)*. Poulsbo: Hood Canal Coordinating Council, March 31, 2017

Daubenberger, Hans (Port Gamble S'Klallam Tribe (PGST)), Julianna Sullivan (PGST), Katy Davis, Emily Bishop (Westward Ecology). *Pollution Identification and Correction Program – Final Report 2017*. Rep. Port Gamble: Port Gamble S'Klallam Tribe, 2017.

Gately, Glenn, Jerry Clarke, Dana Ecelberger, and Craig Schrader. *Chimacum Watershed Water Quality and Fishes: A Comprehensive Review*. Port Hadlock: Jefferson County Conservation District, 2015.

Joy, Shana, Bob Simmons, and Matt Brincka. *Focused Watershed Outreach and Shore Stewards – Joint Final Report*. Tacoma: Puget Sound Partnership, 2015.

Simmons, Bob, Darcy McNamara, Erica Bates, and Wendy Mathews. *Hood Canal Regional Pollution Identification and Correction Program: Phase II Outreach and Education - Audience Research Report*. Rep. Poulsbo: Hood Canal Coordinating Council, 2016.

Simmons, Bob, Darcy McNamara, Erica Bates, and Wendy Mathews. *Hood Canal Regional Pollution Identification and Correction Program: Phase II Outreach and Education - 2016 Site Visit Report*. Rep. Poulsbo: Hood Canal Coordinating Council, 2017.

Simmons, Bob, Darcy McNamara, Erica Bates, and Wendy Mathews. *Hood Canal Regional Pollution Identification and Correction Program: Phase II Outreach and Education - Supplemental Evaluation of 2015 Site Visits*. Rep. Poulsbo: Hood Canal Coordinating Council, 2017.

APPENDICES

Digital users: Click on titles below to go directly to each Appendix

[Appendix A: HCRPIC Phase III Maps](#)

[Appendix B: HCRPIC Phase III Workplan](#)

[Appendix C: HCRPIC Field Implementation Guide](#)

[Appendix D: Pollution Hotspot Closures](#)

[Appendix E: HCRPIC Field Implementation Guide Addendum for Ambient Fresh Water Monitoring](#)

[Appendix F: HCRPIC Phase III GIS Mapping Methods](#)

[Appendix G: HCRPIC Phase III Outreach Products](#)

Appendix A: HCRPIC Phase III Maps

List of Figures

Figure A-1: On-site Sewage Systems located in the Hood Canal watershed

Figure A-2: Hood Canal water quality, showing status of Shellfish Growing Areas, swimming beaches, and parcels closed to shellfish harvest due to pollution

Figure A-3: HCRPIC Phase III shoreline areas monitored

Figure A-4: Map atlas of HCRPIC Phase III shoreline areas monitored and parcel surveys conducted ^

Figure A-5: Map atlas of HCRPIC Phase III pollution hotspots, OSS failures identified, and current OSS corrective status ^

Figure A-6: HCRPIC work conducted in Hoodsport area during Phases II and III

Figure A-7: HCRPIC Phase III ambient freshwater monitoring sites

Figure A-8: Map atlas of OSS types located in the Hood Canal watershed ^

Figure A-9: Conventional OSS located in the Hood Canal watershed

Figure A-10: Alternative OSS located in the Hood Canal watershed

Figure A-11: Other types of OSS located in the Hood Canal watershed

Figure A-12: Seepage pits and pit privies located in the Hood Canal watershed

Figure A-13: Unknown types of OSS located in the Hood Canal watershed

Figure A-14: Age of OSS located in the Hood Canal Watershed

Figure A-15: Clusters of OSS over 20 years old in the Hood Canal watershed

Figure A-16: Clusters of OSS over 30 years old in the Hood Canal watershed

Figure A-17: OSS of unknown age located in the Hood Canal watershed

^ Additional figures available in file [linked here](#)

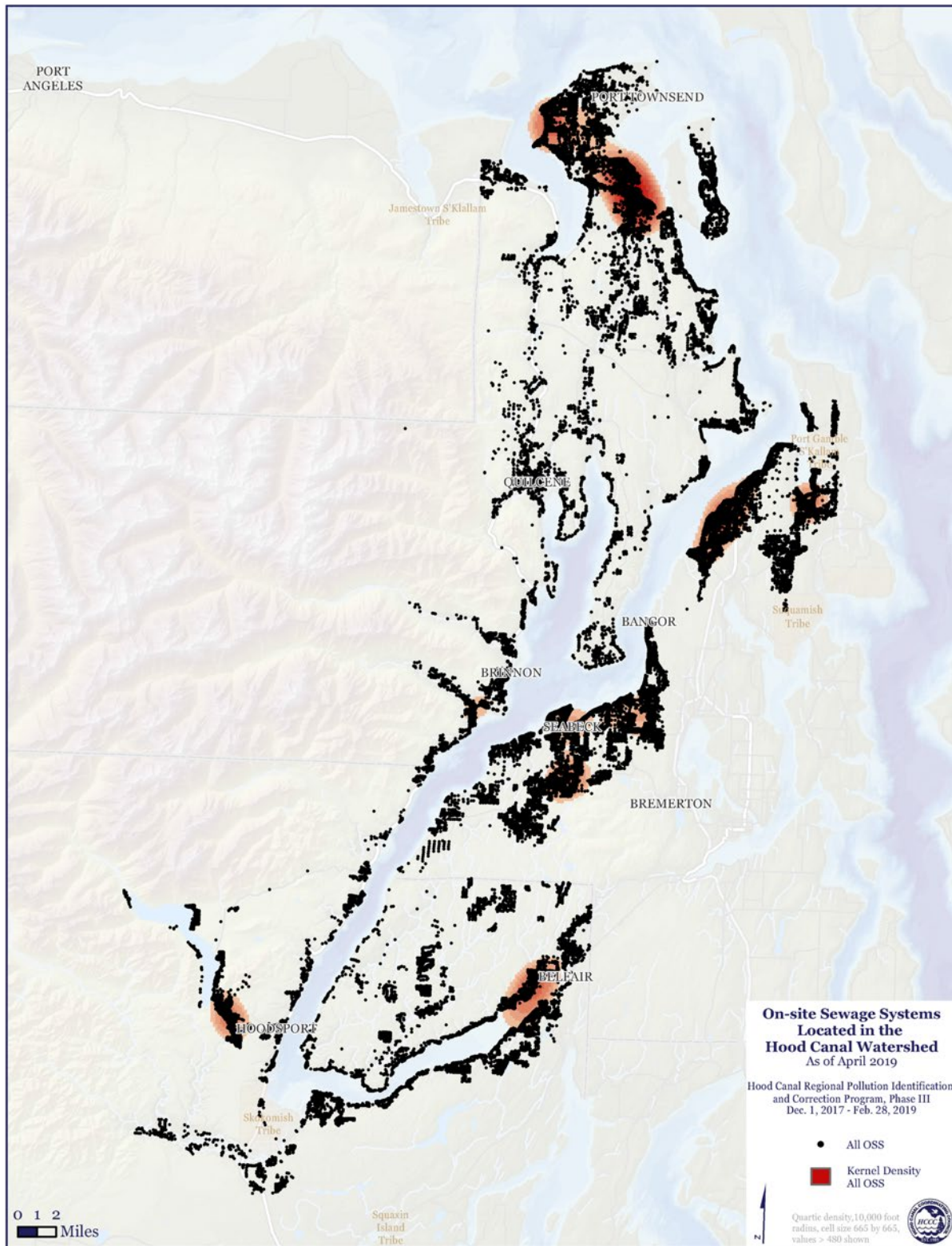


Figure A-1: On-site Sewage Systems located in the Hood Canal watershed

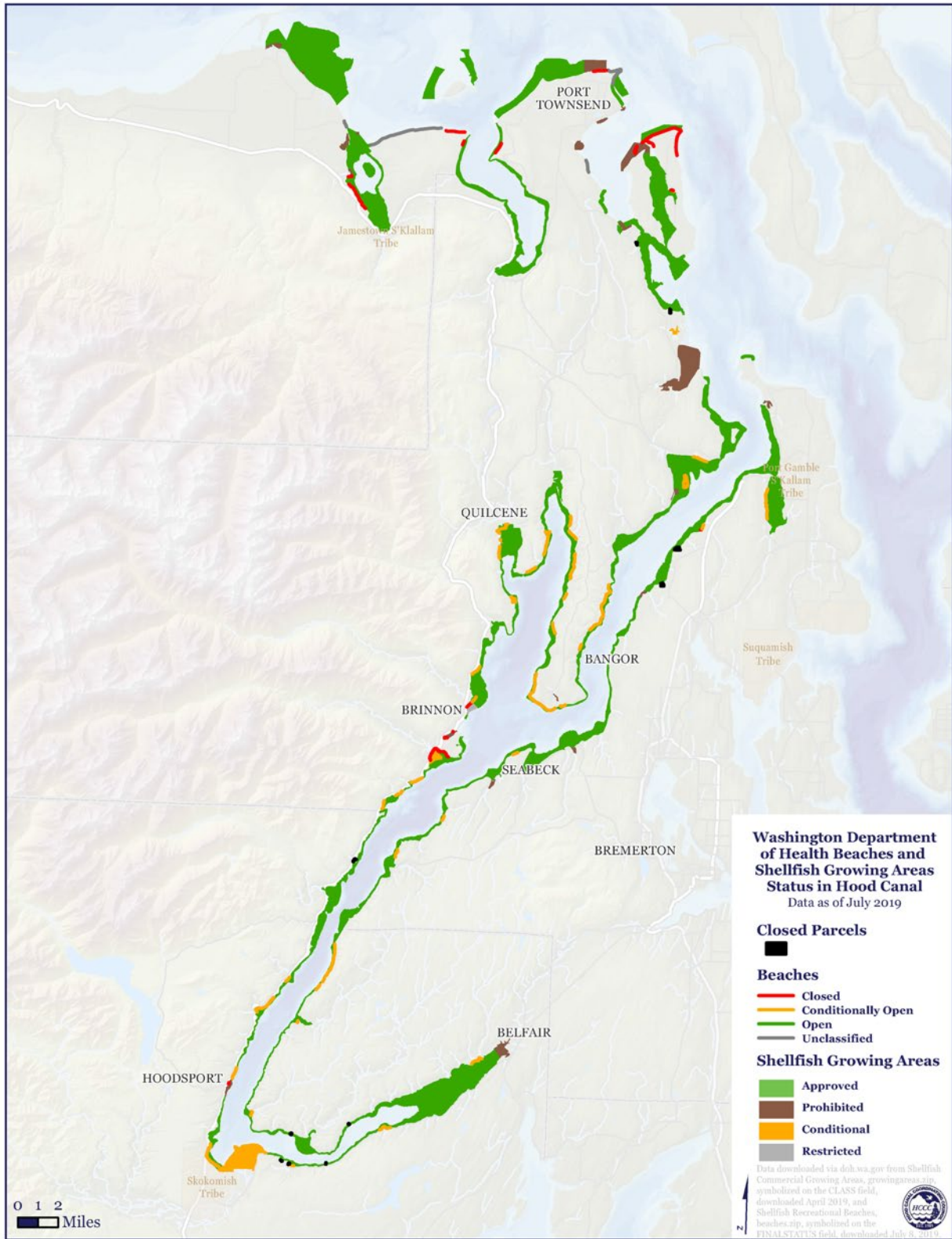


Figure A-2: Hood Canal water quality, showing status of Shellfish Growing Areas, swimming beaches, and parcels closed to shellfish harvest due to pollution

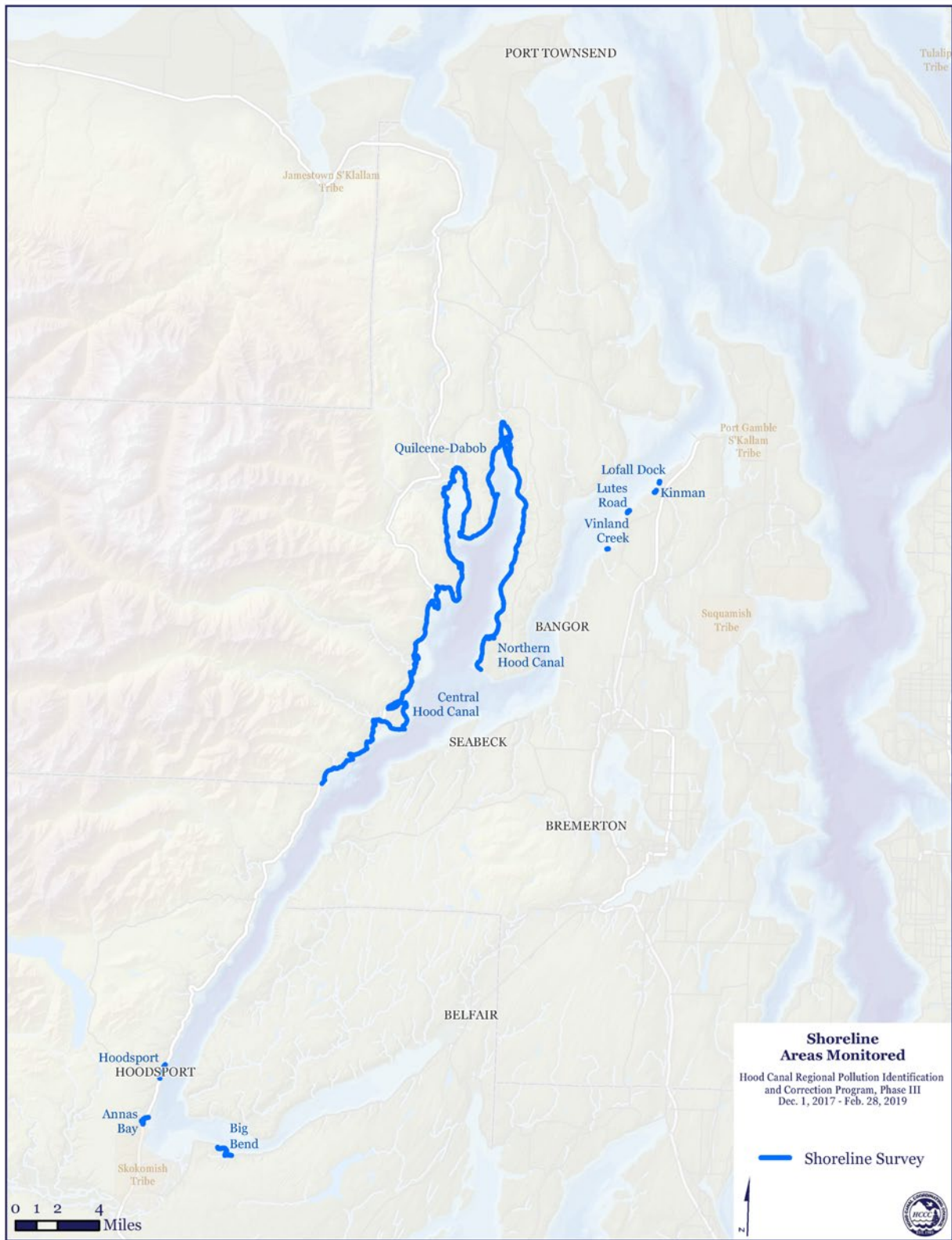


Figure A-3: HCRPIC Phase III shoreline areas monitored

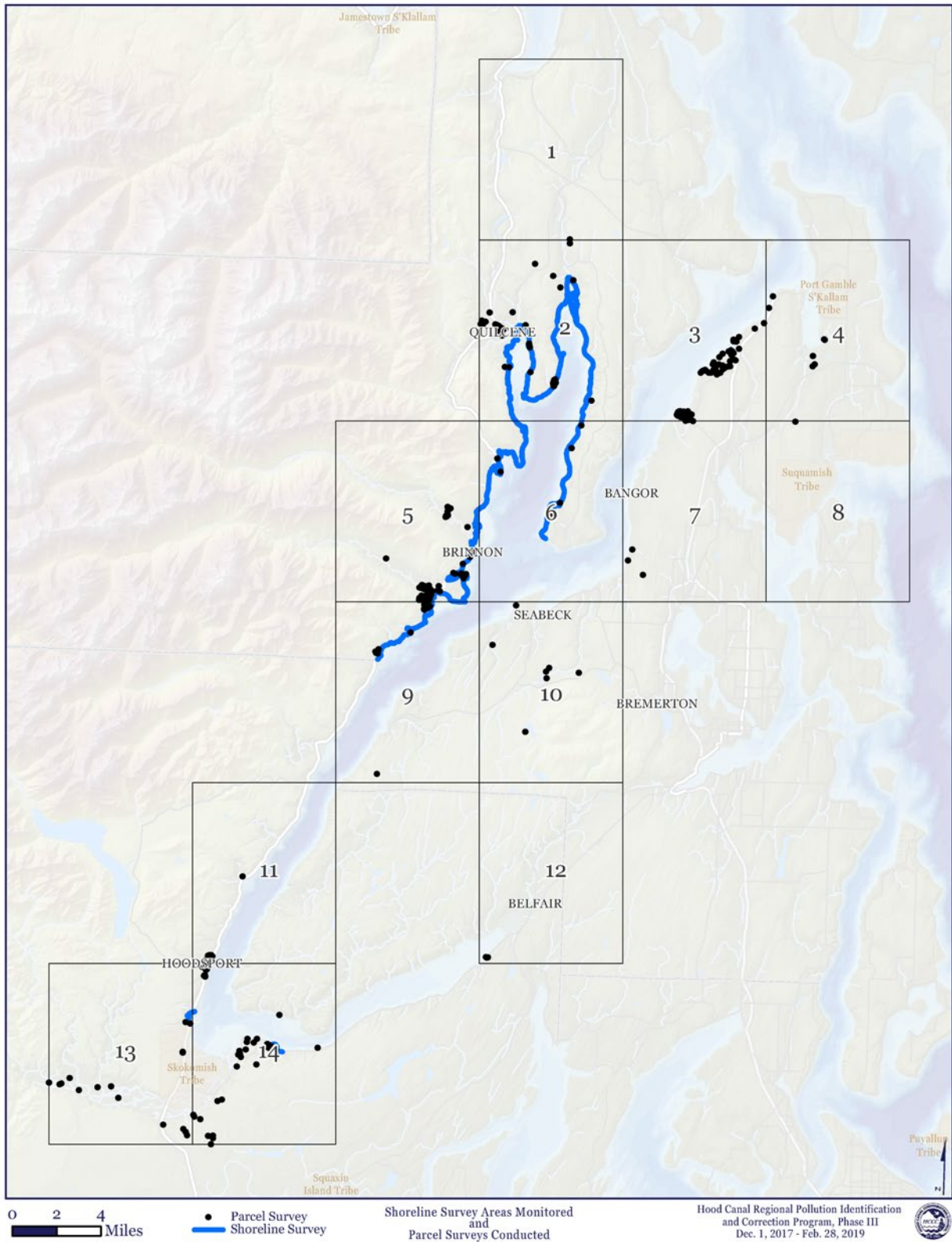


Figure A-4: Map atlas index of HCRPIC Phase III shoreline areas monitored and parcel surveys conducted. Map atlas available at [this link](#).

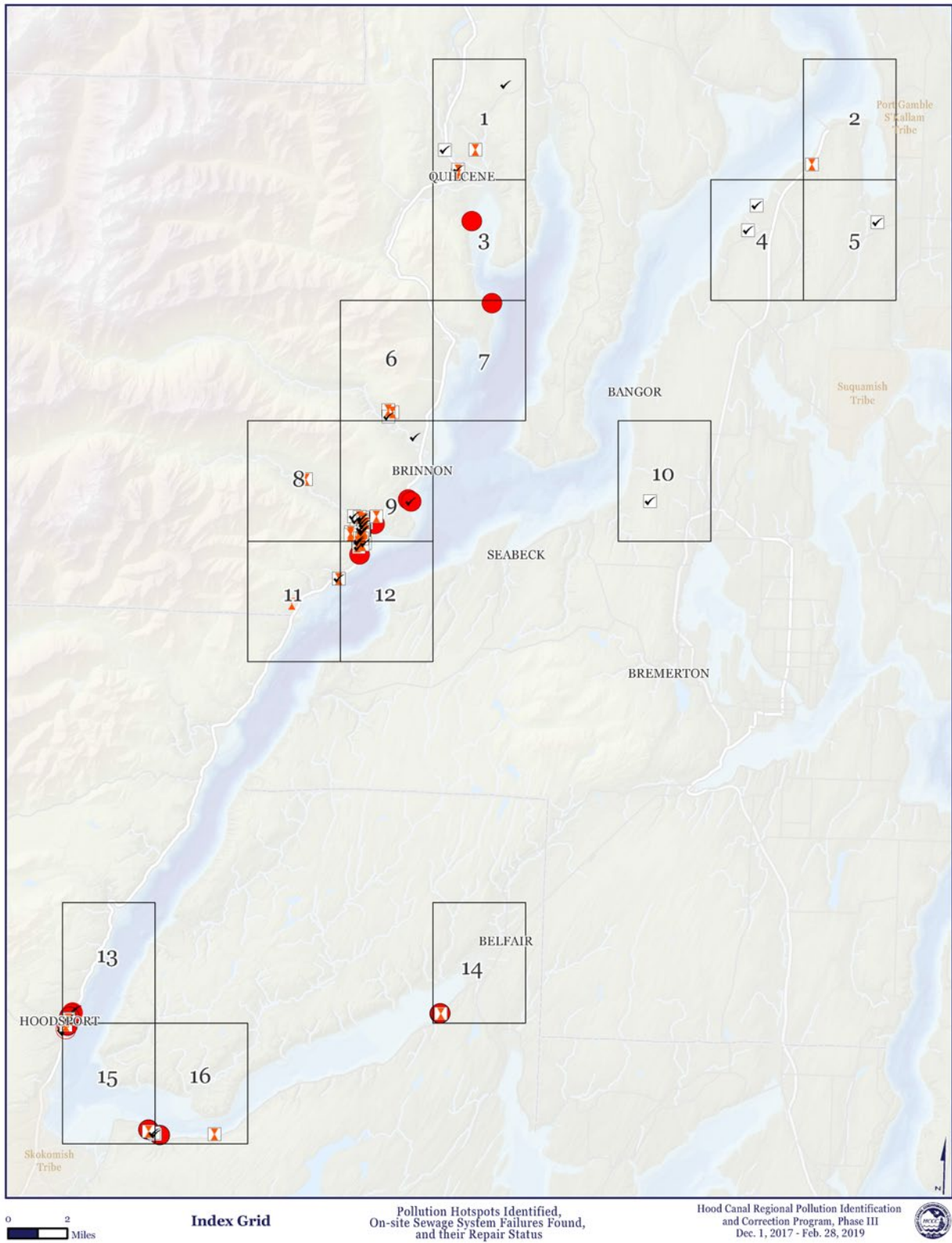


Figure A-5: Map atlas index of HCRPIC Phase III pollution hotspots, OSS failures identified, and current OSS corrective status. Map atlas available at [this link](#).

