



CITY OF POULSBO

Contribution to Puget Sound Recovery



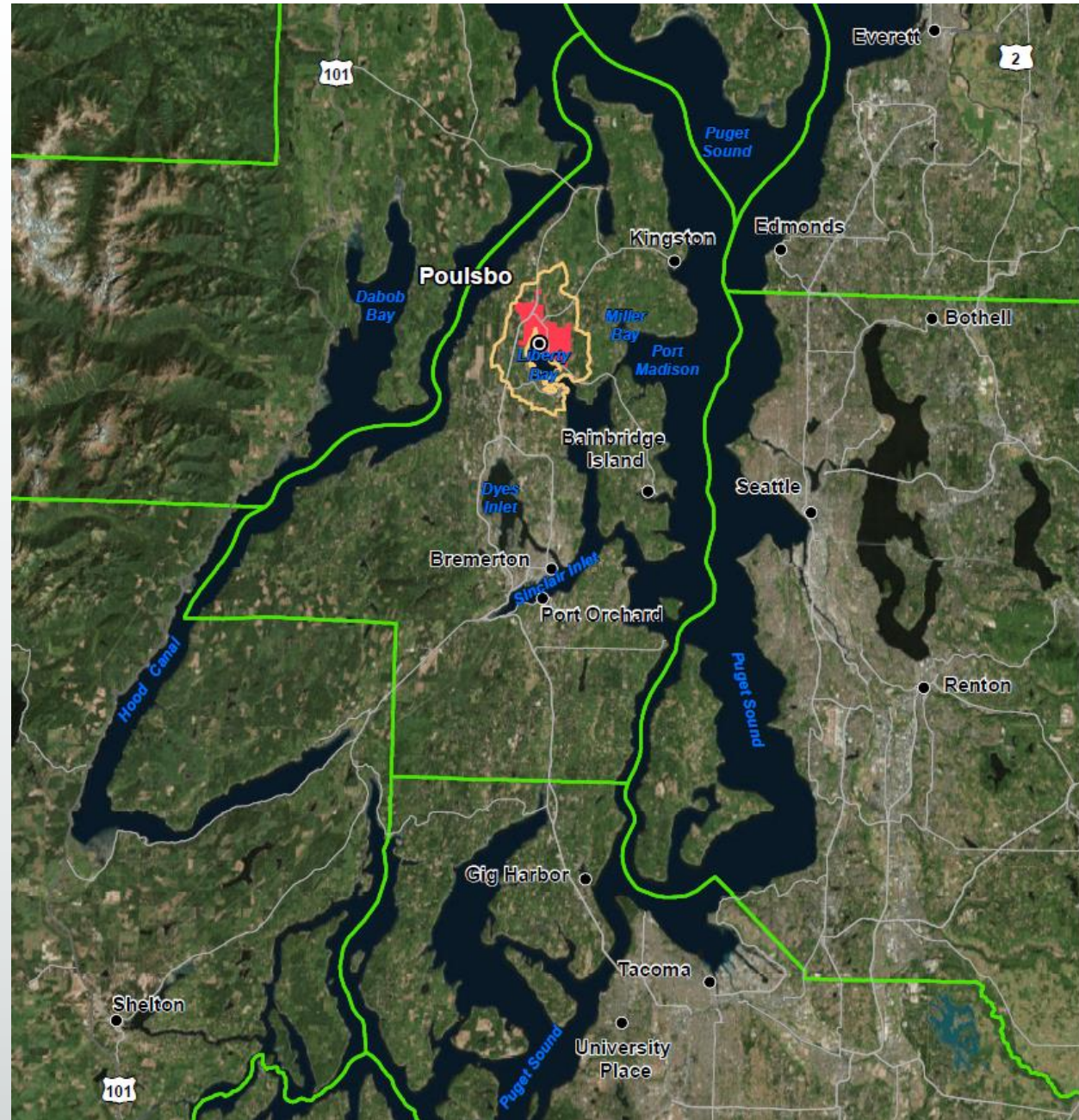
HIGHLIGHTS

- Liberty Bay – Re-Opened to Shellfish Harvest
 - Partnerships were essential
 - Measurement Matters – Total Maximum Daily Load (TMDL) Implementation Plan
- Sample Retrofit and Fish Passage Projects:
 - Retrofits can be small or large
 - Fish Passage
- What makes these projects important to our community?



LOCATION

- 12,400 population
- 4.5 square mile area
- Tributary to Liberty Bay
- Current growth rate ~5%





Commercial Shellfish Harvest History

1967
Conditional
Downgrade

1990
Closed to
Harvest

2006 TMDL
Study

2013 TMDL
Plan

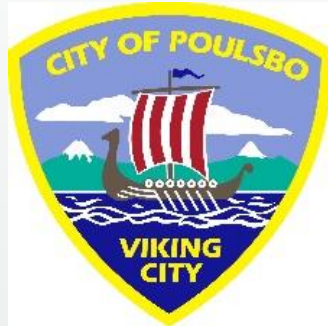
2017 PTIP

2018 Re-
opens



50 years since downgrade!