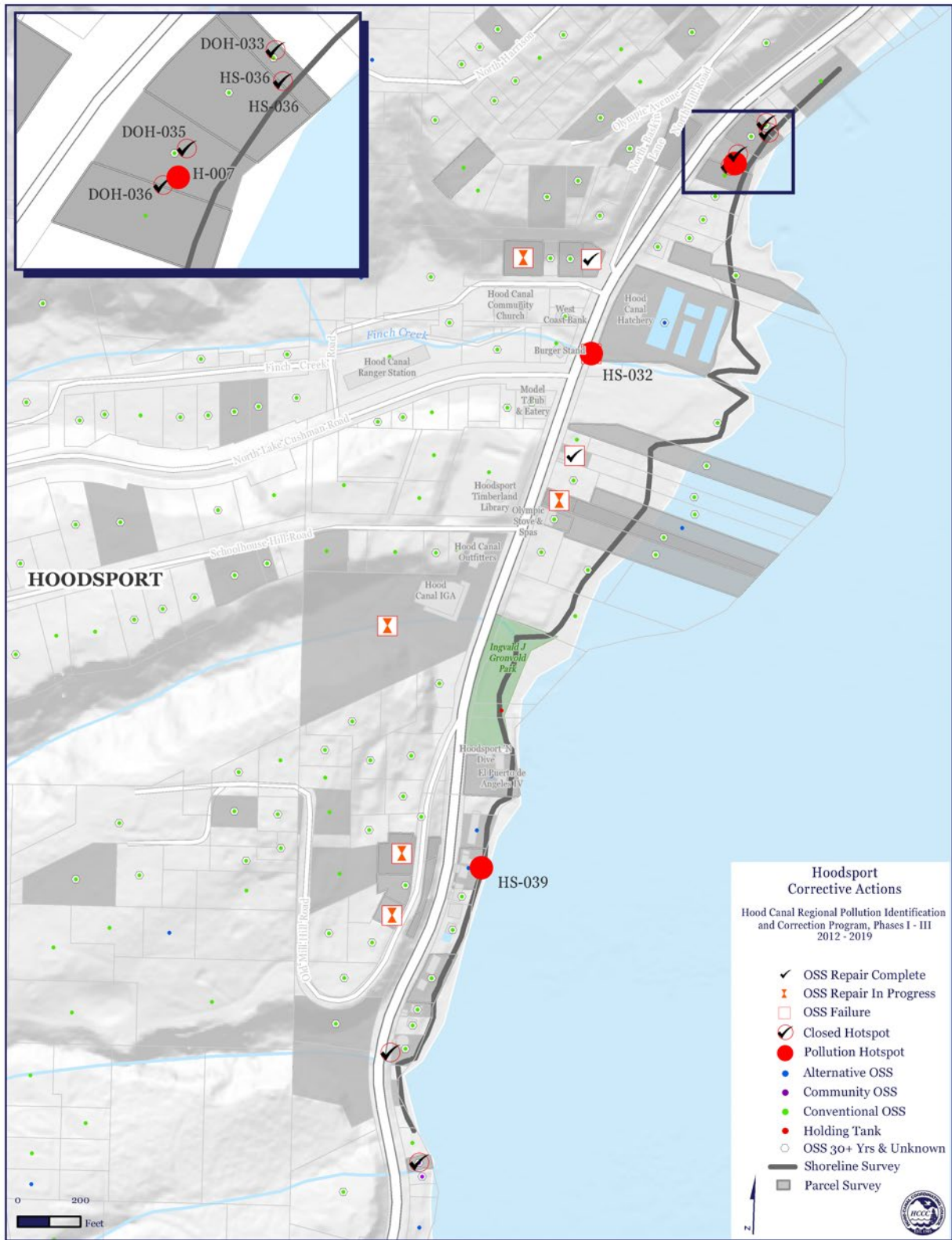


Figure A-6: HCRPIC work conducted in Hoodspport area during Phases II and III

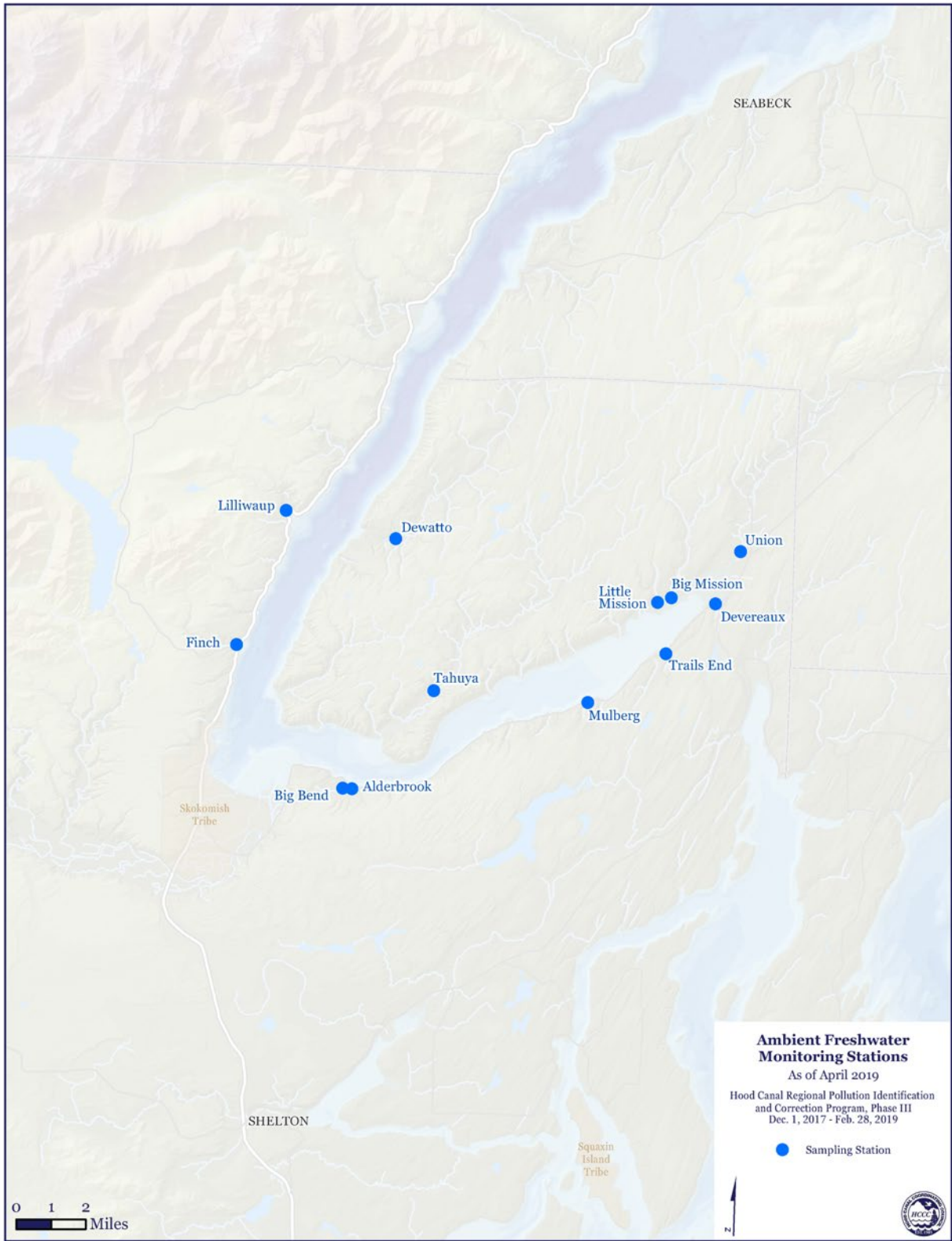


Figure A-7: HCRPIC Phase III ambient freshwater monitoring sites

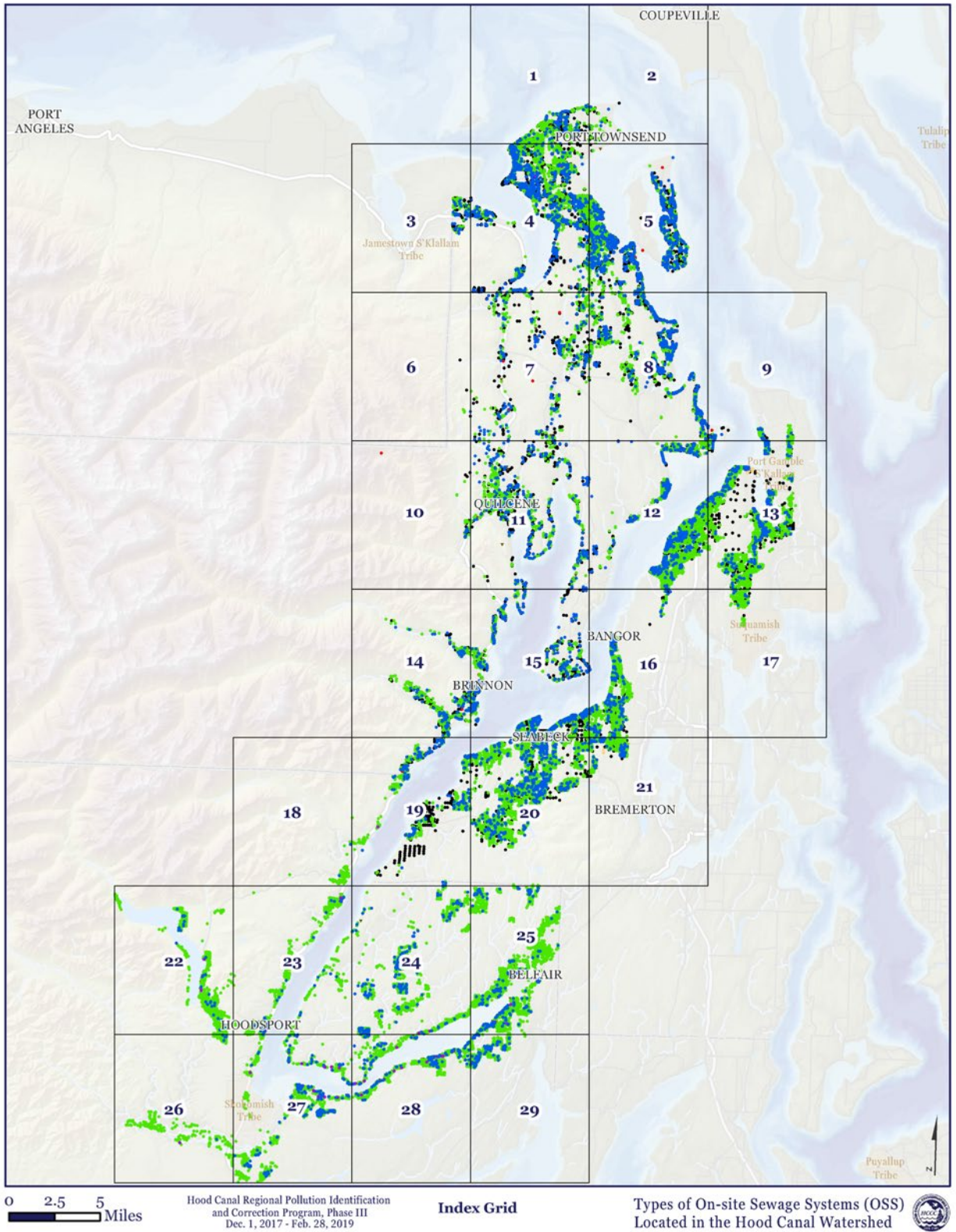


Figure A-8: Map atlas index of OSS types located in the Hood Canal watershed. Map atlas available at [this link](#).

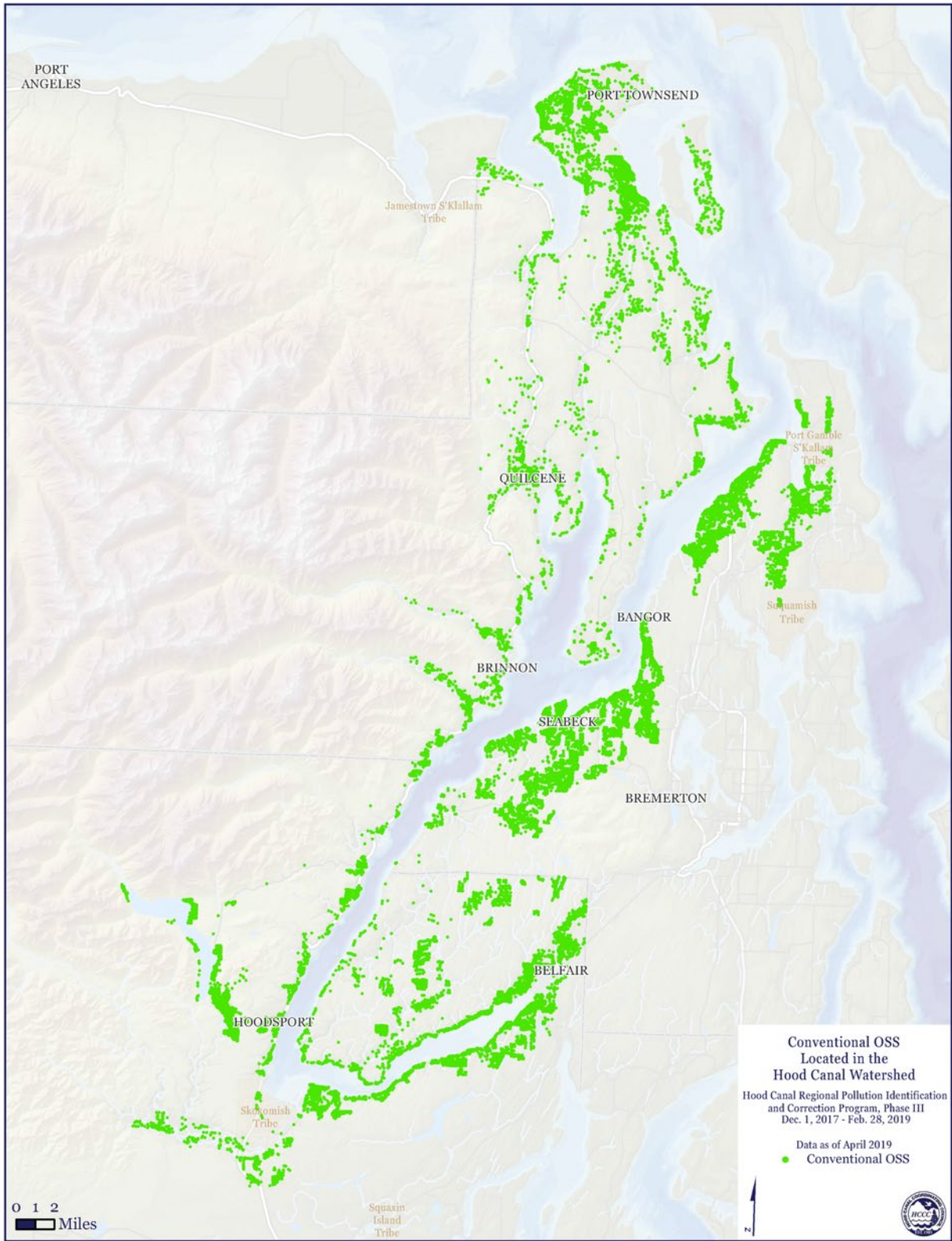


Figure A-9: Conventional OSS located in the Hood Canal watershed

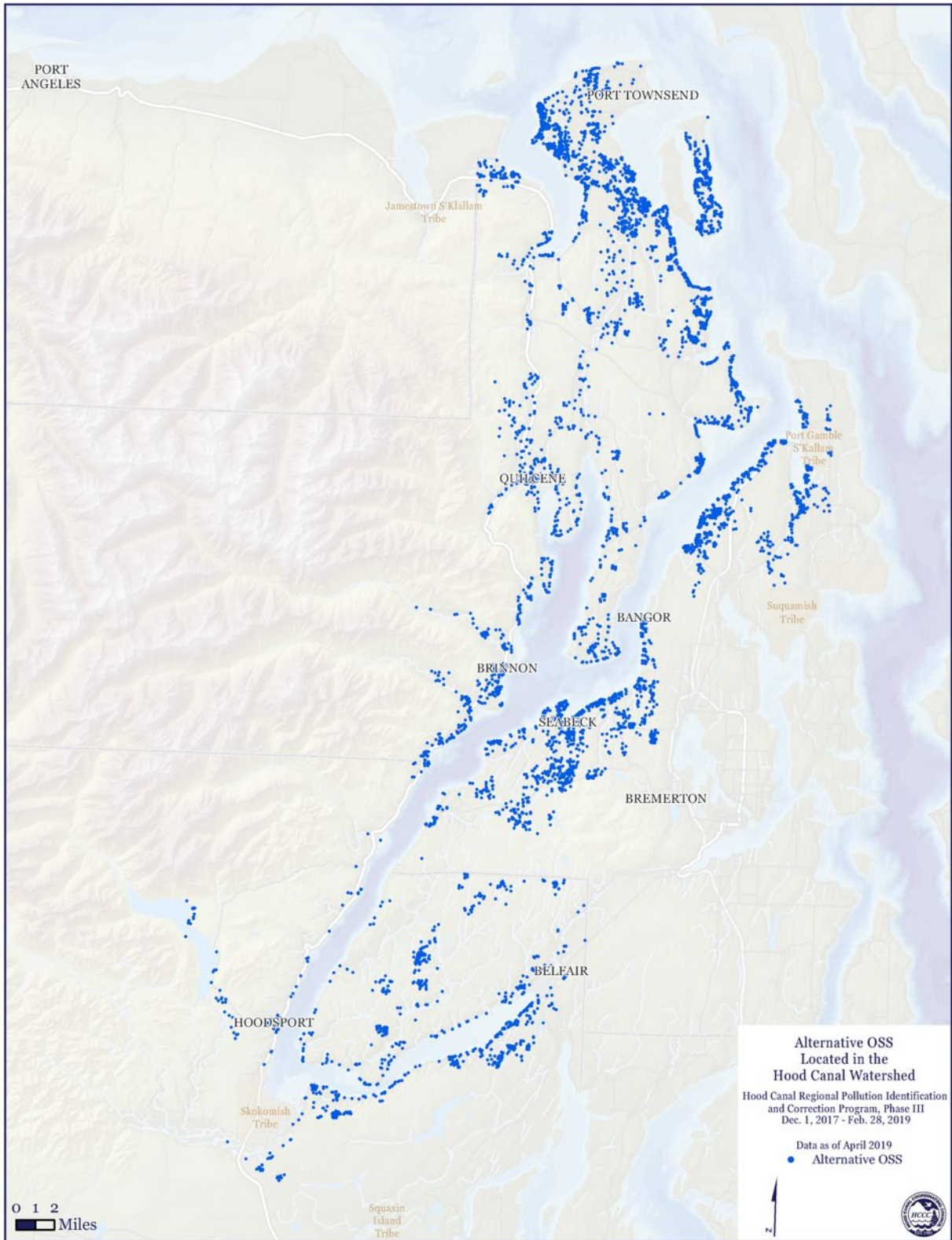


Figure A-10: Alternative OSS located in the Hood Canal watershed

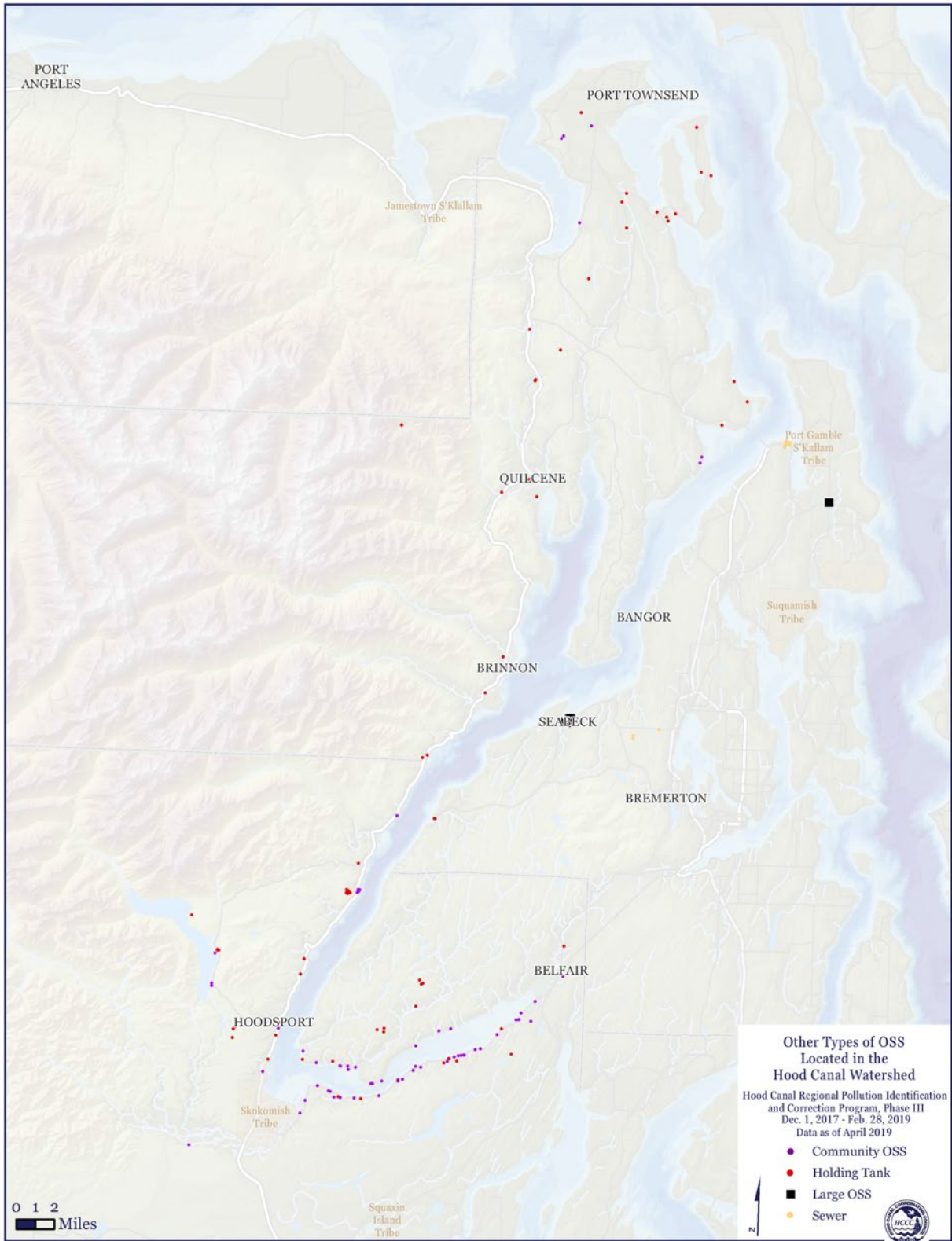


Figure A-11: Other types of OSS located in the Hood Canal watershed

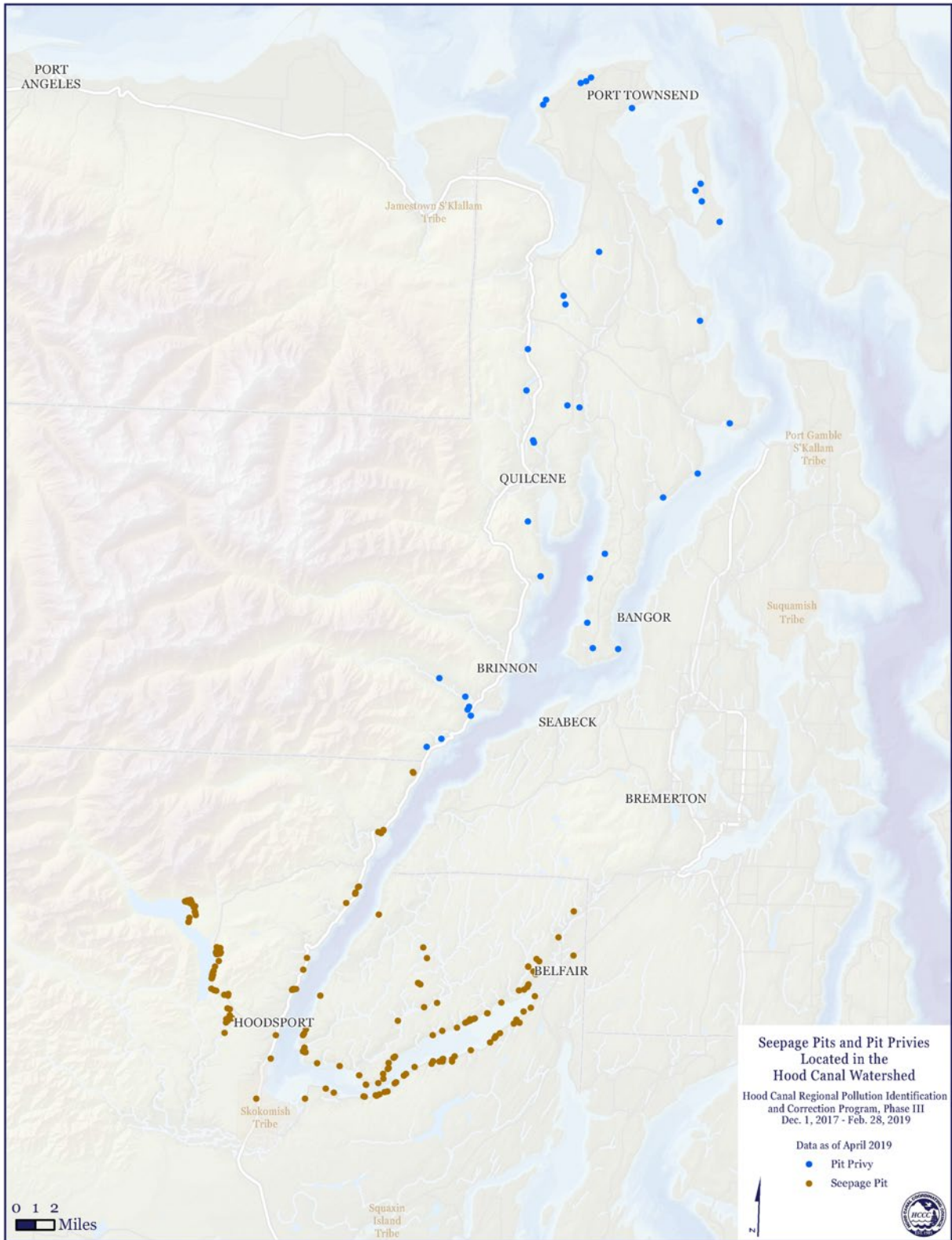


Figure A-12: Seepage pits and pit privies located in the Hood Canal watershed

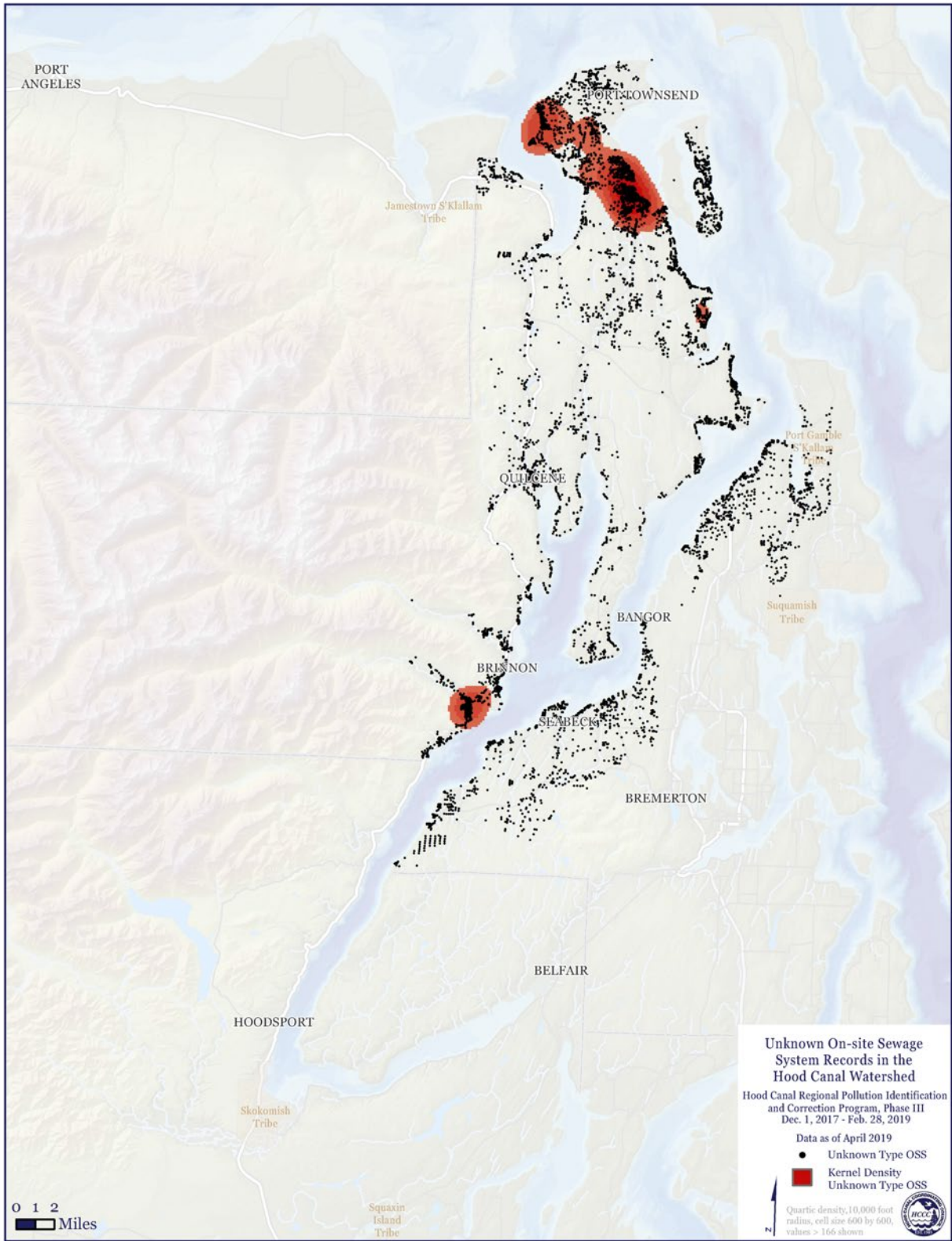


Figure A-13: Unknown types of OSS located in the Hood Canal watershed

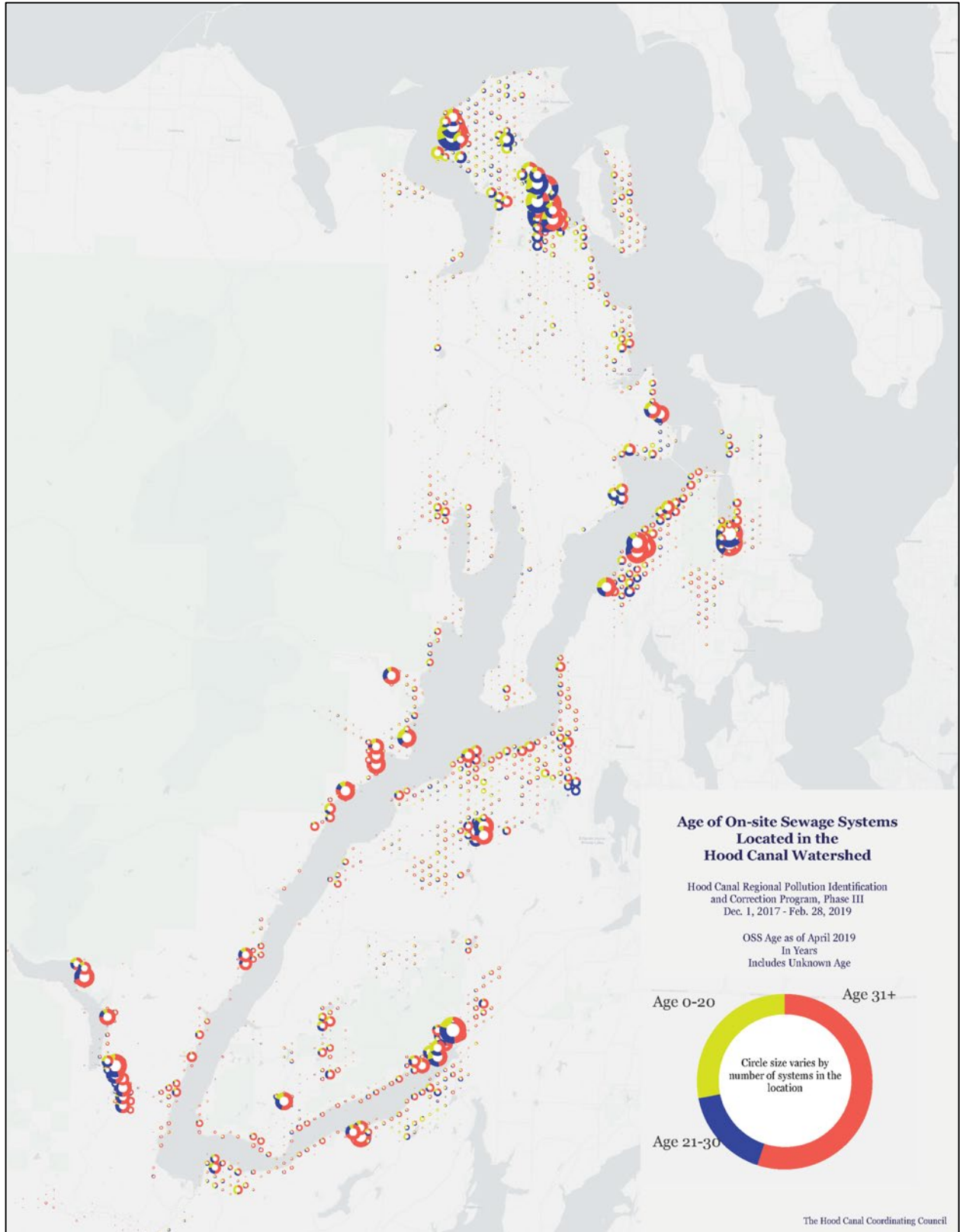


Figure A-14: Age of OSS located in the Hood Canal Watershed

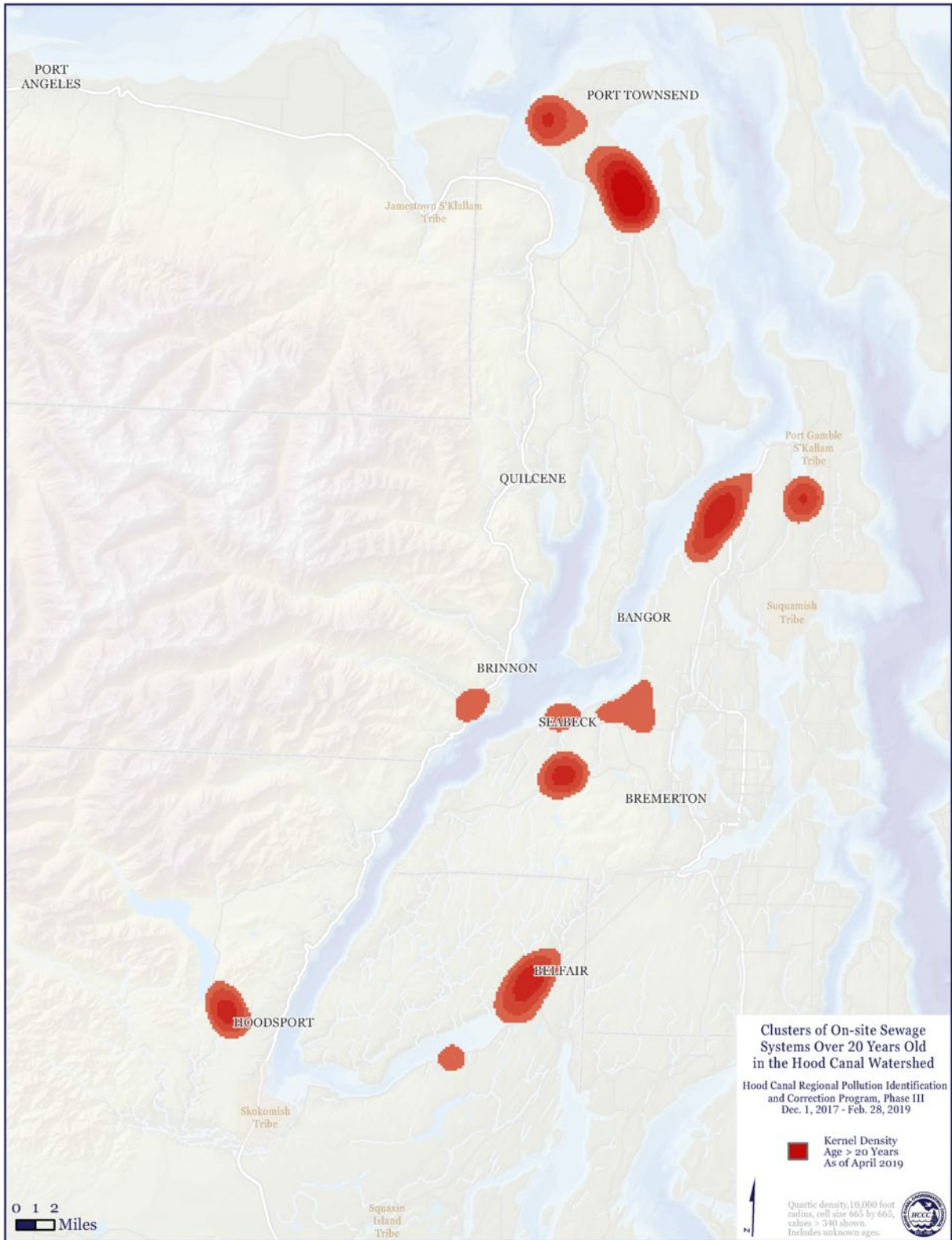


Figure A-15: Clusters of OSS over 20 years old in the Hood Canal watershed

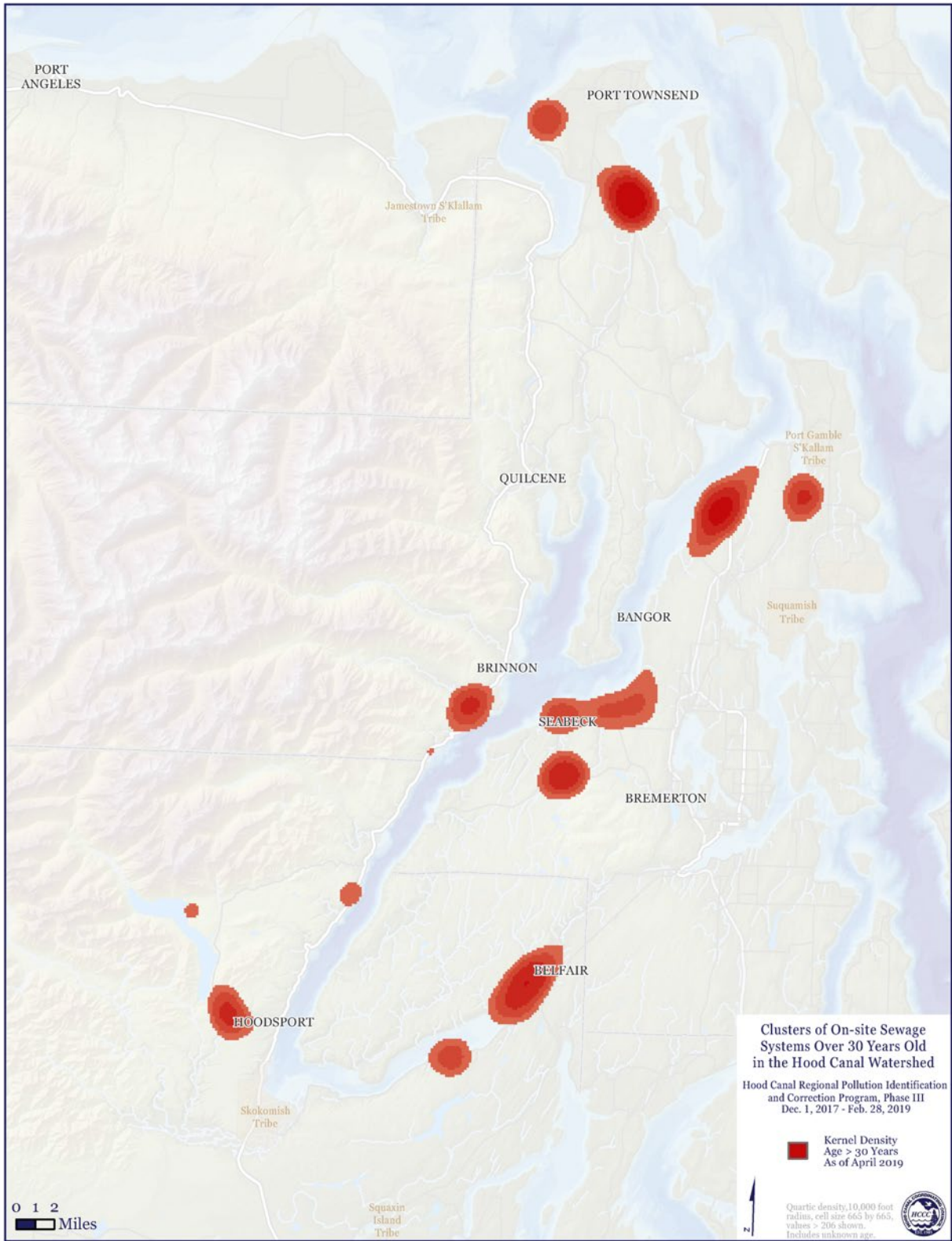


Figure A-16: Clusters of OSS over 30 years old in the Hood Canal watershed

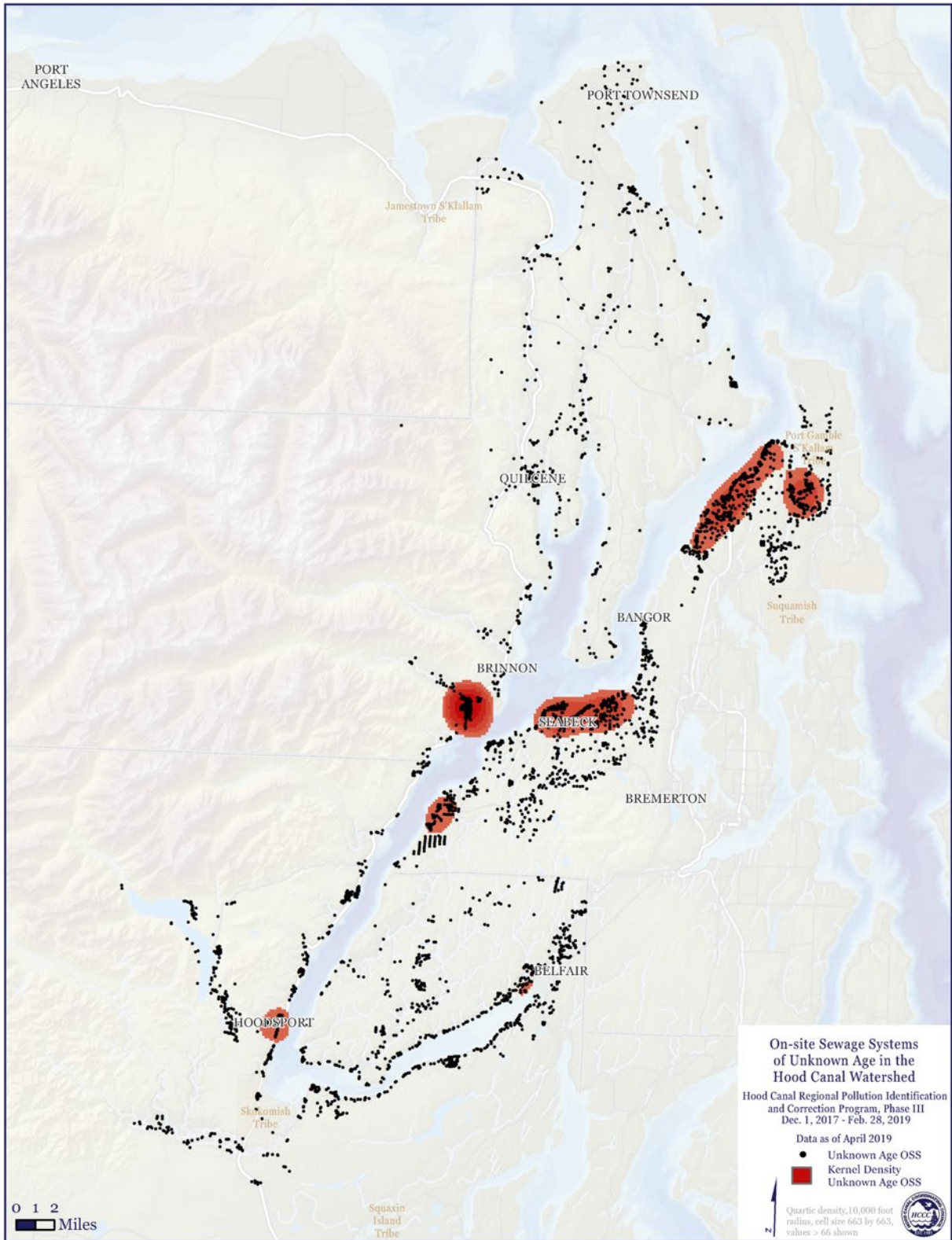


Figure A-17: OSS of unknown age located in the Hood Canal watershed



Hood Canal Coordinating Council

Jefferson, Kitsap & Mason Counties; Port Gamble S'Klallam & Skokomish Tribes

Hood Canal Regional Pollution Identification and Correction Program

Phase 3 Workplan

December 2017 (Revised June 2018)