PROJECT TEAM



Suquamish Tribe



NORTH KITSAP SCHOOL DISTRICT



Land Developers



Community

TMDL PLAN BACKGROUND

- Initiated by Ecology in 2008, completed in 2013
- Water quality standards were not being met
- Actions to attain water quality standards in Liberty Bay
- TMDL is extension of NPDES Permit



**Liberty Bay Watershed
Fecal Coliform Bacteria
Total Maximum Daily Load**

**TMDL and
Water Quality Implementation Plan**



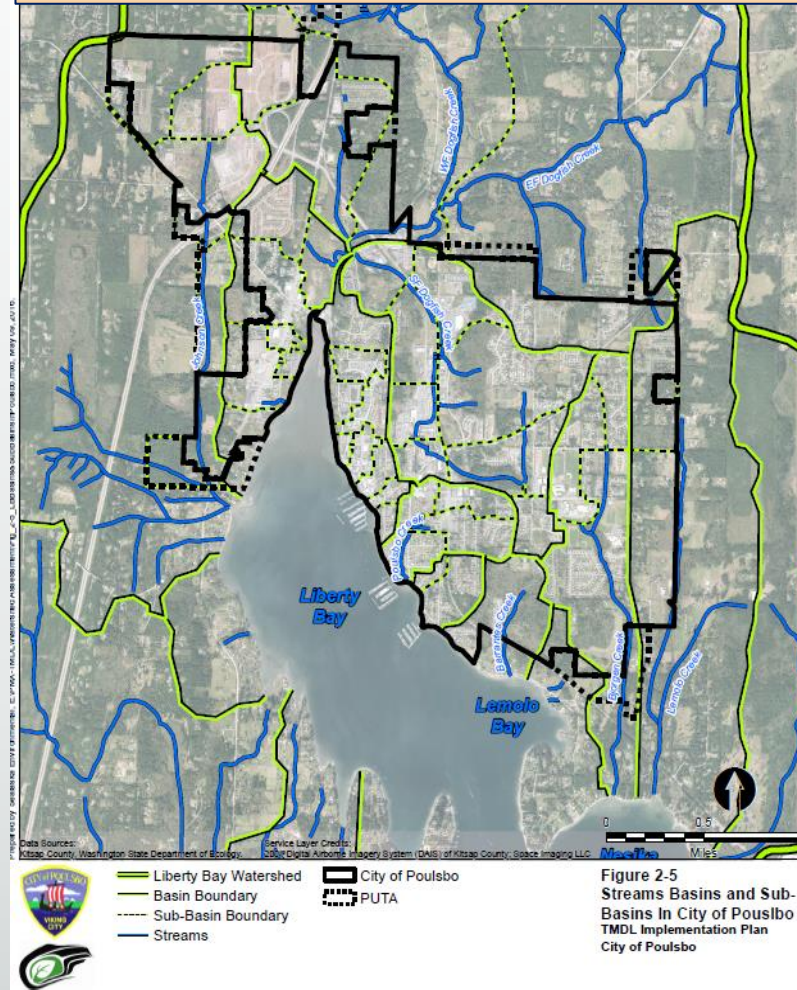
May 2013
Publication No. 13-10-014

WATERSHED ASSESSMENT

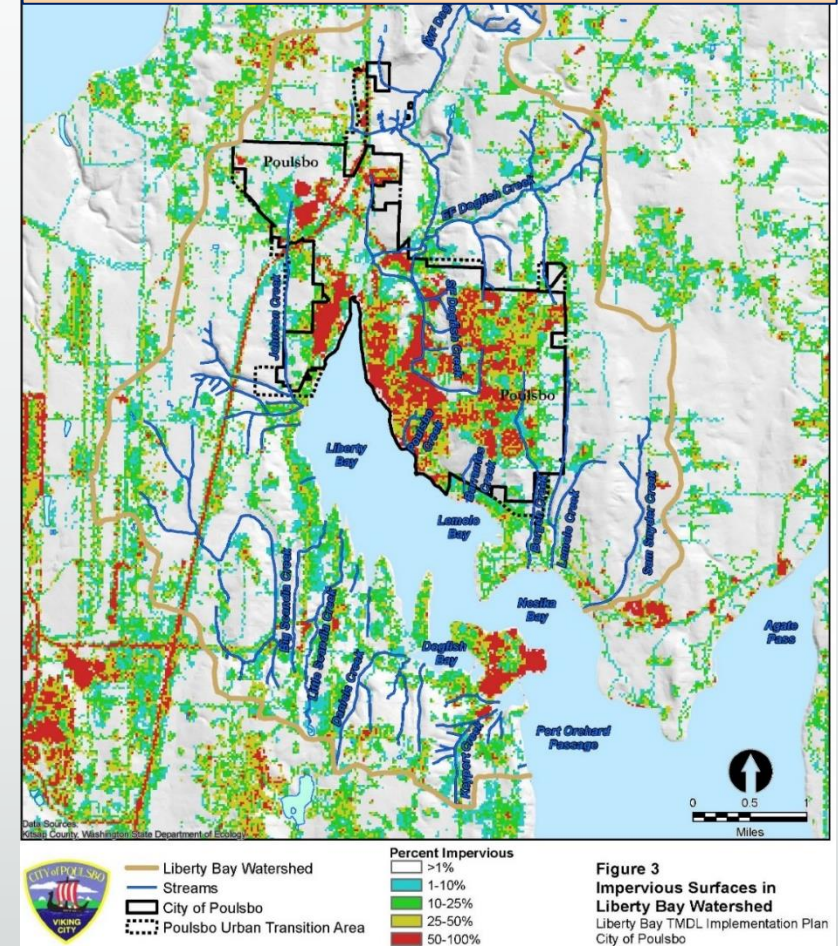


- Characterization
- Evaluate progress
- Identify priorities

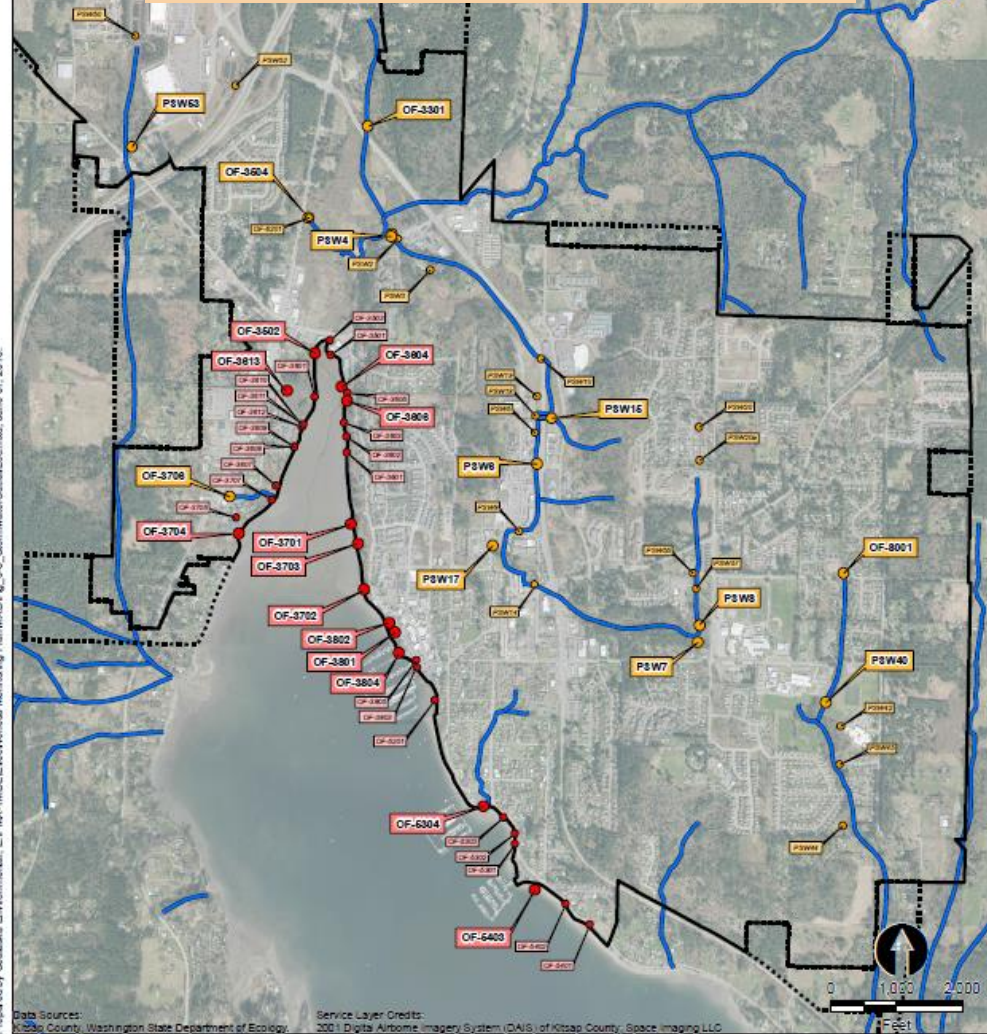
46 Basins



Impervious Surfaces



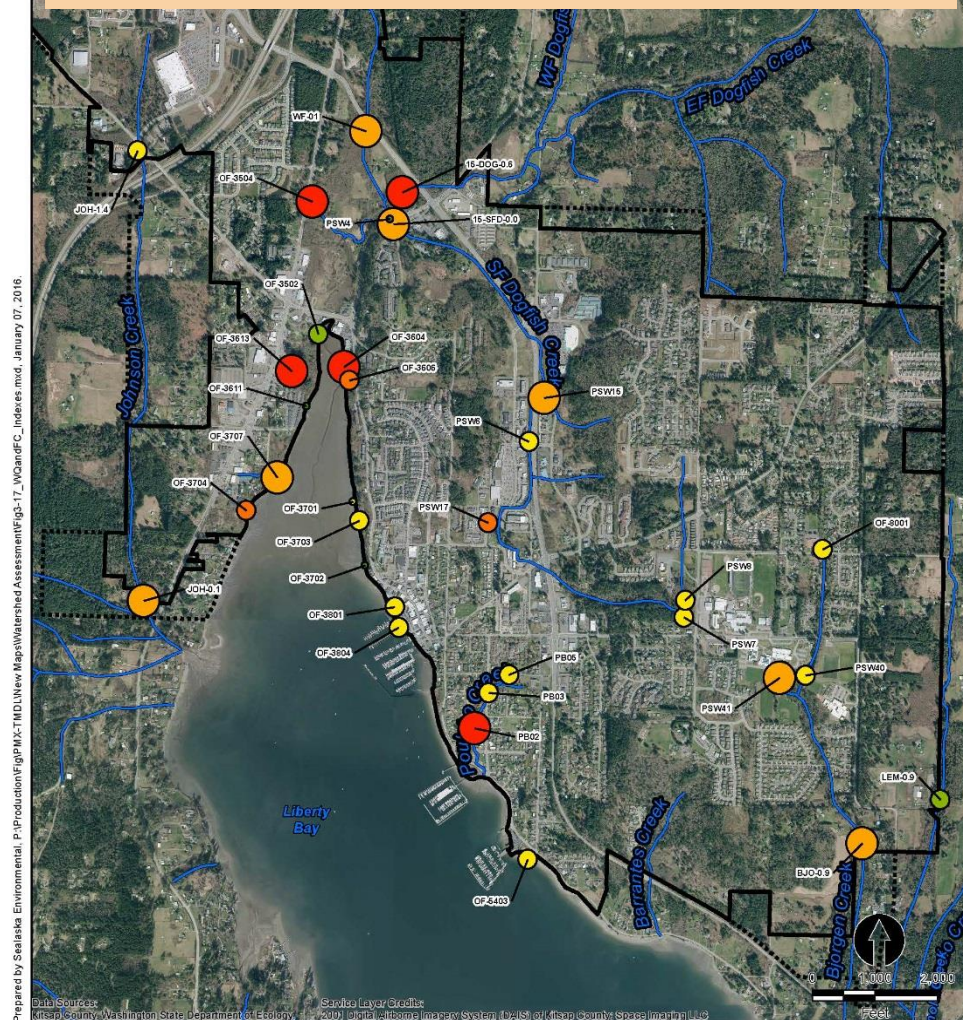
Outfall Mapping



- Streams
- City of Poulsbo
- PUTA
- Marine Outfalls
 - Major/City System
 - Minor/Private
- Freshwater Outfalls
 - Major/City System
 - Minor/Private

Figure 2-22
Stormwater Outfall Locations
TMDL Implementation Plan
City of Poulsbo

Synoptic Stormwater Sampling



- Streams
- City of Poulsbo
- PUTA
- FC Load
 - Low
 - Medium
 - High
- FC Water Quality
 - Good
 - Moderate
 - Poor

Figure 2-25
2015 Water Quality Study
Summary
TMDL Implementation Plan
City of Poulsbo