Table of Contents

Introduction	44
Field Training.....	44
Priority Shoreline & Parcel Surveys Areas	44
Ambient Stream Monitoring.....	48
Nutrient Study.....	49
Reporting and Mapping Update	49
Outreach and Education	50

Prepared by:

Haley Harguth, Hood Canal Coordinating Council
Susan Gulick, Sound Resolutions
Leslie Banigan, Kitsap Public Health District
Seth Book, Skokomish Tribe
Mike Dawson, Jefferson County Public Health
Paul McCollum, Port Gamble S'Klallam Tribe
Katie Otanez, Mason County Public Health
Ian Rork, Kitsap Public Health District
Julian Sammons, Hood Canal Salmon Enhancement Group

Introduction

The Hood Canal Regional Pollution Identification and Correction (HCRPIC) program consists of Jefferson County, Kitsap Public Health District (KPHD), Mason County, Port Gamble S’Klallam Tribe, Skokomish Tribe, conservation districts and other state and local partners working collaboratively to improve the water quality of Hood Canal through shoreline pollution surveys, pollution hotspot investigations, parcel surveys, freshwater ambient stream monitoring, and outreach and education.

Project location: Hood Canal LIO area boundary ([map linked here](#)). Central coordinates: 47.520021, -123.038607.

Field Training

Phase 3 of the HCRPIC Program includes field training to standardize procedures across jurisdictions, learn from each other’s activities, and improve consistency and efficiency of data gathering and data management. HCRPIC members will participate in an approximately three-hour field training by the end of the calendar year (2017). KPHD will lead the training, based on the HCRPIC PIC guidance document. The training will include two components: field surveys and data management. KPHD will schedule separate training sessions with Mason County and Jefferson County, to address specific questions or needs and make the training relevant to each jurisdiction in their local area. Hood Canal Salmon Enhancement Group (HCSEG) staff will be trained for freshwater monitoring, in order to then train their volunteer monitors at a future date. KPHD staff will also assist the volunteer training with HCSEG.

Phase 3 field work and laboratory analysis protocols are described in detail in the [HCRPIC Program Quality Assurance Project Plan \(QAPP\)](#), approved by QAPP administrators on August 21, 2017.

Priority Shoreline & Parcel Surveys Areas

The HCRPIC Phase 3 priority areas are determined collaboratively and informed by current monitoring data and high priority concerns from local health jurisdictions, tribes, and Washington State Department of Health.

Water Quality Objectives

The HCRPIC regional grant scope of work specifies the following objectives for water quality improvements throughout Hood Canal:

- Upgrade **16.5 acres** from Conditionally Approved to Approved in the Big Bend area of Hood Canal 6
- Respond to downgrade in Hood Canal 3
- Upgrade **50 acres** from Prohibited to Approved in the Hoodsport area of Hood Canal 6
- Identify and correct pollution sources causing the closure of **31 parcels**

Field Work Objectives

The following field work objectives are identified for the local health jurisdictions under the regional grant contract:

Mason County:

- 100 parcel surveys
- Shoreline surveys in priority areas
- 4 Hotspots identified & corrected
- 4 OSS failures identified & corrected
- Any agricultural issues identified & corrected

Kitsap Public Health District

- 10 parcel surveys
- Shoreline surveys in priority areas
- 1 Hotspot identified & corrected
- 1 OSS failure identified & corrected
- Any agricultural issues identified & corrected

Additionally, all open pollution hotspots identified in Phase 2 will be followed up on for confirmation sampling and/or investigations.

Shoreline Priority Areas

To achieve the objectives specified in the grant and address high priority water quality concerns from HCRPIC members, priority areas have been identified for Phase 3 field work (Table 1). Priority areas are listed by county, not in any ranked order.

Table 1: HCRPIC Program Phase 3 Priority Shoreline Areas

	Location	Status	Known conditions
	Mason County		
1	Hood Canal 4 – Mike’s Beach Resort	Parcel closure	324133200000 - Undersized OSS
2	Hood Canal 5 – Lilliwaup	Parcel closure	323301100000 - Greywater discharge

3	Hood Canal 6 – Summertide Resort	Parcel closure	322282100100 - Failing OSS
4	Hood Canal 6 – Hoodsport	Prohibited	Finch Cr. Rd. parcels need investigation to follow up on bracket sampling results
5	Hood Canal 6 - Hoodsport (Ph. 2 Hotspot: DOH-033)	Prohibited	Hotspot: 47.40869, -123.13826; Stormwater Drainage, Large basket of debris in front of 2-story yellow house, 30-inch Corrugated Metal Culvert, no flow
6	Hood Canal 6 - Hoodsport (Ph. 2 Hotspot: DOH-035)	Prohibited	Hotspot: 47.40841, -123.13861; Natural Drainage, on north side of BH, in front of peach 2-story (NALTML), 6-inch Ductile Iron Bulkhead Drain, 5 GPM estimated flow
7	Hood Canal 6 - Hoodsport (Ph. 2 Hotspot: DOH-036)	Prohibited	Hotspot: 47.40833, -123.13864; Stormwater Drainage, Under slab of concrete between peach and green house
8	Hood Canal 6 – Hoodsport (Skokomish ID: SS 127/DOH ID: 43)	Prohibited	Divehouse culvert; Discharge to marine site 319 with variable history of fecal coliform sources
9	Hood Canal 6 – Hoodsport (Skokomish ID: SS 128/DOH ID: 44)	Prohibited	23860 Flat weir; Discharge to marine site 319 with variable history of fecal coliform sources
10	Hood Canal 6 - S. Hoodsport (Ph. 2 Hotspot: HS-036)	Prohibited	Hotspot: 47.408605, -123.138226; Small white bh drain, 24480 Hwy 101
11	Hood Canal 6 - S. Hoodsport (Ph. 2 Hotspot: HS-039)	Prohibited	Hotspot: 47.402141, -123.141621; Flow from culvert/ditch between two yellow houses.24010 Hwy 101.
12	Hood Canal 6 – Big Bend	Conditional area	Elevated bacteria at marine monitoring station 252
13	Hood Canal 6 – Big Bend (Calm Cove; Ph. 2 Hotspot: MCPH ID: I-042/DOH ID: 99)	Parcel closures	Calm Cove Hotspot: Creek by shake cottage (47.352728, -123.080728); Parcels 322325081005, 322325081004, 322325081001; Elevated bacteria in shoreline drainages; Shellfish Protection District
14	Hood Canal 6 – Big Bend (Mason Ave.; Ph. 2 Hotspot: MCPH ID: I-055/DOH ID: 106)	Parcel closures	Mason Ave Hotspot: Small creek with decent flow coming out of culvert just E of tan shingle house (47.35029, -123.07253); Parcels: 322325010902, 322325010903, 322325011002, 322325011002, 322338888888; Elevated bacteria in shoreline drainages; Shellfish Protection District
15	Hood Canal 7 – South Shore (east of Alderbrook)	Parcel closures	322353200140 (failing OSS); Currently under enforcement
16	Hood Canal 7 – North Shore	Parcel closures	322245000008, 322245000007, 322245000006 (failing OSS)
17	Hood Canal 8 - Ph. 2 Hotspot: R-036A	Approved	Hotspot: 47.388702, -122.912154; 1 ft. cement culvert @ 15470 SR 106
18	Annas Bay		Flood stage evaluation needed; DOH looking at raising flood stage height

			Assess OSS & drainfield locations, where/when flooding occurs, at what flood stage; Observations differ from gauge indication of flood stage In valley area: sampling of high risk OSS areas needed Skokomish can provide house locations, animal numbers New closure response plan in development Shoreline development issues: Need accounting of OSS conditions
19	Hood Canal 9 - Ph. 2 Hotspot: T-089	Approved	Hotspot: 47.41036, -122.87733; Small bh drain in seemingly dumped mud in front of bh of light green flat-roofed house (up)
20	Hood Canal 9 - Ph. 2 Hotspot: T-113	Approved	Hotspot: 47.41261, -122.87462; BH of gray split-level w/white trim, E of boat ramp, BH drain below 4th (going E) pier-block at base railing
21	Hood Canal 9 - Ph. 2 Hotspot: T-114	Approved	Hotspot: 47.41263, -122.87454; Below gray split-level, just E of ramp walkway, BH drain 4' E of ramp
22	Hood Canal 9 - Ph. 2 Hotspot: T-124	Approved	Hotspot: 47.41383, -122.87355; Center of bh below peach w/white trim hse w/green attached garage. 6" white PVC drain, 2.5' above ground
23	Hood Canal 9 - Ph. 2 Hotspot: T-126	Approved	Hotspot: 47.41401, -122.8734; Square bh drain E of steps E of peach w/white & green house
24	Hood Canal 9 - Ph. 2 Hotspot: T-127	Approved	Hotspot: 47.414025, -122.87340342; 2nd bh drain E of steps to peach w/white & green hse (round bh drain 2' above ground)
25	Hood Canal 9 - Ph. 2 Hotspot: U-075	Approved	Hotspot: 47.4281961, -122.8554094; stream coming out of bulkhead via concrete outlet on the eastern property line of 19263 E SR 106
Jefferson County			
1	Hood Canal 3 – Duckabush	Conditional	Closure response plan in development; PGST diurnal sampling conducted; Recent corrections
2	Hood Canal 3 – Dosewallips	Restricted, Beach closure	
3	Hood Canal 3 – Pleasant Harbor	Prohibited, Beach closure (marina)	Beach has boat access only (Skokomish Tribe can help)
4	Hood Canal 3 – Fulton Creek	Approved	
5	Hood Canal 3 – Jackson Cove	Approved	Hotspot
6	Quilcene Bay	Approved	Hotspots at top of Quilcene Bay (potential agriculture sources)
7	Dabob Bay	Approved	Hotspot at Tarboo Bay (potential agriculture sources)
8	Oak Bay – Little Goose Creek	Parcels closures	960300001, 960300002, 960300003, 960300004, 960300005, 960300006, 960300007, 960300008. Suspect parcels: 998400006 (2017 repair),

			998400007, 998400008 (2017 repair). DOH surveyed Oak Bay, recent correction
9	Oak Bay – S. Bay Way	Approved	921294005 (O&M Violation); DOH surveyed Oak Bay
10	Port Townsend - Irondale/Chimacum Creeks	Beach Closure	Irondale: Correction in progress; fecal counts improving
11	Hood Canal 1 – Paradise Bay		Continue shoreline monitoring and OSS work; starting 2018
Kitsap County			
1	Hood Canal 1 – LoFall Creek	Prohibited area	Parcels 1386499, 158215, 1585207, 1585199, 1585181
2	Hood Canal 1 – Kinman Creek	Prohibited area	Parcels 1385889, 1385897, 2189124, 1385863, 1385855
3	Hood Canal 1 – Vinland Creek	Parcels closures	Shoreline discharge at the creek, and north of creek; 1922301 and 1326644
4	Hood Canal 1	Parcels closures	1390764, 1390681, 2193092, 2398584, 1390400, 1390392; Periodic elevated bacteria in shoreline drainages
5	Hood Canal 1	Parcels closures	2362770, 2051845; Periodic elevated bacteria in shoreline drainages
6	Hood Canal 2	Prohibited area	
7	Hood Canal 4 – LH34		Follow up sampling needed
8	Hood Canal 4 – LH76		Follow up sampling needed
9	Hood Canal public complaints and deficient tank pumping reports	Hood Canal shoreline	

Ambient Stream Monitoring

The Hood Canal Salmon Enhancement Group will lead volunteer monitoring groups in collecting water samples at freshwater streams in priority survey areas. The samples will be analyzed for fecal contamination. Field work and laboratory analysis protocols are described in detail in the [HCRPIC Program Quality Assurance Project Plan \(QAPP\)](#), approved by QAPP administrators on August 21, 2017.

Phase 3 freshwater stream sample sites include Mason County priority streams. Jefferson and Kitsap Counties actively monitor freshwater streams in their jurisdictions, so the Guidance Group elected to focus these efforts in Mason County. Sampling locations were identified collaboratively by Mason County public health staff and Skokomish Tribe natural resources staff, and focus on 303(d) listed streams.

Priority Freshwater Streams

The twelve selected streams (Table 2) will be monitored throughout the project duration at approximately three-week intervals, totaling 17 monitoring events and 200 samples.

Table 2: HCRPIC Phase 3 Priority Streams

HCRPIC Ambient Stream Monitoring Priority Streams
Liliwaup Creek
Finch Creek
Big Bend Creek
Alderbrook Creek
Mulburg Creek
Trails End Creek
Deveraux Creek – wet season only
Union River
Big Mission Creek
Little Mission Creek
Tahuya River
Dewatto River

Nutrient Study

HCRPIC Guidance Group members reviewed the results of the Phase 2 Pilot Nutrient Study to discuss scoping for a follow-up study in Phase 3. The members concluded that they were satisfied with the findings of the Phase 2 Pilot Nutrient Study, and did not recommend the continued allocation of resources toward this task for Phase 3. They recommended re-allocating those funds to higher priority tasks, such as outreach and education to targeted audiences. A specific project recipient was not identified at this time, however, the Guidance Group will continue to discuss how to best re-allocate those funds to improve water quality across Hood Canal.

Reporting and Mapping Update

At the conclusion of field monitoring, all water monitoring and parcel survey data will be reviewed pursuant to the approved QAPP and submitted for reporting and GIS mapping. Maps will be updated with Phase 3 data illustrating the current OSS inventory of Hood Canal jurisdictions, all field work implemented (shoreline areas and streams surveyed, hotspots identified, and parcel surveys conducted), and all OSS failures identified and repaired. The HCRPIC Guidance Group will continue to explore how to utilize mapping tools to evaluate effectiveness over time and look for ways to improve our coordinated approach.

Outreach and Education

The HCRPIC Guidance Group will continue to discuss outreach and education objectives to determine Phase 3 activities. This workplan will be updated accordingly.

OSS Maintenance Vouchers: Guidelines

Funding Guidelines

- Vouchers may reimburse up to \$250 per recipient
- One voucher per septic system
- Can be applied to pumping, tank inspections, risers, other minor repairs installed by a licensed OSS maintenance provider, such as:
 - o Tank sealing
 - o Effluent filters
- Voucher funding is distributed in order that applications are received from eligible recipients, until funds are exhausted

Eligibility Guidelines

- Eligible to parcels in targeted priority areas in Phase 3 Workplan (areas subject to Guidance Group approval)
 - o Only eligible to parcels that have not received previous vouchers in past 2.5 years (since July 2015)
- Also eligible to high priority parcels in the Hood Canal watershed, based on age, lack of OSS records or maintenance history, or prior deficiencies or violations
 - o To be offered directly to specified parcels under investigation, not broadcast widely

Outreach Materials Guidelines

- Reference the Hood Canal Coordinating Council ([logo](#) and name) and the Hood Canal Regional Pollution Identification and Correction Program:
 - o “Septic system maintenance vouchers are provided by the Hood Canal Coordinating Council’s Hood Canal Regional Pollution Identification and Correction Program”
- Include the following required statement recognizing EPA funding:
 - o “This project has been funded wholly or in part by the United States Environmental Protection Agency under assistance agreement PC-01J18001 through the Washington State Department of Health. The contents of this document do not necessarily reflect the views and policies of the Environmental



Protection Agency or the Washington State Department of Health, nor does mention of trade names or commercial products constitute endorsement or recommendation for use."

- Include water quality messaging, such as:
 - o Leaking septic systems are a significant source of pollution impacting Hood Canal beaches and waters
 - o It is important to maintain your septic system because:
 - The Hood Canal community relies on clean beaches for swimming, fishing, shellfish harvest...
 - Hood Canal's ecosystem relies on clean water
 - Clean water requires everyone's help...

Table 3: HCRPIC Phase 3 OSS O&M Voucher Funding

Jurisdiction	Funding
Jefferson County	\$14,000
Kitsap County	\$12,000
Mason County	\$14,000

Hood Canal Regional Pollution Identification & Correction Program

Field Implementation Guide



Table of Contents

Field Preparation & Safety	53
Supplies and Equipment	53
Access and Consent	53
Project Area Evaluation	53
Monitoring & Investigating Fecal Pollution Sources.....	54
Conducting Property OSS Inspections	59
Conducting Property Animal Waste Inspections	64
Property Inspection Data Management	66
Pollution Source Correction.....	66
Reporting and Follow-up	67
Appendix A: Sampling/Testing Equipment	68
Appendix B: Kitsap Health Private Property Access and Consent Policy.....	69
Appendix C: Fecal Pollution Hotspot Flow Charts	72
Appendix D: PIC Property Survey Form	75

December, 2017

Developed from the Hood Canal Regional PIC Program’s Guidance Document

Prepared by Leslie Banigan, Kitsap Public Health District

Contact: Haley Harguth, Hood Canal Coordinating Council (hharguth@hccc.wa.gov)

Hood Canal Regional Pollution Identification and Corrections (HCRPIC) Program partners have contracted with HCCC and National Estuary Program to follow the guidelines outlined in this field guide.

Field Preparation & Safety

Personal safety in the field is extremely important. The key to a safe field inspection is preparation including: obtaining required training, familiarity with related policies and procedures, confirming or acquiring additional information, and gathering necessary supplies, equipment, and protective clothing. Notify fellow staff where you will be working in the field and the approximate time you plan to return. After completing field work, notify fellow staff that you have completed your field work and are returning home. Always park your vehicle in a manner that does not interfere with the movement of other vehicles but provides you with the opportunity for a quick exit (if needed).

Supplies and Equipment

Field staff should carry safety equipment and supplies (see Appendix A) including:

- Identification
- Cell phone/emergency contact phone numbers
- Appropriate personal protective equipment including field boots and disposable waterproof gloves
- Maps, project information, field work information
- Field notebook, pen and/or pencil, permanent marker
- Sampling wand (Fig. 1), bottles, cooler(s) and ice packs
- Digital camera and handheld GPS
- Dog treats
- Pepper spray canister (requires training)
- First Aid supplies and hand sanitizer

Dress appropriately for the weather. Wear clothes that make it easy for you to move fast, and are suitable for brambles, mud, and obstacles. For stream monitoring and shoreline surveys it is highly recommended you wear boots with good ankle support as the topography may be somewhat uneven. Good traction and water proof material is also highly suggested.

Access and Consent

Make sure that you know your jurisdiction's access and consent policy for private property. Appendix B contains access and consent guidance that Kitsap Health uses to make sure that all work is conducted from areas that are legally accessible so that results can be used in a court of law if necessary.

Project Area Evaluation

Gather and evaluate existing information about the project area:

- Project area details and history (area maps, public access areas, soil conditions, sewer maps, stormwater maps, onsite sewage system (OSS) GIS maps, areas of concern, and WSDOH shellfish reports)
- Water quality data

Initial Project Area Visit

- Identify surface waters, such as streams, marine water, and public access areas
- Confirm stormwater drainage patterns (roadside ditches, collection systems, and pipe discharges)



Figure 5: Sampling wand, made from an extendable paint pole with a cut Nalgene bottle attached at the end with electrical tape. Holds a 100ml sample bottle.

- Identify water quality problem areas based on water quality data and determine drainage segments that need investigation
- Look for and document potential fecal pollution sources in the area (OSS, pet and livestock waste, food and grease waste);

Monitoring & Investigating Fecal Pollution Sources

Water Quality Standards and Criteria

The Washington State Department of Ecology establishes surface water quality standards in Chapter 173-201A Washington Administrative Code (WAC). Water quality monitoring results are compared to the current Washington State water quality standards as shown in Table 1. Surface waters in Washington State are designated in the WAC as either Primary or Extraordinary Primary waters.

Table 1. Surface Water Quality Standards and Related Criteria

Parameter	Freshwater Standard		Marine Water Standard	
	Extraordinary Primary	Primary	Extraordinary Primary	Primary
Fecal Coliform Bacteria (FC)	Part 1: ≤50 FC/100 mL (geomean) Part 2: Not more than 10% of all samples obtained for calculating a geomean >100 FC/100 mL	Part 1: ≤100 FC/100 mL (geomean) Part 2: Not more than 10% of all samples obtained for calculating a geomean >200 FC/100 mL	Part 1: ≤14 FC/100 mL (geomean) Part 2: Not more than 10% of all samples obtained for calculating a geomean >43 FC/100 mL	Part 1: ≤14 FC/100 mL (geomean) Part 2: Not more than 10% of all samples obtained for calculating a geomean >43 FC/100 mL
E. Coli Bacteria	≤126 organisms/100 mL (geomean) ¹		None	None
Dissolved Oxygen	> 9.5 mg/L	> 8.0 mg/L	> 7.0 mg/L	> 6.0 mg/L
pH	6.5 – 8.5 units	6.5 – 8.5 units	7.0 – 8.5 units	7.0 – 8.5 units
Temperature	16.0° C ²	18.0° C ²	13.0° C ²	16.0° C ²
Turbidity	Not >5 NTU over background when background turbidity <50 NTU, or not >10% increase in turbidity when background turbidity >50 NTU	Not >5 NTU over background when background turbidity <50 NTU, or not >10% increase in turbidity when background turbidity >50 NTU	Not >5 NTU over background when background turbidity <50 NTU, or not >10% increase in turbidity when background turbidity >50 NTU	Not >5 NTU over background when background turbidity <50 NTU, or not >10% increase in turbidity when background turbidity >50 NTU

Monitoring Objectives

- Conduct water quality monitoring, data management, and reporting, pursuant to Hood Canal Regional Guidance Document and approved Quality Assurance Project Plan
- Collect monitoring data to identify and prioritize nonpoint pollution problem areas along the Hood Canal shoreline for pollution source investigation and correction efforts
- Implement an ambient monitoring program to measure, assess, and characterize priority Hood Canal fresh water quality trends
- Implement shoreline surveys, hotspot confirmation and investigation, to identify and correct fecal pollution sources

- Assess surface water quality results based on applicable State surface quality standards before and after fecal pollution source correction

Ambient Fresh Water Monitoring

The Hood Canal Salmon Enhancement Group will conduct ambient fresh water monitoring in high priority Hood Canal streams. They will use a stratified random sampling strategy to determine current conditions and track long-term water quality trends.

Shoreline Survey Monitoring

Shellfish beds are regulated based on fecal coliform (FC) monitoring, pursuant to the National Shellfish Sanitation Program. PIC programs often use E.coli (EC) sampling because it is more cost effective and has a better correlation with human health risk in fresh water. Jefferson, Kitsap, and Mason Health will conduct shoreline surveys and resulting hotspot confirmations and investigations in priority Hood Canal shoreline areas¹.

Monitoring Station Locations

Sampling routinely takes place near confluences of freshwater flows to marine waters and at selected upstream locations on tributaries. Monitoring stations are determined through review and consideration of the following:

- Geographical and hydrological characteristics of each watershed
- Water bodies on the state 303(d) List
- Water quality results and findings from earlier watershed assessment projects
- Types, locations, and densities of land uses within each watershed
- Locations of public parks and recreational shellfish beaches
- Monitoring station locations from other monitoring efforts (Puget Sound Assessment and Monitoring Program, Public Utility Districts, etc.)

Precision, comparability, and reproducibility of station locations are achieved through the identification and documentation of major landmarks and road crossings (visual and descriptive) and Geographic Positioning System (GPS) coordinates of latitude and longitude.

Segment Sampling

When a stream mouth is a fecal pollution hotspot, the stream system is investigated by dividing it into segments like major tributaries or stream segments with similar land uses. The segment samples are collected to assess fecal pollution contributions of each stream segment. Stations are located at major tributaries or stream segments or at changes of land use.

Bracket Sampling

Bracket sampling can be used to evaluate fecal pollution increases across a parcel or land use. Find an upstream sample location, preferably publically accessible, as close as possible to the potential fecal pollution source. Select a downstream sample location as close as possible to the parcel or potential fecal pollution sources. Collect three to five sample sets and calculate geomeans for the upstream and the downstream station to determine whether bacteria increases across the property or land use. Obtain and document property owner's permission to sample on private property. Take photographs to document location and physical observations.

Post Correction Sampling

Sampling is conducted 2-3 times at confirmed shoreline hotspots after fecal source correction to confirm that fecal pollution sources have been corrected.

¹ Hood Canal Regional PIC Program Phase 3 Workplan (Dec 2017)

Monitoring Data Management

Effective quality assurance and quality control and data management are essential for assessing and using water quality monitoring results to identify and correct fecal pollution sources. Jurisdictions must review their data, pursuant to the approved QAPP, to ensure that all parameters monitored and laboratory analytical results are characteristic of expected results.

Kitsap Health has developed and tested a cloud-based water quality monitoring database and reporting system that streamlines the data reporting, hotspot confirmation and investigation processes. HCRPIC partners are encouraged to use the cloud database and will provide training and electronic access as needed.

By March 31, 2019, Kitsap Health will prepare and transmit HCRPIC Phase 3 monitoring data to SToret that was entered into Kitsap Health’s database by December 31, 2018. The Port Gamble S’Klallam Tribe has a SToret node and can assist jurisdictions to prepare and transmit data that was not entered into Kitsap Health’s database.

Conducting Shoreline Surveys

A shoreline survey is the inventory and bacterial assessment of all flowing fresh water discharges to the shoreline project area. Most project areas require both wet and dry weather season shoreline surveys.

Wet season: November - April
Dry season: May - October

Dry weather events can identify problems in areas where stormwater masks fecal pollution sources or where residences are only occupied in the summer. **Wet weather** assessments can identify OSS failures caused by high seasonal groundwater and surface water drainage issues. Wet weather conditions are met when water is flowing off parcels and stormwater is flowing in roadside ditches or storm systems and is representative of typical wet weather conditions.

Shoreline Survey Field Preparation Checklist

- Check tides (<http://www.protides.com/washington>) and weather conditions
- Determine the shoreline to be surveyed and potential “start” and “end” access points. These can be a public access area, like a public boat launch, or from a property where consent has been granted to access the shoreline. The County’s Assessor database and Washington State Department of Ecology’s shoreline aerial photos can help determine potential public access points. Visit the area ahead of time to determine “start” and “end” accessibility.
- Determine whether you need a shoreline survey partner. Partners are recommended when the area is unknown, very muddy or marshy, or when distances or tasks can be more efficiently conducted with a partner. Always err on the side of caution, while using resources carefully and wisely.
- Estimate the number and type of samples to be collected and coordinate with the laboratory. Plan to deliver the samples within the required holding time.
- Develop a sampling strategy and sample labeling system ahead of time. There are several ways to name sampling stations. It is important to choose carefully because you will need to use this system throughout the project and these station names will be reported in grant reports and SToret. Examples are shown in Table 2.
- Gather field supplies, including a travel cooler with ice packs
- Calibrate refractometer

Table 2: Shoreline Survey Station Identifier Examples

Project Area	Naming Description	Station ID
Hood Canal 2 growing area	Hood Canal 2 may be abbreviated HC2 followed by sequential number	HC2.1,2,3....
Murden Cove	MUR followed by sequential number	MUR 1, 2, 3...

Conducting the Shoreline Survey

Park one vehicle safely at the “start” access point and another vehicle at the “end” access point. Place your business card, with cell phone number, on the dashboard or inside the driver’s side window, to provide contact information.

Collecting Water Samples

1. The HCRPIC Phase III approved QAPP requires one field blank per sample event and one replicate sample for every ten sample sites. Typically, the replicate sample is collected at a larger flow, where it is easier to collect both samples at the same time without collecting debris or surface microlayer.
2. Wear disposable, waterproof gloves for your safety.
3. At the top of the field notebook page (Table 3), clearly print the project name, weather and tide conditions, date, start/end locations and direction of travel, and staff.
4. Clearly record each sample name, collection time, location, drainage type and size (seep, stream, pipe, pipe material and size) in the field notebook. Record detailed, parcel-oriented descriptions in the field notebook so outfalls can easily be re-sampled. Note any characteristics that will help distinguish the property when accessed from upland so the associated property address can be identified.
5. Record GPS latitude and longitude coordinates of the discharge in the field notebook. Entering the sampling station in the GPS helps re-locate the sample site.
6. Take a digital photograph of the sampling location with distinguishing features to help identify the location. In some instances, more than one photo may be necessary to re-identify the location for subsequent surveys.
7. Measure and record salinity in the field using a refractometer of each flowing discharge points, including stormwater outfalls, yard drains, bulkhead drains, pipes, drainage ditches, seeps, and sheet flow, to distinguish between marine and fresh water. Collect fresh water samples at discharges with 10% (or ppt) or less salinity and collect a sample for marine water evaluation when salinity is more than 10%.
8. Proper technique for collecting, labeling, and transporting samples is critical to ensure that sampling data is valid. To be representative, water samples should be collected from free falling surface water when possible. Bottom sediments and surface bacteria can skew sample results. Use a black permanent marker to label 100 milliliter sample bottles with the sample identifier, date, and collection time.
9. Hold the sample bottle under the flow, using the sample wand if necessary, to fill the bottle to the 100-milliliter mark. Minimize the amount of underlying sediment and surface layer collected. Avoid contaminating the sample by touching the inside of the lid or bottle.
10. Note and document in the field notebook any unusual odors, matting, vegetation, laundry lint, food waste, warm temperature, animal tracks or waste, or any other characteristics that may indicate a sewage or laundry source.
11. Store samples in travel cooler or backpack cooler with ice to keep them within the holding temperature. Transfer the samples to a regular cooler with ice in the vehicle.
12. Wash hands as soon as possible after sampling and before you eat.

Table 3: Field Notebook Example

Hood Canal Shoreline Survey – Hood Canal 2					DATE: _____
Staff: Banigan & Rork					
Weather and tide conditions: <i>e.g. Rain, 50F, wind S at 10 mph, Low tide 2.1' at 10:22</i>					
Start: Address and/or landmark and approximate distance					
Sample ID	Time	Latitude	Longitude	Description	Comments
HC2.1	10:15	xx.xxxxx	xx.xxxxx	6 in black flex in bulkhead	Matting at base of bulkhead
HC2.2	10:25	xx.xxxxx	xx.xxxxx	Beach seep	Raccoon tracks
HC2.3	10:43	xx.xxxxx	xx.xxxxx	4 in pvc pipe under dock	Suds
HC2.4	11:02	xx.xxxxx	xx.xxxxx	Stormwater diffuser on hillside	

Transporting Samples and Chain of Custody

Transport water samples in coolers with enough ice packs to meet the temperature holding requirements. Use a smaller travel cooler on the shoreline and transfer samples to a larger cooler in the vehicle. Complete the chain of custody for transmitting water samples to the accredited contract laboratory. Check the appropriate sample type and turnaround time on the chain of custody.

Sample results

Water quality sample results are reported by the contract laboratory. Review the results and validate for quality assurance and quality control pursuant to the approved QAPP. Enter water sample results into a water quality database (pg. 5). Kitsap Health’s cloud database prints a report that shows which samples need confirmation, which locations have been confirmed as “hotspots,” and can track field work, confirmed pollution sources, and post corrective sampling.

Confirmation Sampling

The HCRPIC guidance document specifies that initial shoreline samples that exceed a threshold of 200 FC/100ml or 100 EC/100 ml are confirmed by re-sampling twice and calculating the geometric mean value (GMV) of the three samples. **Re-sampling should occur as soon as possible and must be collected within the same weather season.** Fecal source investigation should begin as soon as possible in discharges that have two bacterial samples that are greater than or equal to 500 FC/100ml or 320 EC/100 ml. Sites where the GMV of three samples are equal to or exceed 500 FC/100ml, or 320 EC/100ml are considered confirmed bacterial “hotspots” that need further investigation. Refer to Appendix C-1 for a hotspot confirmation flow chart.

Pollution “Hotspot” Investigation Process

Table 4 and Appendix C-2 provide overviews of the hotspot investigation process. Rank the confirmed “hotspots” per the GMV and initiate investigation of the “hotspots” with the greater GMVs first.

Table 4: “Hotspot” Investigation Process

Step	Instructions
1	Confirm “hotspot” during the season it was confirmed (dry or wet) by collecting a minimum of three samples for GMV calculation.
2	Create map of the area within 200 feet of the “hotspot”.
3	Conduct reconnaissance to assess number of homes, proximity to drainage, presence of livestock, possible access points for segment sampling, etc.
4	If ≤10 homes, review (OSS) records for all homes and inspect them.
5	If >10 homes, conduct segment sampling. Start at the discharge and collect samples uphill toward the source. Collect a minimum of three samples on separate occasions and calculate GMV for each segment. Note that segment sampling must occur during the same season that “hotspot” was confirmed. <ul style="list-style-type: none"> – If drainage is high throughout, conduct OSS record search and inspect all homes within 200 feet. – If drainage is not high throughout, conduct OSS record search and inspect all homes within 200 feet of the “hotspot” segment(s).

Assemble an investigation package for each “hotspot” including: photos, maps, segment sampling, and parcel survey packages including OSS permit and maintenance records for nearby residences and education and outreach materials. Evaluate potential fecal pollution sources through property inspections and segment sampling. Prioritize parcel inspections as shown in Table 5 below.

Table 5: Parcel Inspection Prioritization

Priority	Criteria
HIGH	<p>Properties with gravity OSS within 200 feet of the drainage that have one or more of the following characteristics:</p> <ul style="list-style-type: none"> – No OSS permit records – you must confirm if EH Clerical has not recorded search in Logger notes – Evidence of unpermitted repairs – Previous “Concern” or “Suspect” inspection rating – Permitted gravity OSS ≥ 30 old – History of public OSS or water quality complaints – Two or more deficient pump reports indicating component failure or malfunction, or surfacing failure – Livestock present, pasture and/or heavy use area in poor condition, with high probability of contaminated runoff due to topography.
MEDIUM	<p>Properties within 200 feet of the drainage that have one or more of the following characteristics:</p> <ul style="list-style-type: none"> – Permitted gravity OSS 15-29 old with no maintenance in last 6 years – Permitted gravity OSS 15-29 with one deficient pump report indicating component failure or malfunction, or surfacing failure. – Alternative OSS with multiple deficient inspections – consult ORME and OSS/DW before inspecting. – Livestock present, pasture and/or heavy use area in poor condition, with some probability of contaminated runoff due to topography.
LOW	<p>Properties within 200 feet of the drainage that have one or more of the following characteristics:</p> <ul style="list-style-type: none"> – Permitted gravity OSS 0-14 old – Permitted alternative OSS with 0-1 deficient inspections– consult ORME and OSS/DW before inspecting – Livestock present, with low probability of runoff due to topography.

Appendix C contains flow charts from the HCRPIC Phase II approved QAPP that illustrate when and how shoreline samples are confirmed, how they are investigated, and when and how a hotspot is closed.

Conducting Property OSS Inspections

Property inspections are conducted to identify fecal pollution sources and to provide property owners and residents with information and free technical assistance to prevent premature OSS failures and other fecal pollution sources. Provide financial assistance information about OSS repair loans during property inspections.

Property OSS Inspection Preparation

Before conducting a site visit, gather all relevant information about the property that is being visited. Check available databases for OSS permit and maintenance records, and to see if there are any prior complaints or other useful information. Work with your supervisor if you feel the need to check with the local Sheriff’s Office about potential safety concerns about a property, or if you need an escort. Consider taking a field partner in the following circumstances:

- Entering a home to conduct a dye trace
- Inspecting properties with “no trespassing” signs where the house is not visible from the road
- When site conditions make you uncomfortable

Before conducting property inspections, prepare PIC inspection packets, including a survey form (Appendix D), assessor records, and OSS permit and maintenance records for each property in the project area. Carefully review the OSS permit and maintenance records and prepare the inspection form. Note any maintenance deficiencies, public complaints, or information you would like to give to the homeowner on the survey form.

Conducting the Property OSS Inspection

Property OSS inspections consist of:

- Contacting the property owner/occupant to conduct the informational interview
- Obtaining access and consent to perform a field inspection of the property including an inspection of the OSS components and animal waste management
- Evaluating discharges leaving the property
- Making site-specific recommendations to reduce stress to the OSS
- Dye test the OSS when it has conditions that may indicate problems:
 - No permit records
 - No record of repair of documented failure or deficiency
 - Within 200 feet of polluted drainage
 - To determine functional status of the OSS

It is very important that the inspector be confident, cordial, well-organized, and professional when conducting property inspections. The job of inspecting private properties to identify pollution sources is much easier when the public perceives the inspector as an objective and trustworthy professional. Developing a good relationship and trust with the owner/occupant is the key to a successful site visit.

Health inspectors have the legal right to approach a property via the normal access route to the front door. Information collected during inspections can only be used as evidence if inspectors follow local property access and consent policy. Appendix B contains an example from Kitsap Health.

No Trespassing Signs

When there is “No Trespassing” sign, leave a door hanger (Fig. 2) with a brief description of the visit’s purpose and contact information at a gate or fence post. Door hangers must not be placed in or on mailboxes, since mailboxes are legally reserved for U.S. Postal Service.

Hostile Residents or Pets

Cut a site visit short if the owner or resident makes you feel uncomfortable, threatens you, or shows any signs of hostility. Leave the property immediately if an individual makes threats or threatening gestures towards you and do not engage in confrontation. Drive away and find a safe location to note the details on an inspection form. Inform your project lead, field supervisor or manager immediately.

You have the right to defend yourself if you are attacked or threatened. How you choose to defend yourself will depend on the circumstances of the assault and your abilities. Use pepper spray if the person will not let you leave the property,

Dogs can be a major threat in the field. It is strongly recommended that field staff carry dog treats and pepper spray when conducting property inspections. When entering a property, look for signs of dogs, such as doghouses or leashes and listen for barking. Stay in the car when dogs are present and assess whether the dogs are friendly or aggressive. Stay near the car with the door open for a minute or rattle a fence or gate and call out a friendly greeting with your name and



Figure 6: Door hanger example

affiliation several times to draw attention to yourself and listen for barking. If you feel confident that there is no immediate threat, continue to follow the main path to the front door. If not, wait a few minutes to give the resident time to notice the dog barking and come to the door. Note the dog on the survey form and if possible, note the owner's or resident's name to try to make phone contact to schedule an appointment. You can also leave your business card or door hanger at the door or gate with the date and time you were on the site.

If you encounter a hostile animal on the property or feel an attack is imminent leave the property immediately and notify your manager or field supervisor. If the animal is not allowing you to leave and the owner/occupant is unwilling or unable to provide assistance, the use of defensive pepper spray is authorized. After the spray is discharged leave the property and notify your manager or field supervisor. If you have been assaulted, and you are able to get to a safe place, call 911.

Approaching the Property

Take only the items you will need for your site visit, including identification, cell phone, dog treats, and pepper spray. Women should conceal their purse securely in the vehicle or trunk. Have materials organized and ready to go in a briefcase or clipboard. Do your preparation and follow-up away from the dwelling if possible.

Announce your presence by identifying yourself and your organization as you near the structure. This will alert the owner/occupants if they are outside that you are approaching and alert any dogs that might be loose or in the yard. Proceed to the front door. Knock and ring the doorbell while announcing yourself. Following no response at the front door, it is acceptable to follow the main access route to the back door. Call out a greeting in case someone is working outside and knock on a side or back door, provided this does not infringe on the curtilage of the property. Curtilage is the land immediately surrounding and associated with the home. An example of Kitsap Health's curtilage guidance is described in Appendix B.

Step back from the door while waiting to make sure there is a comfortable distance between you and the door. If the owner or occupant is there (must be over 18 to provide consent) and opens the door, introduce yourself, hand them your business card, and ask if they are available to talk for a few minutes. If they say "yes" then provide a brief introduction about your visit: reasons for the PIC project, details of a public complaint, or deficiencies noted in a maintenance report. Be concise in conveying information. Answer questions and offer to call with information if you don't have the answers. If they say "no" ask if you can have their phone number to arrange a convenient time to come back.

Inspecting the On-site Sewage System

The PIC property survey form (Appendix D) includes a checklist of topics to address during the property inspection. Work through the form and provide the owner or occupant with a copy of their OSS records (when available) to provide an overview of their system. Ask whether they have experienced any problems like odors, soggy spots, or backups. Identify on the survey form whether the property is upland, streamside, on a marine shoreline, drains to storm water systems, or has potential FC sources

It is important to get consent from the owner or occupant to walk over the drainfield during the PIC site inspection.

Use this as an opportunity to educate the owner/occupant about the location of the OSS components and how to protect them, signs of OSS problems and failure, and what a properly functioning drainfield should look like. Make site-specific suggestions that the owner/occupant can use to protect their OSS investment (i.e. conserve water, route surface or ground water away from components, reduce waste strength and avoid using harmful chemicals, and prevent physical damage).