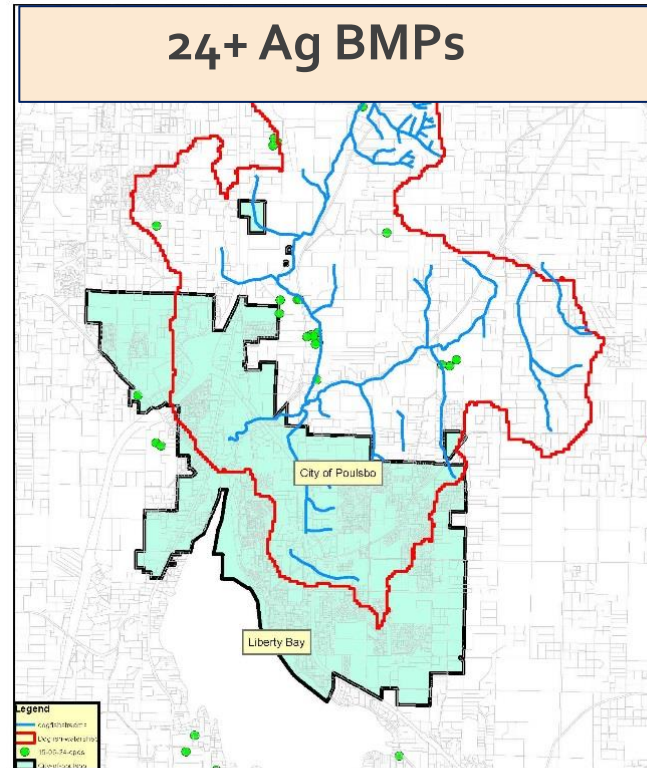


CORRECTIVE ACTIONS

40+ OSS corrections



24+ Ag BMPs

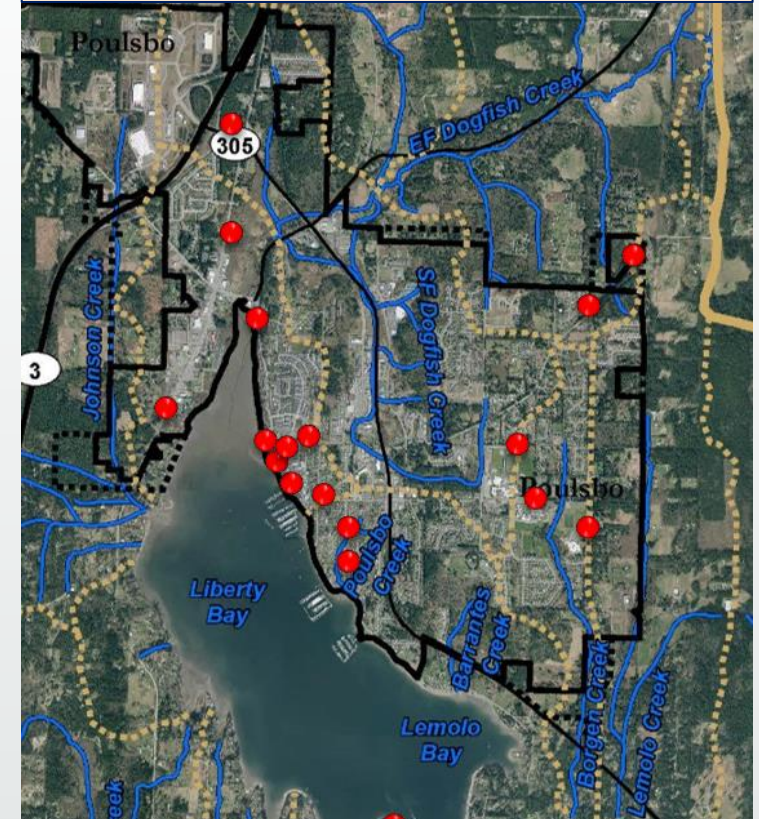


Map Created by:
Brian Stahl
July 2015

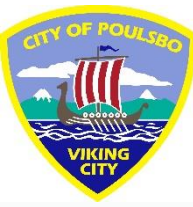
Figure 5. Kitsap Conservation District
Best Management Practices
Dogfish Creek



18 to 25+
Stormwater Retrofits



Corrective Actions:
\$10M+ investment over 8 year period



TMDL COMPLIANCE APPROACH

- Proactive approach to document action and measures progress
- Aggressive, prioritized capital program
 - 25+ retrofit projects in last 20 years
- Enhance O&M
 - Improve procedures for public O&M
 - Instituted a Private (Drainage) Facilities Maintenance (PFM) program going beyond permit requirements by including facilities permitted prior to 2010.
 - 241 properties in the PFM program, most of which were not maintained prior to the initiation of the program.
- Continue on-going public education campaigns, expanding when possible
 - Robust Mutt Mitt program and backyard pet waste campaigns
- Develop stewardship opportunities
 - ILA with Kitsap Conservation District for rain gardens & grid paving
 - To date, 10 practices installed & 14 pending
- Expand annual dry weather screening to include 2 wet-weather rounds for effectiveness monitoring
- Keep community and elected officials engaged

Stormwater Treatment and Impervious Areas

- > 50% of the Total Impervious Area is Treated



Prepared by: Salinas Environmental Planning, Inc. (SEP) for the City of Poulsbo, Washington State Department of Ecology, as part of the Liberty Bay TMDL Implementation Plan, December 14, 2015.