If there are no OSS permit records and the owner/occupant knows the approximate location of the components, make a rough sketch of the components on the PIC property survey form and note "per recollection of the" owner or occupant. This information can be added to local permit records. The 2020 target in the Puget Sound Action Agenda is to

document all OSS in marine recovery areas and other designated areas with 95% of system inspections current and all deficient systems repaired or replaced.

When the visit is complete, thank the person for allowing you to interview them. Gather all your belongings and try to leave immediately and go to a safe place to record site visit details. Assign a rating to the OSS following the inspection using the OSS rating criteria in Table 6. **It is very important to carefully follow the rating guidance, to provide consistency between inspectors and jurisdictions.**

Table 6. HCRPIC OSS Inspection Rating Classifications

Rating	Criteria for Meeting Classification	Action
No Apparent Problems	<ul style="list-style-type: none"> – Completed/signed Sewage Disposal Permit on file at local health jurisdiction, or provided by owner and entered into record – No illegal repairs or alterations performed on OSS – All applicable setbacks and conditions in effect at the time of permitting are in place 	None
No Records	<ul style="list-style-type: none"> – No completed/signed Sewage Disposal Permit on file at local health jurisdiction, or provided by owner/occupant – No Concern, Suspect or Failure conditions were observed 	None
Concern	<p>Concerns include, but are not limited to:</p> <ul style="list-style-type: none"> – System with no records and drainfield less than 50 feet from surface waters or wells – Improper use of designated reserve area – Vehicular traffic and/or pavement on OSS components – Roof drains or other drainage/infiltration systems potentially impacting the OSS – Unpermitted expansion or modification of existing structure(s), or addition of new structures, or recreational vehicle connections that impacts the OSS – Unpermitted work conducted on the OSS – Excavation or excess fill within the OSS area, or a cut down slope of the OSS that has the potential to impact the OSS performance 	Consult project lead for unpermitted alterations, expansions, repairs, connections or new construction
Suspect	<ul style="list-style-type: none"> – Drainfield area is saturated – Collected water sample results from bulkhead drains, curtain drains, or other pipes or seeps, <u>at or above 500 FC/100 ml (or 406 EC/100ml) and a positive non visual dye test</u> confirmed by Ozark Underground Laboratories – Collected water sample results from bulkhead drains, curtain drains, or other pipes or seeps, <u>less than 500 FC/100 ml (or 406 EC/100ml) and positive visual dye-test</u> 	<p>Mail Suspect Letter</p> <p>Follow up wet season dye test</p> <p>Note property records</p>

Failure	<ul style="list-style-type: none"> – Sewage on the surface of the ground – Sewage discharged directly to surface water or upon the surface of the ground unless the discharge is under permit from Ecology – Sewage backing up into, or not draining out of a structure caused by slow soil absorption of septic tank effluent – Sewage leaking from a septic tank, pump tank, holding tank, or collection system – Any component of an onsite sewage system or public sewer connection found to be broken, in disrepair, or not functioning as intended – Inadequately treated sewage effluent contaminating ground or surface water – Collected water sample result from bulkhead drains, curtain drains, or other pipes or seeps, at or above 500 FC/100 ml (or 406 EC/100ml) and positive <u>visual dye-test</u> results – Cesspools/seepage pits where evidence of ground or surface water quality degradation exists, or inadequately treated effluent contaminating ground or surface water – Non-compliance with standards stipulated on the permit, with the regulations in effect at the time the system was approved for use, or with the regulations in effect at the time the structure was constructed or modified – Straight discharge (greywater or blackwater) from any indoor plumbing, including recreational vehicles, is observed and documented 	<p>Enforcement</p> <p>Note property records</p> <p>Notify WSDOH shellfish program if failure discharges to shellfish beds</p>
----------------	--	---

Dye Testing

Use field and office review, as well as best professional judgment, to determine which residences to dye test in a hotspot drainage (Table 7). The age of the OSS, its proximity to the drainage, and/or the existence of potential or actual conveyance are key factors to evaluate.

Table 7: Dye Test Determination Matrix

Dye Test Determination	Criteria
REQUIRED <i>(See Manager for exception)</i>	1.No OSS records, and one or more living units are setback <u>< 200 feet</u> from surface waters. 2.Permitted gravity systems with evidence of unpermitted repairs, and drainfield is <100 setback. 3.A drain pipe on, or just off, the property with a permitted OSS that has odors, grey/black matting, and/or high bacteria counts. 4.A storm water structure on the property, or just off the property, with a permitted OSS that has evidence of illicit sewage discharge or connection.
RECOMMENDED <i>(Inspector discretion)</i>	5.No OSS records, and living units are <u>≥200 feet</u> setback from surface waters. 6.Permitted gravity systems that have a history of deficient pumper reports, and drainfield is <100 setback. 7.Permitted gravity systems that are 30 years or older, and drainfield is <100 setback. 8.Permitted alternative systems with a history of deficient maintenance reports, and drainfield component is <100 setback.
OPTIONAL	9.All other OSS with factors indicating any probability of failure

Always conduct a follow up dye trace in the wet season when a dry season dye trace is negative, or is suspect. Properties inspected during the dry season, that have potential for wet season problems, must be re inspected during the wet season.

Unresponsive Property Owners

It is recommended to make three attempts to contact each property owner/occupant by door hangers left at the door, including one attempt on a Saturday. Note dates, type of contact, and results of contact attempts on

the PIC inspection form or complaint form. Send a letter describing the project to those properties that have not responded. Use bracket sampling to investigate non-participating and denied access properties.

Property parcels where the owner/resident denies access to inspect the drainfield are rated “Denied Access.” These properties are evaluated by reviewing OSS records, noting other potential FC sources, and determining the proximity of surface waters to the property. Those parcels draining to surface waters are investigated during wet weather conditions by collecting FC or EC water samples leaving the property. In the event the water samples show elevated bacteria levels that are impacting surface water, the inspector will contact the property owner to request a dye test.

State and local agencies have the authority to pursue administrative searches when implementing their civil enforcement authority, where specifically authorized by statute. In the event the owner remains unresponsive, a search warrant can be explored through the local prosecuting attorney’s office pursuant to Chapter 70.118 RCW.

Conducting Property Animal Waste Inspections

Assessment of Non-OSS Fecal Coliform Pollution Sources

Pet Waste

State and many local regulations prohibit the discarding of pet waste in areas where it may pollute surface or ground water. Kitsap Health and Jefferson Health’s solid waste regulations require that pet owners pick up pet waste at least weekly, or more often as necessary, double bag, and dispose in a sealed trash container.

Review local pet waste disposal requirements with owners or occupants on properties with pets during PIC property inspection.

Livestock Waste

Washington state, and Kitsap and Jefferson County’s solid waste regulations require that animal waste be managed properly, including manure from livestock. According to these solid waste regulations, “animal manure shall not be deposited, or allowed to accumulate, in any ditch, gulch, ravine, river, stream, lake, pond, marine water or upon the surface of the ground, or on any highway or road right of way, where it may become a nuisance or menace to health or pollution of water.”

It is important to start livestock and agricultural animal PIC inspections early in a project since the investigation and correction can be time consuming and challenging.

Contact your local Conservation District to gather any available farm inventory or ranking information. Conservation Districts conduct agricultural inventories using windshield surveys, ground observations and aerial photography. Site conditions are noted including: number and type of animals, acreage, pasture conditions, waste management, livestock confinement, barns and outbuildings, topography and proximity of land use activity to surface waters.

Kitsap uses the 1-5 rating scale in Table 8, to evaluate properties based on potential to pollute. Parcels ranked “1” and “2” are considered high priority and are investigated.

Table 8: Farm Ranking Scale

Priority	Criteria
1: High	Pasture in poor condition. Livestock have access to surface water and/or there is a high probability of contaminated runoff due to topography sloping toward water body. Visual evidence of contamination problem.
2: Medium-High	Pasture in poor condition. Some reason to believe degraded conditions are seasonal or could get worse seasonally. Some areas on property reflect higher levels of management
3: Medium	Pasture is in fair condition. Open water in vicinity of the property but with limited access or evidence of use. A moderate probability of runoff.
4: Medium-Low	Pasture in good condition. No open water in vicinity and/or a low probability of contaminated runoff reaching surface water.
5: Low	Visual inspection from roadside indicates historic or recent past farming activity. Pastures not utilized by livestock. No livestock currently on site. Old barns and/or farm equipment evident.

When performing PIC inspections involving agricultural properties, follow the same procedure as described in conducting the property inspections, but **add the following items**:

1. Identify the property parcel boundaries (with the owner’s permission) to document and sample any flowing surface waters that leave the property
2. Photograph potential fecal pollution sources to the sampling points (see examples in Fig. 3), such as:
 - Accumulated animal waste (pets, livestock, and agricultural animals)
 - Non-vegetated, heavily used or muddy pastures or animal holding areas draining to surface waters
 - Animals with uncontrolled access to surface waters
 - Discharge pipes or ditches
 - Stormwater systems
 - Inadequate grease or food waste management which can attract wildlife

3. Inform the owner/resident of the potential fecal pollution source and let them know that they can choose to voluntarily work with the local Conservation District to help develop and implement interim and long-term waste management plans. Ask the property owner or resident if you can have a Conservation District representative contact them via telephone and/or email.

4. Sketch the parcel on the PIC property survey form, showing sampling locations, surface waters (marine water, lakes and ponds, streams, wetlands, and storm water) originating on, running through, or contiguous to the parcel. Show discharge pipes (noting material and diameter), number and locations of animals or birds, animal waste observed, stormwater system components, livestock stream access, and fencing.

5. Collect at least three water samples from the same location(s) on different days to best represent field conditions during wet weather conditions. Collect an upstream sample above the property to bracket the parcel or potential fecal pollution source if possible. Fecal pollution source correction will be needed when the three sample GMV increases across the property by the Part 2 water quality standard for the water body.



Figure 7: Photos of animal waste conditions

6. Notify the owner or resident when you have confirmed an agricultural or livestock fecal pollution source and suggest that they work voluntarily with the local Conservation District. If the owner/resident refuses assistance from the local Conservation District, and/or does not want to address/correct the fecal pollution issue, staff will need to take enforcement action and utilize appropriate legal authority. If the county doesn't have legal authority, Ecology can be contacted for assistance.

Property Inspection Data Management

Property inspection ratings and reporting must carefully follow the OSS inspection rating classifications to provide consistency between jurisdictions in the Hood Canal region. The data from PIC inspections (contact information, parcel rating, dye tests, site-specific concerns, and materials distributed) need to be managed in a manner that is useful for inspection follow-ups, reporting, and subsequent projects using the HCRPIC Program Cumulative Data Report spreadsheet.

Pollution Source Correction

Voluntary Correction

Outreach and Technical Assistance

PIC staff provide education and outreach for property owners and residents to encourage and assist them to voluntarily correct fecal pollution sources. PIC staff also provide free technical assistance to property owners to help them mitigate fecal pollution sources. Typically, before initiating enforcement actions, PIC staff work with property owners to assist them to identify the cause(s) of the problem and offer suggestions for mitigation. PIC staff work with the owner to ensure that the owner has information and resources to keep the repair process on track and prevent a public health threat from untreated sewage.

Financial Assistance

PIC staff provide information about financial assistance for OSS repairs. Craft3 is a non-profit community development financial institution with a mission to strengthen economic, ecological and family resilience in Pacific Northwest communities. Craft3 provides low interest loans and assistance to residents who may not have access to financing in Kitsap, Mason and Jefferson counties for the repair and/or replacement of onsite sewage systems. Additional financial assistance may be available to qualified residents through the US Department of Agriculture, or Indian Health Service.

Enforcement

Check your local jurisdiction for their enforcement policy for failing OSS. Enforcement is a tool that is used to ensure that OSS failures are corrected in a timely manner and that surfacing sewage does not pose a public health threat. Jefferson, Kitsap, and Mason Counties use the following tools when enforcement actions are necessary.

Notice and Order to Correct Violation Letter

A Notice and Order to Correct Violation (NOCV) letter is issued when conditions exist that are in violation of the local OSS and/or solid waste regulations, and issued pursuant to local OSS or solid waste ordinances.

The NOCV requires the owner/operator of a failing OSS to contact a licensed designer or professional engineer within an appropriate time period. A 7 or 14-day time period may be used in cases where there is a threat to public health, (e.g. surfacing sewage). PIC staff may issue a pump-out order for properties with failing OSS, as part of the NOCV. A pump-out order means that the tank is pumped as often as is necessary to keep sewage off the ground surface and from backing up in the residence. The owner/occupants are required to conserve water to prevent untreated sewage from surfacing and flowing into surface, ground or into storm water.

After the deadline specified in the written notice has been reached, the status of the violation must be determined. If a violation still exists, further enforcement options may be appropriate. Under normal circumstances, failure to comply

with an NOCV is followed by a Notice of Civil Infraction (ticket). Mason County Health has the option to request the Hearings Examiner issue a non-compliance notice to title for, or place a lien on, a property with a failing OSS.

Search Warrants

In Washington State, an administrative search warrant can be obtained to conduct a dye test of an OSS if data shows the OSS may be polluting fresh or marine waters of the state. Administrative search warrants to address suspected OSS failures are only used after all other options are exhausted. The decision to pursue an administrative search warrant is made in coordination with local managers, directors, and the local prosecuting attorney's office. A description of the administrative search warrants follows, and is taken from the Private Property Access and Consent Policy found in Appendix B:

Administrative Search Warrant: State and local agencies can conduct administrative searches when implementing their civil enforcement authority, where specifically authorized by statute (Chapter 70.118 RCW). The administrative warrant application may be based on specific evidence of an existing violation or on a general inspection program based on reasonable legislative or administrative standards for conducting an area inspection. The agency may apply for the warrant only after the local health officer has requested inspection of the person's property under a specific administrative plan and that the person refused the health officer access to the property.

The specific administrative plan is developed in response to pollution in commercial or recreational shellfish harvesting area or pollution in freshwater. The plan must include: the overall goal of the inspection; the location and address of the properties being authorized for inspection; requirements for notifying the owner or resident of the plan and its provisions and times of any inspections; the survey procedures to be used in the inspection; the criteria that would be used to define an onsite sewage system failure; and the follow-up actions that would be pursued when an onsite sewage system failure is confirmed.

The local health officer develops and submits the plan to the court as part of the justification for the warrant, along with specific evidence showing that it is reasonable to believe pollution is coming from the septic system on the property to be accessed for inspection. The court official may issue the warrant upon probable cause.”

The administrative search warrant process has been very effective in Kitsap County. The process begins with a letter from Kitsap Health. This is followed by a letter from Kitsap's prosecuting attorney's office requesting a voluntary dye test before beginning the formal process of requesting the dye test pursuant to a court-ordered search warrant. The prosecuting attorney's letter results in permission to dye test most of the time.

Reporting and Follow-up

Reporting and follow-up are an important part of any successful PIC project. Reporting is a required component of grant agreements and the quality of reporting will determine future funding. Accurate record-keeping is essential to ensure accurate reporting.

Follow-up is also a crucial part of successful PIC projects. Public cooperation depends heavily on whether participants feel that the rules are fairly applied to everyone.

Appendix A: Sampling/Testing Equipment

Sample Equipment

- ❑ **100ml sterile plastic water sample bottles.** Used to collect water samples for FC or EC analysis.
- ❑ **Sample wand.** Telescoping wand used to collect water samples.
- ❑ **Cooler with ice and/or ice pack(s).** Used to store samples until delivered to lab.
- ❑ **Digital camera.** Used to document violations/items of interest. All inspectors are issued a digital camera in the Pollution Identification and Correction Program.
- ❑ **GPS unit;** used for shoreline surveys, trend and impact monitoring.
- ❑ **Dye tracers.** Ready-for-use individual liquid dye mixtures in 500 ml Nalgene® bottles stored separately from other PIC supplies in a water proof container. Used to dye-test OSS.
- ❑ **Charcoal packs.** Used during dye tests to “catch” dye. Packs are available in the storage cabinet located in the office and in a separate location from the dye tracers.
- ❑ **Whirl-Pak™ bags.** Used for storage of individual control and dye packs retrieved from sampling sites.
- ❑ **Water proof markers, e.g. “Sharpie”.** Used to write on water sampling bottles for identification purposes.
- ❑ **Rubber bands and plastic bags.** Used to post and protect written materials left for property owners/occupants.

Paperwork

- ❑ **OSS permit records.** Used to assist inspectors locate the OSS on a specific property.
- ❑ **OSS monitoring and maintenance records.** Used to determine if the alternative OSS on the property has been properly maintained through the monitoring and maintenance program.
- ❑ **PIC property inspection form.** Used to record needed information regarding the property being inspected.
- ❑ **PIC door hanger.** Used to inform area residents that a Health Inspector visited that property, and to provide information regarding the purpose of this visit.
- ❑ **“Rite-in-the-Rain” notebook.** Used to map sampling locations.

Safety Equipment

- ❑ **Identification badge.** Used to identify you to property owners. Badges are issued to the inspector.
- ❑ **Business card.** Used in conjunction with badge to identify yourself to property owners. Cards are issued to the inspector.
- ❑ **Cellular phone.** Inspectors are issued a cellular phone for use while conducting business, or they may use a personal cell phone.
- ❑ **Pepper spray.** Used for self-defense. Inspectors are trained annually in the use of pepper spray. Pepper spray containers are issued by the Health District after completion of the training.
- ❑ **Disposable latex gloves.** Used to protect an inspector from pathogenic organisms that are associated with sewage.
- ❑ **Personal Protective clothing** includes; steel toe or safety toe boots and rain gear (jacket and rain pants). These items are provided to staff according to the Collective Bargaining Agreement.
- ❑ **Hand-wipes/sanitizer.** Used to clean hands. Always use a hand-wipe after collecting water samples or charcoal packs.
- ❑ **Chlorine bleach solution.** Used for cleaning-up spilled dye. Wear gloves while handling.

Appendix B: Kitsap Health Private Property Access and Consent Policy

This discussion of search and seizure law and access procedures is intended to provide guidance only. Search and seizure analysis is very fact-intensive and inspectors are cautioned to discuss field conditions with their supervisors and to seek legal counsel where appropriate. This Private Property Access and Consent information is used by Kitsap Public Health District. The basis for the guidelines comes from interpretation from State Law cases and so should be transferrable to other Counties, however Kitsap recommends that Counties check with their legal contacts before adopting these guidelines.

Private Property Access and Consent

Site Entry and Searches

Inspectors must enter private property while conducting inspections or surveys. Because the state and federal constitutions prohibit unreasonable searches, an inspector must decide whether he or she may legally enter a property to conduct an inspection. In all cases, an inspection can occur only if (1) the inspector makes observations from a place where the inspector may legally be without consent, or (2) after obtaining consent from a responsible party (owner or tenant). To assist you in determining whether you may enter a property some basic constitutional doctrines are discussed below:

Reasonable Expectation of Privacy

There are two components to a reasonable expectation of privacy. The first is a subjective component: Does the person have a subjective expectation of privacy in a particular object or location? The second is an objective component: Is this expectation one that society recognizes as reasonable? Generally, a person has a reasonable expectation of privacy in his home, in the area immediately adjacent to the home, and in areas where he/she has taken steps to exclude the public and shield the area from the public's view.

Residence

A person always has a reasonable expectation of privacy in his/her home. You may not enter a person's home, except with the resident's consent.

Curtilage

The land immediately surrounding and associated with the home, i.e., that area associated with the intimate activity of a home and the privacies of life. Curtilage receives the highest level of protection under both the federal and state constitutions. You may not enter the curtilage without a resident's consent, except as explained below. To help determine if an area is within the curtilage, answer these questions:

Q: How close is the area you want to inspect to the house?

A: *The closer the area you want to inspect is to the house, the more likely it will be considered within the curtilage.*

Q: Is there a fence or other enclosure that surrounds the house *and* the area you want to inspect?

A: *A fence that surrounds the house suggests the limits of the curtilage. Accordingly, where a house is situated on a standard lot and the lot is fenced, that is the limit of the curtilage. On a larger piece of property there may be a fence around the perimeter of the property, and an inner fence enclosing the house. In that case, the interior fence would indicate the limits of the curtilage. A clearing or maintained area has the same effect. Thus, on a larger piece of property that is forested, the cleared area surrounding the house would indicate the limits of the curtilage.*

Q: What is the area you want to inspect used for?

A: *The concept of the curtilage is to protect those activities normally associated with the home and the privacies of life. Thus, if an area near the house is used for family or personal activities (e.g., play area, patio, garage), then it is probably within the curtilage. However, if the area is used for activities not associated with home life,*

especially illegal activities, then it probably will not be considered within the curtilage. You may use evidence you observe from the road or a neighbor's property, or information a neighbor gives you, to determine if an area is being used for an activity associated with the home or some other activity.

Q: Has the resident taken any steps to protect the area you want to inspect from observation of passersby?

A: *If a fence -- especially a sight-obstructing fence -- or hedge shields the view of the house from the street and neighboring properties, then the area within the fence or hedge will probably be considered within the curtilage.*

Q: Can an inspector ever enter the curtilage?

A: *Yes. You may enter the curtilage to contact the resident. In doing so, however, you may use only a recognizable access route, such as a driveway, walkway, or path. Approach the house as any reasonably respectful citizen would. Normally, you should not enter a side or back yard. You may, however, call out or try to get someone's attention if you see or hear something that leads you to believe the resident is in a side or back yard.*

Other factors to consider when conducting an inspection of private property are included below.

No Trespassing Signs

A "No Trespassing" or "No Solicitors" sign does not prohibit you from approaching a residence using a recognized access route for the purpose of contacting the resident.

Open Fields:

Areas that are outside the curtilage are considered "open fields" and do not always receive the same high level of constitutional protection that the curtilage does. In an urban area, you may not find any open fields. In outlying areas, however, you are likely to encounter them. An open field doesn't need to be either "open" or a "field." It could be a thickly wooded area or a beach. Generally, an open field is any unoccupied or undeveloped area outside the curtilage.