- Liberty Bay Watershed
- Basin Boundary
- Streams
- City of Poulsbo
- PUTA
- 1992/1997 Compliant
- 2005 Compliant
- Future Developable

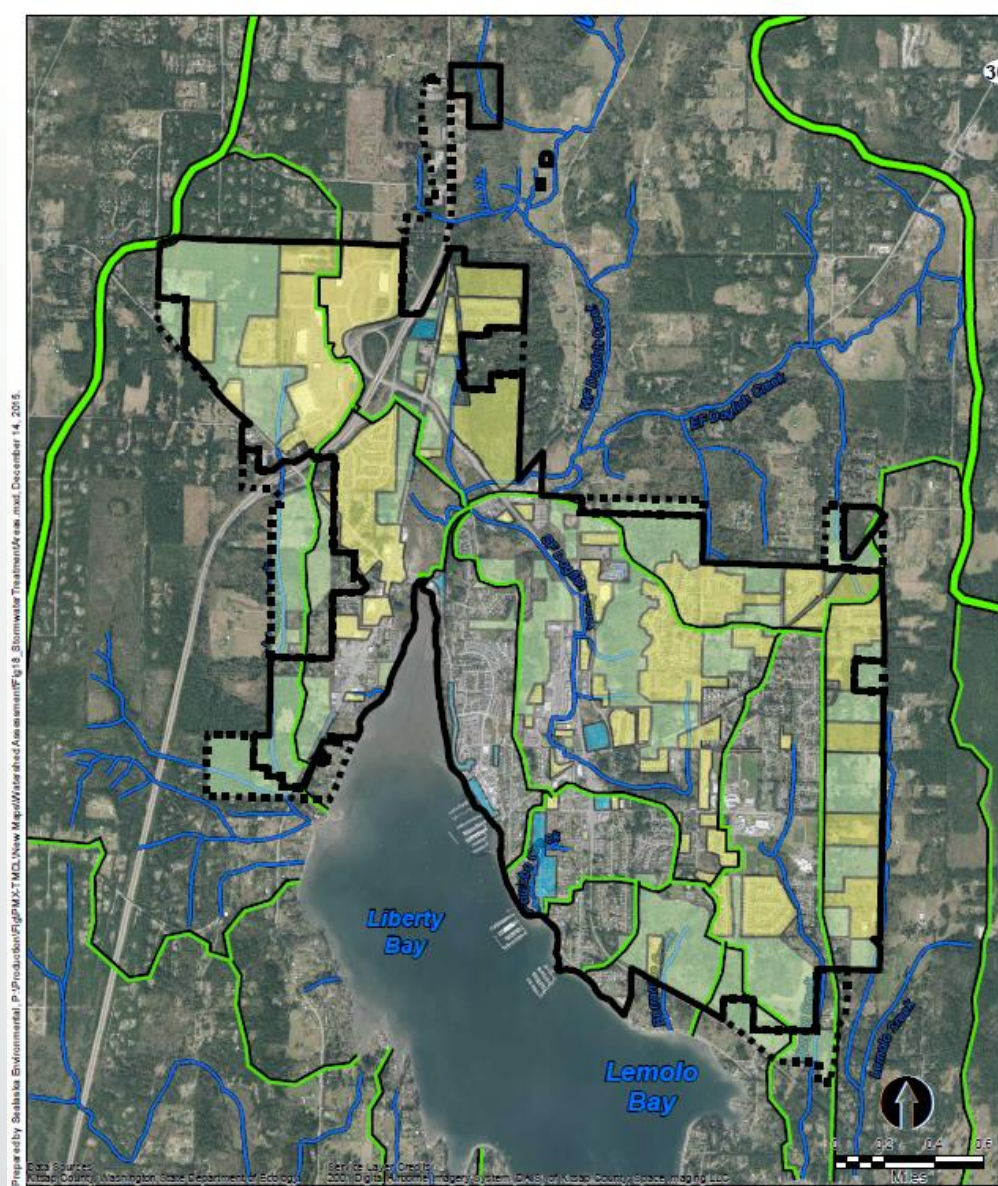
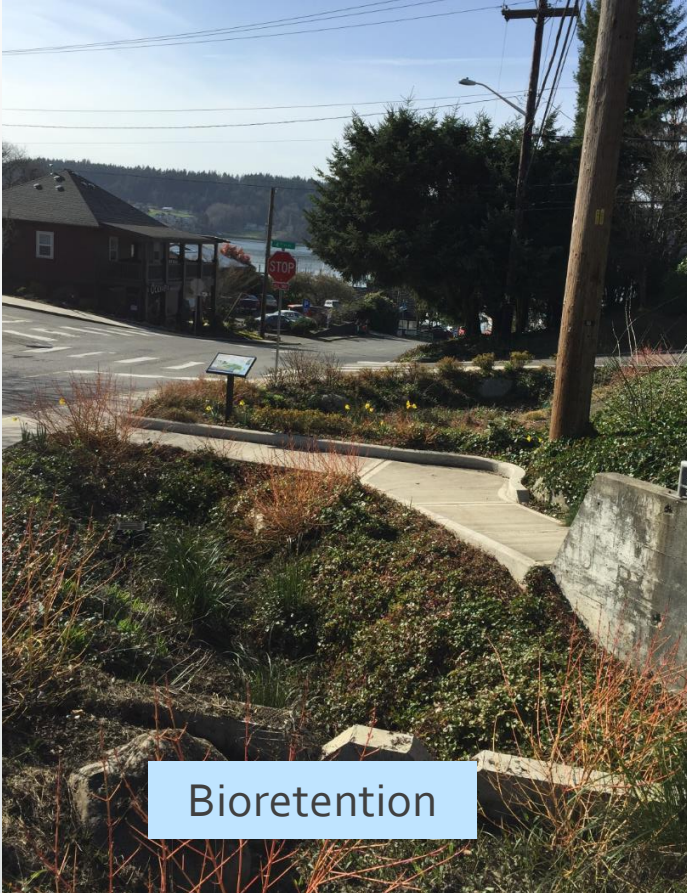