In many instances, you will be able to enter open fields without the permission of the owner. However, you need to consider whether the owner has manifested an "expectation of privacy" in the area you want to enter. Some manifestations of an expectation of privacy are: 1) a long driveway; 2) "No Trespassing" signs; 3) fences, especially sight-obstructing fences, or maintained hedges; 4) a locked gate; or 5) the area cannot be seen from a road or neighboring property.

Each situation is different, so it is not possible to provide a blanket rule for entering open fields. It may be best to consult with a supervisor before entering.

Open View

If you are in a place you may legally be, such as a roadway, public property, a neighboring property that you have permission to be on, or are approaching the residence via a recognized access route, then you can base an enforcement action on anything you can see from that vantage point. Accordingly, if a person allows you in his/her backyard, and you can see illegally stored solid waste on the neighbor's patio, you can write a notice and order to correct the violation or a notice of civil infraction, based on what you can see from the neighbor's property. As long as you remain on the property you have permission to be on, you can climb a ladder to see over a fence, or use binoculars. You may take photographs from a place you may legally be.

Plain View

The plain view doctrine applies when you have entered a property with the resident's consent. The plain view doctrine allows you to use anything that you see inadvertently as you walk through the area. The object must be in plain view; you may not move anything. You may not remove a lid on a trash container to see inside. Plain view works the same way when the resident has given you permission to look around. If you want to see inside or under something, ask the resident if it's okay.

Consent

An inspector obtains valid consent to inspect when he or she asks the resident for permission to conduct an inspection and receives an affirmative response through words or action.

When seeking consent to access a property, it is important to set the property owner's or user's expectations. Explain the purpose of your entry into a residence or curtilage and explain the scope of consent you are requesting. Document the consent in field notes, including from whom it was requested and obtained, and any limitations on time, location, and repeat visits.

Avoid statements like "I'm going to look around," or "I have to inspect the property". A person who submits to an inspection after such a statement has not necessarily given his/her consent to the inspection and a court could suppress anything that is found during the inspection. A civil enforcement inspector need not inform a person of his/her right to refuse an inspection but, if the person asks whether he/she may refuse, the inspector must tell the person that he/she may refuse (or may limit the scope of the inspection).

Where two or more persons may claim a reasonable privacy interest in a particular dwelling or premises, consent given by one individual may be valid only as to common areas and to the specific area over which the giver of consent has authority or control.

Administrative Search Warrant

State and local agencies can conduct administrative searches when implementing their civil enforcement authority, where specifically authorized by statute.

The local health officer may apply for an administrative search warrant to identify failing septic tank drainfield systems. The administrative warrant application may be based on specific evidence of an existing violation or on a general inspection program based on reasonable legislative or administrative standards for conducting an area inspection. The agency may apply for the warrant only after the local health officer has requested inspection of the person's property under a specific administrative plan and that the person refused the health officer access to the property.

The specific administrative plan is developed in response to pollution in commercial or recreational shellfish harvesting area or pollution in freshwater. The plan must include: the overall goal of the inspection; the location and address of the properties begin authorized for inspection; requirements for notifying the owner or resident of the plan and its provisions and times of any inspections; the survey procedures to be used in the inspection; the criteria that would be used to define an onsite sewage system failure; and the follow-up actions that would be pursued when an onsite sewage system failure is confirmed.

The local health officer shall develop and submit the plan to the court as part of the justification for the warrant, along with specific evidence showing that it is reasonable to believe pollution is coming from the septic system on the property to be accessed for inspection. The court official may issue the warrant upon probable cause.

Appendix C: Fecal Pollution Hotspot Flow Charts

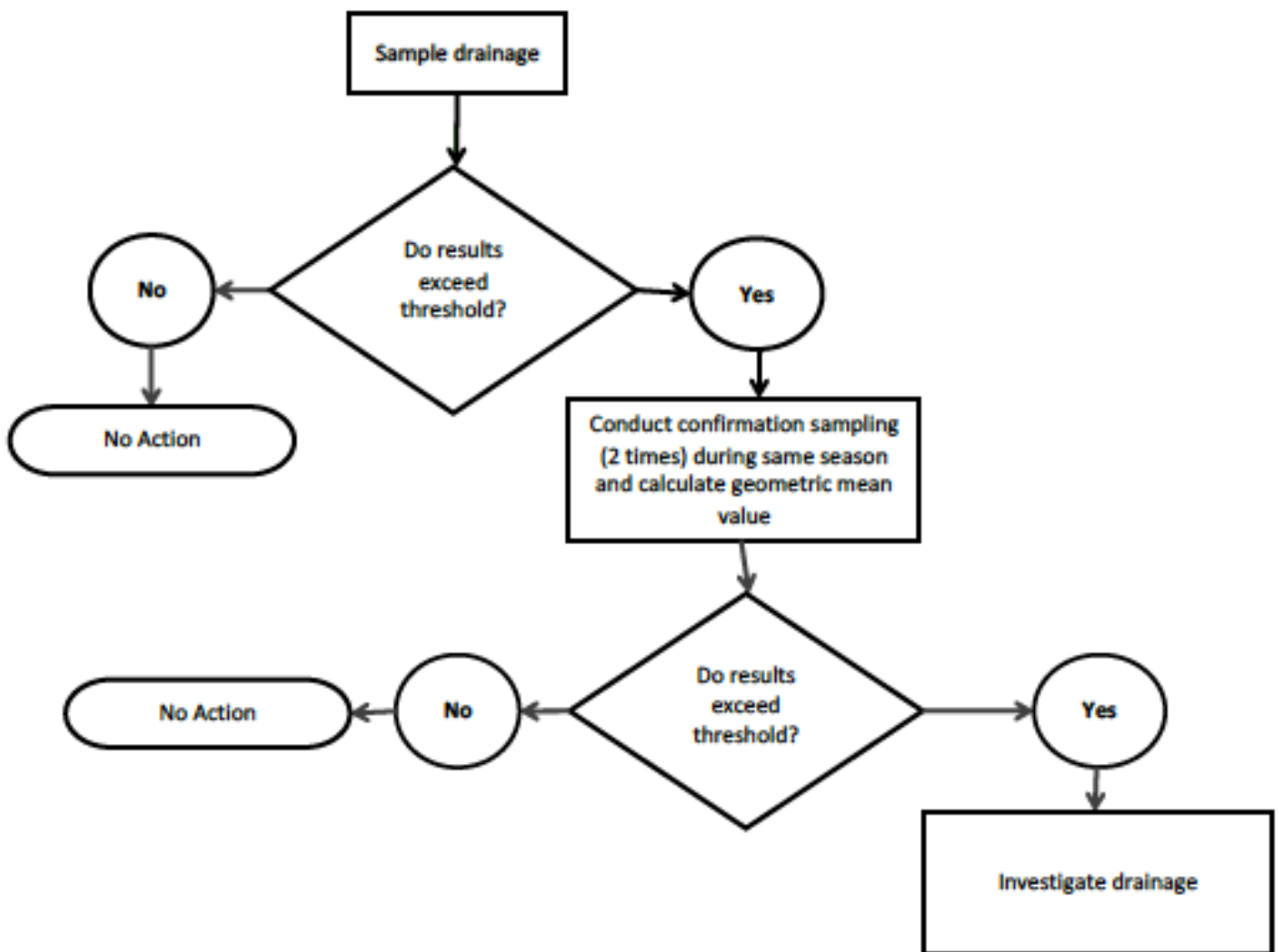
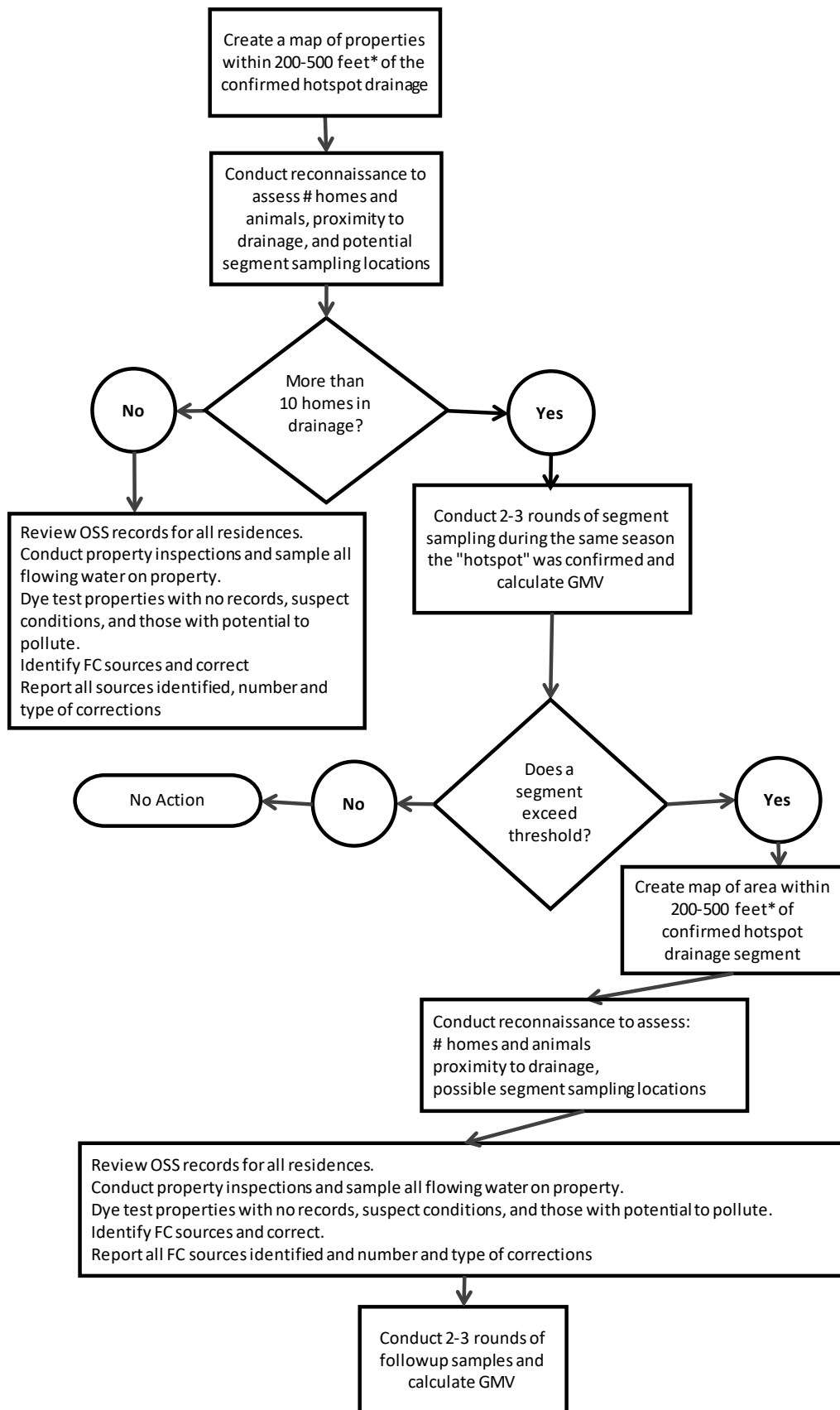


Figure 1: Fecal Pollution Hotspot Confirmation Flow Chart (from HCRPIC Phase II Approved QAPP)



* depends on number and extent of water conveyances

Fig 2. Fecal Pollution Hotspot Investigation Flow Chart (from HCRPIC Phase II Approved QAPP)

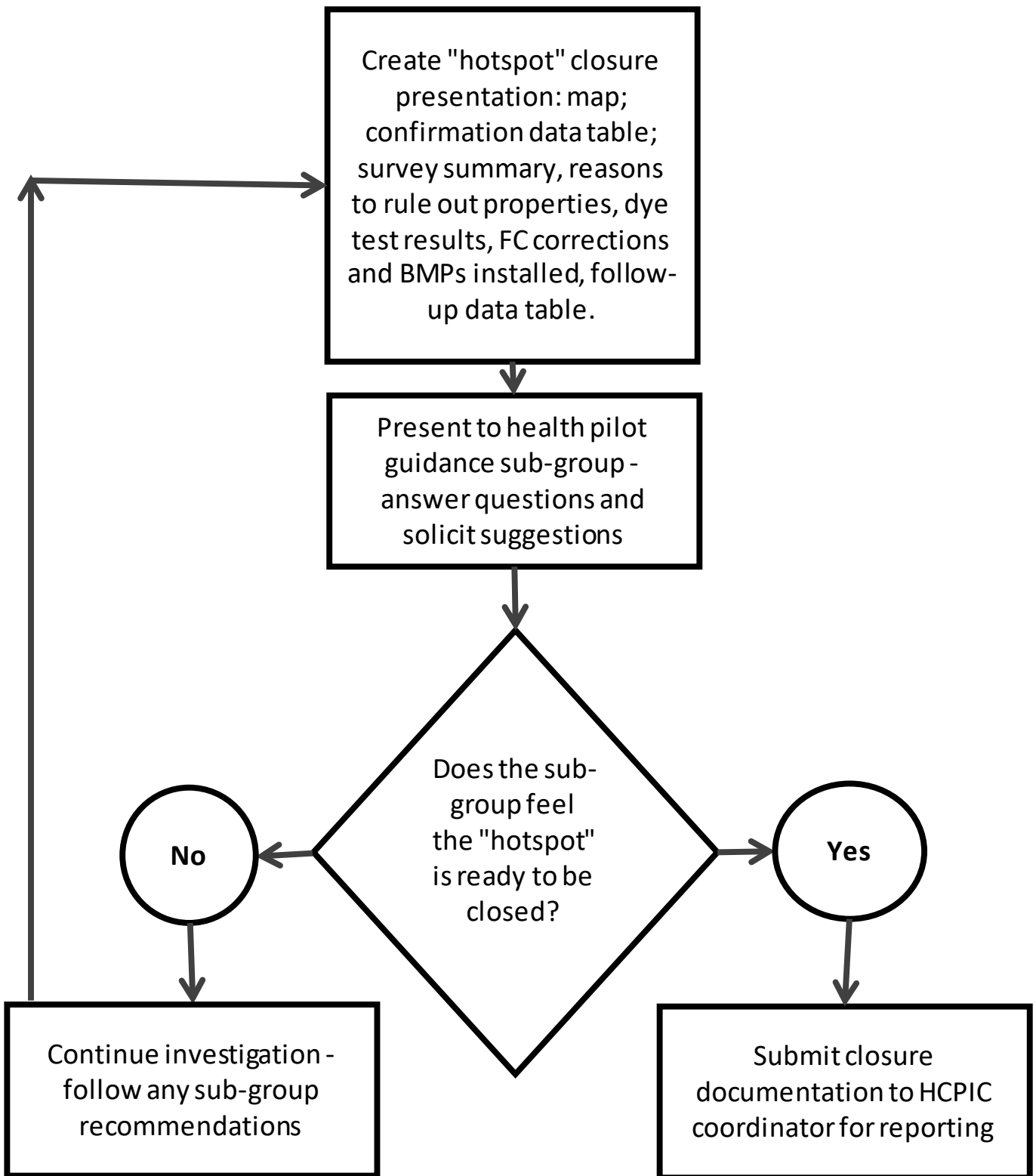


Figure 3: Fecal Pollution Hotspot Closure Flow Chart (from HCRPIC Phase II Approved QAPP)

Appendix D: PIC Property Survey Form

PROPERTY TAX ID:

PROJECT AREA	ADDRESS
OWNER NAME	PHONE
OCCUPANT NAME	

PROPERTY INFORMATION:

<u>Occupancy Type:</u> <input type="checkbox"/> Commercial <input type="checkbox"/> Single family <input type="checkbox"/> Multi-family	<u>System Type:</u> <input type="checkbox"/> Standard gravity <input type="checkbox"/> Pressure <input type="checkbox"/> Drip irrigation <input type="checkbox"/> Glendon <input type="checkbox"/> Other: _____ <input type="checkbox"/> M & M contract	<u>Records on File:</u> <input type="checkbox"/> BSA <input type="checkbox"/> Permit <input type="checkbox"/> As built	<u># Bedrooms:</u> <u># Occupants:</u>	<input type="checkbox"/> Marine shoreline <input type="checkbox"/> Freshwater shoreline <input type="checkbox"/> Upland <u>Distance to OSS:</u>
<u>Survey date(s):</u>	<u>Staff:</u>	<u>OSS rating:</u>	<u>Farm rating:</u>	<u>Date last pumping:</u>
<u>Roof drains:</u> <input type="checkbox"/> OK <input type="checkbox"/> Needs improvement	<u>Curtain drains:</u> <input type="checkbox"/> OK <input type="checkbox"/> Needs improvement	<u>Bulkhead drains:</u> <input type="checkbox"/> OK <input type="checkbox"/> Needs improvement	<u>Pets present:</u> (# and type)	<u>Livestock present: (# and type)</u>

Notes/Comments on OSS and/or other property conditions:

OSS EDUCATION CHECKLIST:

- Water usage: (hydraulic loading, plumbing leaks, laundry, garbage grinder, low flow fixtures, runoff, sprinklers)
- Waste strength: (use of additives, chemical drain cleaners, bleach, fabric softener, meds, fats/oils/greases)
- Physical damage: (driving over drainfield, bldgs/structures, heavy equipment etc.)
- Inspect system regularly (pump/inspect frequency, warning signs of failing OSS, purpose for reserve area)
- Educational materials provided circle 1 or more (Fact Sheet, OSS manual, Repair brochure, Pet waste)

ANIMAL WASTE CHECKLIST:

Animal waste management:	<input type="checkbox"/> OK	<input type="checkbox"/> Needs improvement	<input type="checkbox"/> Violation
---------------------------------	-----------------------------	--	------------------------------------

- Pet waste
- Manure from livestock
- Referral to Kitsap Conservation District: _____

OSS INFORMATION:

IF FLOWS FROM THIS PROPERTY ARE POTENTIALLY IMPACTING WATER QUALITY, OR IF THERE IS NO "AS BUILT," COMPLETE THE FOLLOWING:

In the box below, draw sources/areas of animal waste, surface water flows, locations of OSS and where samples/dye tests were collected/placed on the property. For consistency, indicate distances and directions on the drawing (Not To Scale). **If no "As Built," draw OSS per owner's information.**

N

Notes: _____

DYE TEST DATA:

Dye Test Date:			Dye Used:									
Location Number	Control (BAC)			Pack Week #1			Pack Week #2			Pack Week #3		
	Placed	Retrieved	Result	Placed	Retrieved	Result	Placed	Retrieved	Result	Placed	Retrieved	Result
1												
2												
3												

WATER SAMPLE DATA:

Sample Date	Inspector	Result (FC per 100mL)	Location

Appendix D: HCRPIC Phase III Hotspot Closures

HCRPIC Phase 3 Investigations for Hoodport Hotspots Closed 5/30/2018

Mason County Public Health

Katie Otañez – *Environmental Health Specialist*

North Hoodport Hotspots

DOH Site Name	MCPH Site Name
DOH 33	HS-014
DOH 35	H-004
DOH 36	H-006
--	HS-036



In wet season in Phase 2 and 3, MCPH bracket sampled the neighborhood behind these N Hoodport line of shoreline houses. Only able to sample during wet season and MCPH never found a sample result higher than 20 CFU/100 mL. Pollution from the steep hill behind highway has not shown any evidence of pollution contribution. If pollution levels increase in this area again, highway runoff/stormwater will in higher priority than the upland neighborhood.

HOODSPORT 2017-2018 WET SEASON DATA

HOODSPORT PHASE 3 WET SEASON DATA						
Station	Date	Time	FC	Lat	Long	Geomean
H-004	1/22/2018	14:35	5	47.408410	-123.138610	
H-004	1/23/2018	14:55	5	47.408410	-123.138610	5
H-004	2/21/2018	14:45	5	47.408410	-123.138610	
H-006	1/22/2018	14:25	5	47.408330	-123.138640	
H-006	1/23/2018	14:50	5	47.408330	-123.138640	5
H-006	2/21/2018	14:47	5	47.408330	-123.138640	
H-007	1/22/2018	14:15	2001	47.408200	-123.138630	
H-007	2/21/2018	14:55	395	47.408200	-123.138630	690
H-007	3/6/2018	14:35	415	47.408200	-123.138630	
H-014	3/6/2018	14:55	5	47.406710	-123.138780	
H-027	2/6/2018	14:05	40	47.400510	-123.142720	
H-027	12/20/2017	13:15	15	47.400510	-123.142720	
H-028	2/6/2018	14:00	15	47.399830	-123.142450	
HS-032	3/6/2018	15:15	5	47.406619	-123.140391	
HS-036	1/22/2018	14:54	5	47.408605	-123.138226	
HS-036	2/21/2018	14:35	5	47.408605	-123.138226	4
HS-036	3/6/2018	14:42	3	47.408605	-123.138226	
HS-039	2/6/2018	14:40	16	47.402141	-123.141621	
HS-039	3/19/2018	13:05	24	47.402141	-123.141621	92
HS-039	12/20/2017	12:40	2001	47.402141	-123.141621	

Associated Parcels:

1) 24480 N US Hwy 101, Hoodspport, WA 98584
42212-50-01004

Attempted site visits throughout Phase 2 & 3. The full-time resident has passed away in the beginning of Phase 3 and is no longer occupied. Daughter of deceased contacted MCPH to notify us that the property is not being used. The property has a care taker but is not being lived in. They are current with OSS maintenance with no unsatisfactory reports. No pollution found in Phase 2 & 3 above or below house.

2) 24470 N US Hwy 101, Hoodspport, WA 98584
42212-50-01001

Sanitary surveys in Phase 2 and 3 produced NAP rating despite being close to hotspots. Homeowners are only a few months past their O&M due date with no prior unsatisfactory maintenance events. No pollution found in Phase 2 & 3 above or below house. This was 1 of 2 full-time residents in Phase 2 and 1 of 3 full-time residents in Phase 3.

3) 24450 N US Hwy 101, Hoodspport, WA 98584
42212-50-02006

This is the least used property in this row of shoreline houses. No observed occupancy during duration of Phase 2 and only 1 weekend in Phase 3. They are overdue for maintenance, but homeowners are reluctant to get P&M done since it is used less than 1 week a year. No pollution found in Phase 2 & 3 above or below house.