Figure 18
Stormwater Treatment
Areas

Liberty Bay TMDL Implementation Plan
City of Poulsbo

STORMWATER RETROFITS



Bioretention



Parking Lots



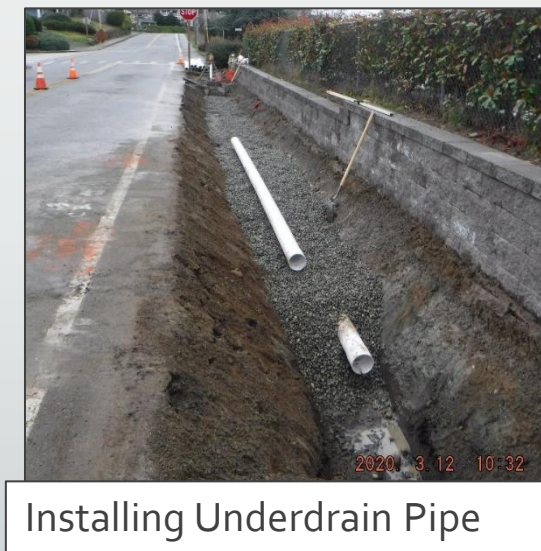
Green Streets

Fjord Drive Bioretention Swale - Before



- Existing condition is a roadside grass lined ditch
- No water quality treatment
- Mud / sedimentation build up

Fjord Drive Bioretention Swale – Construction



Fjord Drive Bioretention Swale – Construction



Fjord Drive Bioretention Swale – Complete



- Enhanced Water Quality Treatment ~ 1.4 Acres
 - 0.6 Acres of road surface
- Attractive retrofit
- Consistent with LID features in downtown, on 6th Ave, and on Hostmark

Poulsbo Middle School Water Quality Vault - Before



- Outfall for ~115 Acre basin
- No treatment
- Large concrete outfall structure in degraded condition
 - Attractive nuisance
- Erosion/degradation of outfall near Creek

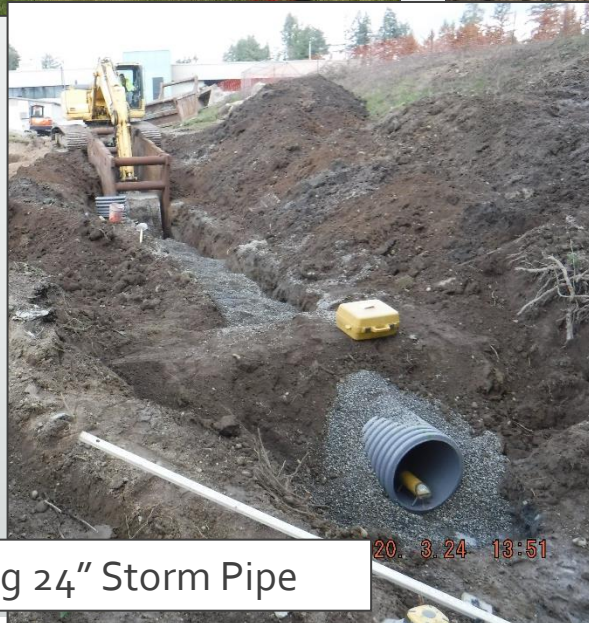
Poulsbo Middle School Water Quality Vault - Construction