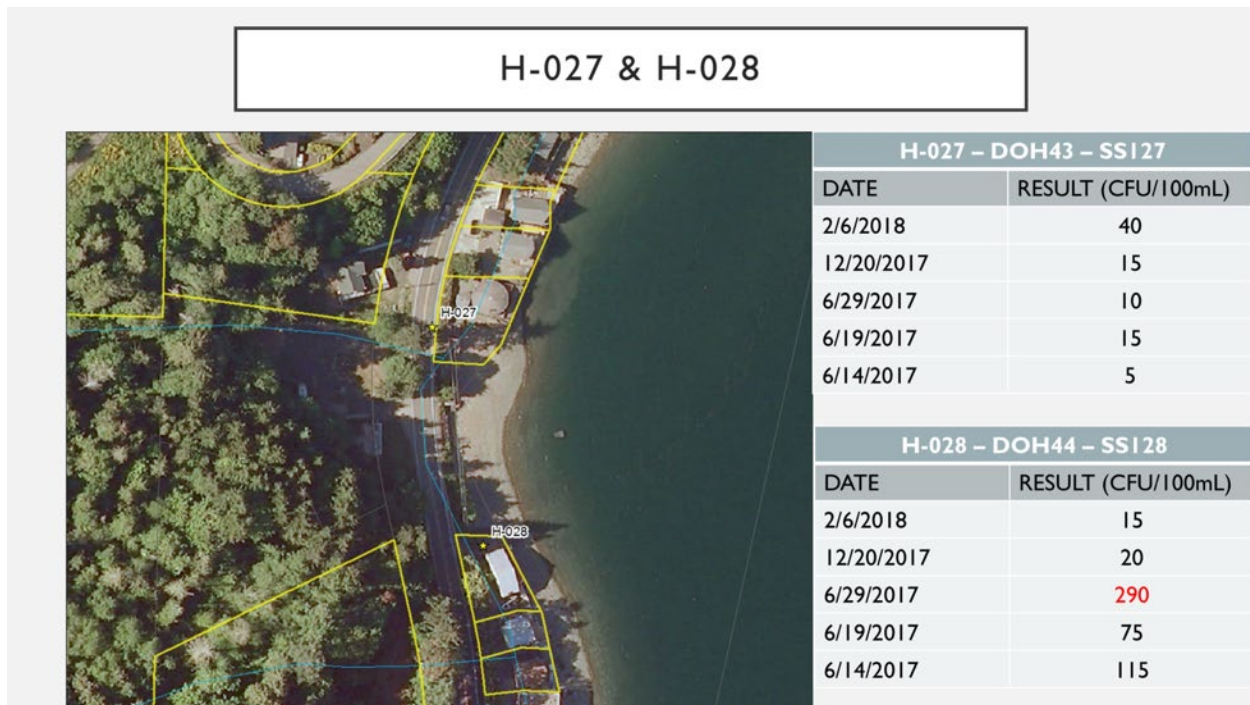
4) 24440 N US Hwy 101, Hoodspport, WA 98584
42212-50-02012

Completely unoccupied during Phase 2 and no evidence of pollution identified during that Phase. House sold in between Phase 2 and 3 and OSS was pumped and inspected. High hits were observed on beach directly below their drainfield and H-007 was determined a hotspot in Phase 3. Despite high hits found

below this parcel, DOH 036 has not been affected by this OSS. No elevated hits ever observed. Homeowners are working on the stormwater on their property to direct runoff away from drainfield. Their drainfield, although close to DOH 036, does not appear to have hydrologic connection due to concrete stormwater barriers. If pollution was getting into this drainage it is most likely from highway.

South Hoodspport Hotspots

DOH Site Name	MCPH Site Name
DOH 43	H-027
DOH 44	H-028



Associated Parcels:

1) 23891 N US Hwy 101, Hoodspport, WA 98584
42212-51-10501

This OSS passed a 2017 dry season dye test and a 2018 wet season dye test. DYE 2017-00159. They are current with OSS maintenance with no unsatisfactory reports.

2) 23900 N US Hwy 101, Hoodspport, WA 98584
42213-22-70080

Site visit and parcel survey produced a NAP rating. Location of septic system doesn't connect this OSS with H-027/DOH 43. They are current with OSS maintenance with no unsatisfactory reports.

3) 23860 N US Hwy 101, Hoodspport, WA 98584
42213-50-00001

Since the beginning of HCRPIC Phase 2 and throughout Phase 3 this home has not been occupied. They are current with OSS maintenance with no unsatisfactory reports.

R-036a

HOTSPOT R-036A



DATE	RESULT (CFU/100 mL)
3/5/2018	5
1/31/2018	10
8/15/2016	115
8/1/2016	140
6/22/2018	225

15470 E SR 106, Belfair, WA 98528
22222-11-00040

MCPH made at least 1 site visit attempt/"drive by" each sampling season. MCPH left 1 door hanger during a site visit attempt with no reply. On 2/6/2018 MCPH sent first contact letter of Phase 3 with no response. On 4/10/2018 MCPH mailed 2nd contact letter with no response. It seems like renters live there. No other shoreline property would be contributing to R-036a and the upland is all undeveloped until to get to the top of the ridge. They are current with OSS maintenance with no unsatisfactory reports.

Hood Canal Regional Pollution Identification & Correction Program

Field Implementation Guide – Addendum: Ambient Fresh Water Monitoring Procedures

These monitoring procedures were developed from Kitsap Public Health District and other established monitoring protocols. These procedures do not address every possible monitoring situation. As such, guidance from the project lead should be sought in determining the best course of action during unusual circumstances.

Monitoring Event Preparation

Prior to conducting a complete and successful monitoring event, certain preparations must be made. Monitoring event preparations are coordinated by program staff and shall include the following:

- Checking and following the applicable monitoring schedule.
- Identifying the number and location of monitoring stations for that event.
- Identifying and scheduling field staff.
- Ensuring that the necessary field equipment will be available, calibrated, and ready for monitoring.
- Obtaining the correct type and number of sampling containers.
- Coordinating sample delivery and analysis/holding times with the receiving laboratory.
- Reviewing tide charts before planned monitoring events.
- Developing a monitoring route.

Pre-Monitoring Activities

All field monitoring activities will be conducted in the same manner for all monitoring stations. The standard sequence of events for each monitoring site, where applicable, is as follows:

- Put on field gear and protective clothing appropriate for the sampling event and weather conditions.

- Park vehicle in a safe and clearly visible location that provides staff a safe exit from the vehicle.
- Enter monitoring event information in field notebook (see Section 8.E).
- Gather all applicable field equipment and approach the specific monitoring station

Monitoring Activities

The following text summarizes monitoring protocols used for fresh water streams. Variations from approved monitoring protocols, when necessary, are noted. For specific information related to a monitoring protocol, please refer to the published document.

Fresh Water Streams

Fresh water stream samples are collected and analyzed according to the following monitoring protocols (as cited or as amended):

- “Recommended Protocols for Measuring Conventional Water Quality Variables and Metals in Fresh Water of the Puget Sound Region” (EPA, 1990); and
- “Guidance for Conducting Water Quality Assessments and Watershed Characterizations Under the Nonpoint Rule (Chapter 400-12 WAC)” (Ecology, 1995).

Monitor Fresh water stream stations as follows:

- Wear disposable, waterproof gloves for your safety.
- Approach monitoring stations from a down-stream direction. Take care to avoid disturbing bottom sediments.
- Once at the station location, label sample containers to be used at that site per the Sample Container Identification and Labeling Procedures section below.
- Collect samples while facing upstream (against the flow) at approximately 12 inches below the water surface, or at half the depth of the water column (when the depth of the stream is 23 inches or less). To address the fact that bacteria concentrate in the surface micro layer, sample bottles will be filled using the “U” scoop motion. The “U” scoop motion ensures that the sample will not be biased with micro layer bacteria. The sample will then be sealed, placed in a cooler and held at four degrees Celsius. Sample analysis will begin no later than 24 hours from collection.
- Measure physical parameters and record in the field notebook.
- Store the samples in a cooler with ice to keep them within the holding temperature.
- Wash hands as soon as possible after sampling and before you eat.

Field Data Documentation Procedures

Water resistant field books are used during every monitoring event to record, at minimum, the following:

- Sampling date and time;
- Field personnel present;
- Type of matrix (e.g., marine water, fresh water streams, etc.);
- Watershed or area being monitored;
- General weather conditions (e.g., dry or rainy, windy or calm, cloudy or sunny, air temperature);
- Sampling location identification number;
- Parameters monitored (e.g., water temperature, salinity or conductivity, dissolved oxygen concentration, etc.); and
- Related field observations (e.g., color and/or smell of water, potential sources of pollution observed, notes on sampling collection, etc.).

Area-specific precipitation amounts are retrieved from local rainfall stations. Tidal stage readings are retrieved from localized tide charts.

Sample Container Identification and Labeling Procedures

Mark all sample containers with the pre-assigned monitoring site identification code. The HCRPIC Phase III approved QAPP requires one field blank per sample event and one replicate sample for every ten sample sites. Typically, the replicate sample is collected at a larger flow, where it is easier to collect both samples at the same time without collecting debris or surface microlayer.

Field duplicate samples end with the letter "R" (e.g., field samples DF01 & DF01R).

Presented by: PetersonGIS

Hood Canal Regional Pollution Identification and Correction Program - Mapping Services

Presented to: The Hood Canal Coordinating Council on the 15th of June 2019
Phase III Methods

OVERVIEW

PetersonGIS provided GIS analyses and mapping for the Hood Canal Regional Pollution Identification and Correction Program (HCRPIC) Phase III final report.

TASKS

1. HCRPIC Program Phase III Data Analysis and Mapping
 - a. Jefferson County Pre-processing

The latest Jefferson County parcels were obtained. A point file depicting Jefferson County septic system locations, types, and approximate ages was created by joining the JeffCo_SOM_sys_type spreadsheet with the Permits_Septic point layer, joined on the case number field after removing the SOM or SEP code. Codes in the 1,000s in the JeffCo_SOM_sys_type spreadsheet were then joined to the parcels, centroids were created out of the joined records, and those centroids were then merged with the new point layer from the previous step. This included 736 non-permitted onsite septics (OSS) that didn't match up in the original join due to missing SEP case numbers. The approximate age was calculated from the case number. Non-permitted ages were coded as 999, which indicates unknown age in the final datasets. The HCCC OSS type categories were assigned to the Jefferson County categories via a join table after working with the team to determine which categories should be assigned to which types. Jefferson County had multiple OSS points per parcel in some cases. For these, we wanted to be able to visualize all the points. Therefore, a secondary dataset was created with a point displacement renderer for mapping purposes. Note that we mapped approximately 16,000 OSS in this phase for Jefferson County, whereas in the previous phase we mapped approximately 11,000 OSS for Jefferson County. Hotspots were added via latitude and longitude coordinates supplied by Jefferson County. Shoreline surveys were supplied as a shapefile by Jefferson County. Parcel survey points represent parcel centroids of matching parcels. Information on failure and repair locations was also processed.

- b. Mason County Pre-processing

The latest Mason County parcel data was obtained. Ages were computed from the install date in the supplied Mason County OSS data. Parcels were dissolved on the PIN field then

joined to the OSS data via PIN. The HCCC categories were already assigned to the Mason County data when it was received. Centroids were created from the data. Failures, repairs, and parcel surveys were all processed in a similar manner as for the other counties. Shoreline survey lines were created from coordinate start and stop locations.

c. Kitsap County Pre-processing

The latest Kitsap County parcel data was obtained and joined to the necessary ancillary tables. A dissolve operation was performed on the RP_ACCT_ID field as in many cases duplicate RP_ACCT_IDs indicate separate portions of the same parcel where shore pieces are separate, which can result in non-ideal centroid placement and number. The team created a crosswalk table for the Kitsap OSS types and their proper HCCC category. This was also joined to the parcels. Centroids were created. The data already had age information in the correct format for this project. Failures, repairs, and parcel surveys were all processed in a similar manner as for the other counties. Shoreline survey lines were created from coordinate start and stop locations.

d. Maps

A series of maps was created to show the new data in a variety of ways including types, ages, densities, and locations. A new basemap was created for this purpose. New, regularly sized, atlas grids were created. Marginalia was also standardized. Density calculations were re-run in QGIS using the quartic Kernel Shape function and other inputs as recorded on each of the density maps so that the same visualizations may be rerun in the future. Symbol levels were activated on all maps that display overlapping point colors so that the color overlaps are at least not randomized. A new data visualization technique was also investigated: donut charts for the display of multivariate information regionally over the entire Hood Canal area.

2. Demonstration of HCRPIC Program Effectiveness

Looking at all the data at once, including Phase II data, in localized/large-scale regions, was beneficial for looking at the effectiveness of the program. To do this, a large-scale map of the Hoodspout area was created with all the OSS Phase II and Phase III data, a new basemap was created to accommodate the large scale, and the Mason County hotspot data from Phase II was QA/QCd and edited.

Appendix G: HCRPIC Phase III Outreach Products

Figure G-1: Hood Canal ...a way of life

Figure G-2: HCRPIC 2017-2019 Accomplishments & Highlights



HOOD CANAL

...a way of life

Hood Canal isn't just our home, it's our way of life. When Hood Canal is threatened, we face risks not only to our local wildlife and ecosystems, but to our health, recreation, and economy.

The biggest pollution threats aren't always obvious. Failing septic systems can hide unnoticed for years before we see the damage they cause. The Hood Canal Regional Pollution Identification and Correction (PIC) Program works to find these problems *before* they cause harm.

HOOD CANAL, CLEAN AND SAFE

A perfect Hood Canal day means the beach and the water—smooth stones under your toes, splashing and swimming in the clear water, watching children at play. Unfortunately, just one failing septic system can leak bacteria that flow down onto the beach and make your family sick.

A well maintained septic system does not cause water quality problems; however, they can fail as they age or if they are not maintained. The most effective way to address failing septic systems is to work within our community to find and clean up pollution at the source, before it becomes a hazard.



Every year, PIC program partners walk Hood Canal shorelines to identify sites with high fecal pollution (human or animal waste). They investigate any pollution "hotspots" to uncover the source, and help property owners fix the problem.

Through this voluntary approach, pollution is cleaned up and community relationships are strengthened as we work together to protect our Hood Canal.

[LEARN ABOUT OUR PROCESS>>](#)

What are we protecting?



213

miles of shoreline for swimming, boating, and fishing.



30,000

acres of shellfish growing areas.



20,000

residents and millions of visitors.

Figure G-1: Hood Canal ...a way of life (page 1 of 2)

PROTECTING *the Hood Canal way of life*

Problem
Hood Canal is home to nearly 30,000 septic systems. While septic systems typically work for about 30 years, many local septic systems are much older. When they fail, the untreated human waste flows down to the beach.

Every failing septic system that we find and fix prevents disease-causing organisms from reaching our beaches, making people sick, and impacting the environment.

Identification
The PIC team walks priority shorelines and samples drainage to find "hotspots." We then investigate pollution sources with additional sampling and interviews.

Collaboration & Correction
The PIC team provides free technical assistance to help property owners repair their septic systems. Most repairs are corrected through a cooperative voluntary partnership.

Outcomes
Our work keeps Hood Canal's ecosystem healthy, our beaches swimmable, and shellfish beds open for harvest.

In 2017-2019, the Hood Canal Regional PIC Program monitored 66 shoreline miles, conducted 380 site visits, found 55 septic system failures, and completed 28 septic system repairs.

Visit hccc.wa.gov/PIC to learn about Hood Canal Regional PIC Program Results.

The HCRPIC Program Phase III was funded by the U.S. Environmental Protection Agency's National Estuary Program. This project has been funded wholly or in part by the United States Environmental Protection Agency under assistance agreement PC-00/32601 to Washington Department of Health. The contents of this document do not necessarily reflect the views and policies of the Environmental Protection Agency, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

Figure G-1: Hood Canal ...a way of life (page 2 of 2)



HOOD CANAL REGIONAL POLLUTION IDENTIFICATION AND CORRECTION (PIC) PROGRAM 2017-2019 ACCOMPLISHMENTS & HIGHLIGHTS

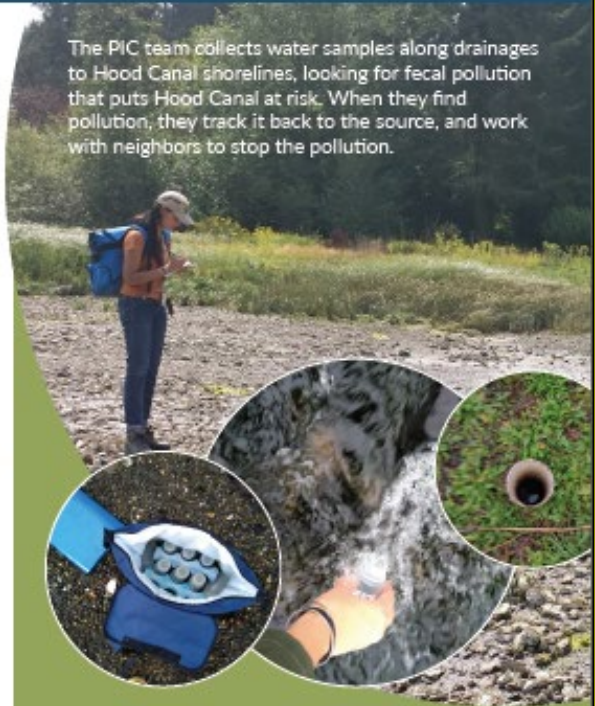
The Hood Canal Regional PIC program is a cooperative effort to identify, investigate, and proactively correct fecal pollution sources that drain to the Hood Canal shoreline. We work directly with community members to protect clean water and beaches and keep our community healthy.

Why is the PIC program important?

Clean water is the key to preserving Hood Canal's human health, robust tourism, recreational appeal, and rich natural resources—including shellfish and finfish, which offer important economic, cultural, and subsistence value to residents and tribes statewide. The PIC program is focused on protecting our clean water by proactively identifying, investigating, and repairing threats to prevent further harm.

In addition, because our regional approach consolidates grant applications, contracts, quality assurance plans, expertise, labor hours, and reporting, individual program partners experience the full benefits of the program at a fraction of the cost. In turn, each partner brings a broad range of resources and knowledge to help us address challenging pollution problems.

The PIC team collects water samples along drainages to Hood Canal shorelines, looking for fecal pollution that puts Hood Canal at risk. When they find pollution, they track it back to the source, and work with neighbors to stop the pollution.



A robust local PIC program keeps Hood Canal and the people who live here healthy.



SEPTIC SLEUTHING

Between 2017 and 2019, the regional team walked 66.6 miles of priority Hood Canal shorelines and sampled all fresh waters draining to the beach. We focused on places where people swim, fish, and harvest shellfish, because that's where human health is most at risk.

We identified multiple "hotspots" with high fecal pollution and visited 380 properties in those drainage areas looking for fecal pollution sources. During each visit, we provided site-specific tips on how to get the most life possible from septic systems.

The team worked closely with 28 property owners to complete needed on-site septic system (OSS) repairs, providing free technical assistance to support these community members in correcting their pollution sources voluntarily.



Figure G-2: HCRPIC 2017-2019 Accomplishments & Highlights (page 1 of 2)



HOOD CANAL REGIONAL POLLUTION IDENTIFICATION AND CORRECTION (PIC) PROGRAM 2017-2019 ACCOMPLISHMENTS & HIGHLIGHTS



The regional PIC team provides a coordinated approach and works collaboratively with the community to protect clean water on Hood Canal beaches.

RESULTS THROUGH COLLABORATION: 2017-2019 Highlights

Agency Outcomes

JEFFERSON COUNTY

- 59.5 shoreline miles
- 190 site visits
- 41 OSS failures
- 21 OSS repairs

MASON COUNTY

- 6.3 shoreline miles
- 102 site visits
- 9 OSS failures
- 3 OSS repairs

KITSAP COUNTY

- 0.8 shoreline miles
- 88 site visits
- 5 OSS failures
- 4 OSS repairs

Overall Outcomes



CASE STUDY RESTORING HOODSPORT

Hoodsport is a vibrant and historic community with miles of shoreline, rich shellfish resources, and aging septic systems. Area shorelines have been closed to shellfish harvesting for decades due to septic system pollution. The Hood Canal PIC partners, led by the Skokomish Tribe, Mason County, and Washington State Department of Health (DOH) have been working diligently to prevent and correct pollution sources to open the shellfish beds to harvest. We expect that water quality improvements resulting from this work will allow DOH to approve shellfish harvesting in Hoodsport for the first time.

COLLABORATIVE ACCOMPLISHMENTS

- Skokomish Tribe alerted the team to rich shellfish resources in Hoodsport and assisted with Hoodsport water quality monitoring
- Mason County conducted Hoodsport shoreline investigations and identified seven failing septic systems—two are repaired, and five are in the correction process
- DOH approved the status of six of the nine shoreline pollution hotspots thus far, as we await additional OSS corrections



We Need Your Support

Clean water is crucial to the health of the Hood Canal community. It is also essential to safe recreation and its economic benefits.

The Hood Canal Coordinating Council developed the PIC program to protect Hood Canal, and continuation of our work will require a stable funding source. Grant funding is becoming harder to secure, but the challenges that PIC addresses are urgent and ongoing. A robust PIC program requires a sustainable funding source to meet the needs of our communities today and prepare for the challenges of tomorrow.



The HCRPIC Program Phase III was funded by the U.S. Environmental Protection Agency's National Estuary Program. This project has been funded wholly or in part by the United States Environmental Protection Agency under assistance agreement PC-00J32601 to Washington Department of Health. The contents of this document do not necessarily reflect the views and policies of the Environmental Protection Agency, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

Figure G-2: HCRPIC 2017-2019 Accomplishments & Highlights (page 2 of 2)