School Site



Excavating



Installing 24" Storm Pipe



Installing Manholes

Poulsbo Middle School Water Quality Vault – Construction



Poulsbo Middle School Water Quality Vault— Complete



- Enhanced Water Quality Treatment ~ 2.56 Acres of PGIS
- Allows for School/City to install treatment vaults in line for increased capacity
- Stabilized outfall and placed farther back from Bjorgen Creek



CIP PROJECT NO. 1

SOUTH FORK DOGFISH CREEK RESTORATION



Prepared by Sealaska Environmental, E:\P\A\T\ML\Stormwater Management Plan\MSDF\fig_C-1_SF_Dogfish_Cr_18th.mxd, February 9, 2016

Data Sources: Kitsap County, Washington State Department of Ecology, 2001 Digital Aerial Imagery System (DAIS) of Kitsap County, Space Imaging LLC



- Existing Stream
- New Stream Channel
- Existing Control Structure
- Existing Oil Water Separator
- Existing Underground Detention Facility
- Existing Stormwater Pipe
- New Stormwater Pipe
- Parcel Boundary
- Existing Culvert
- Proposed Culvert
- Features to be Removed
- Restored Stream Buffer
- Bioretention
- Enhanced Bioretention
- Constructed Wetland

Project C-1, 1A
SF Dogfish Creek Restoration at 8th Ave.
Stormwater Management Plan
City of Poulsbo



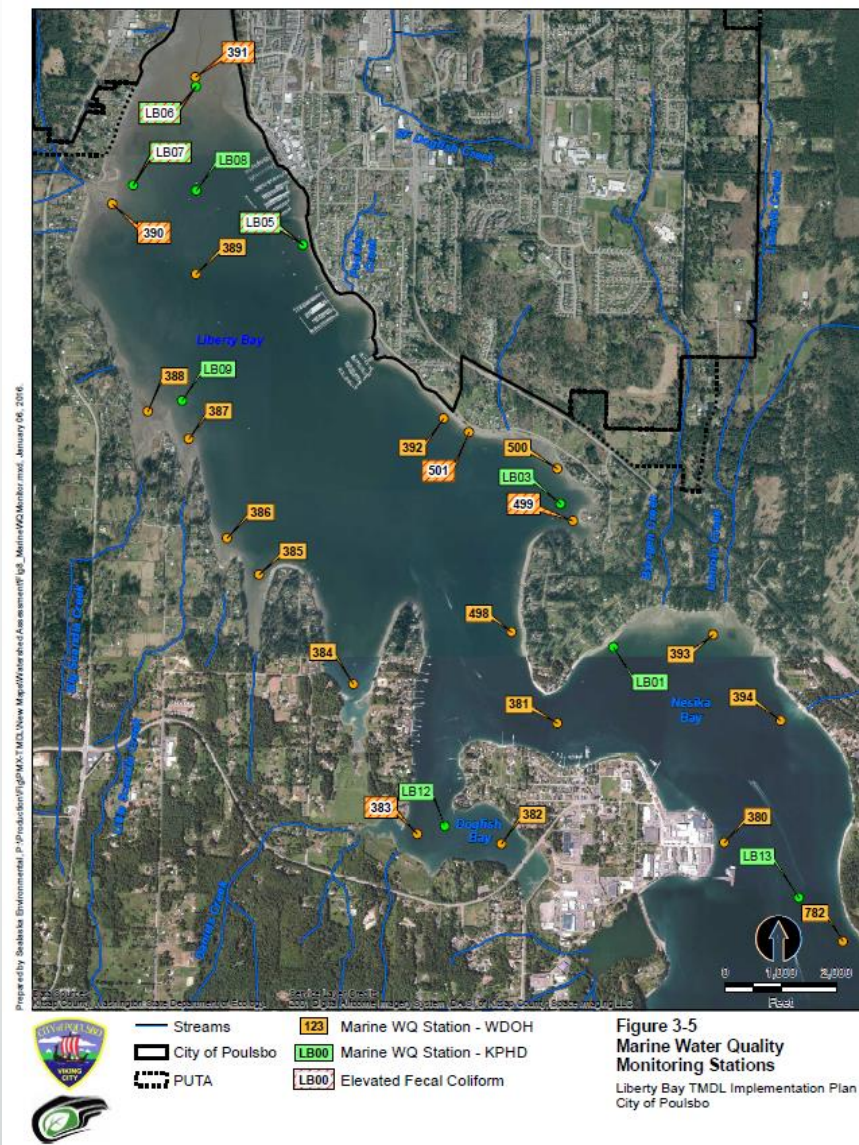
BJORGEN CREEK

- Channel grade was too steep for fish
- Reconfigured to meet Dept. of Fish and Wildlife requirements.

MONITORING RESULTS



KEY FINDINGS



Water quality is improving.
Marine water meets standards
at all 29 locations.

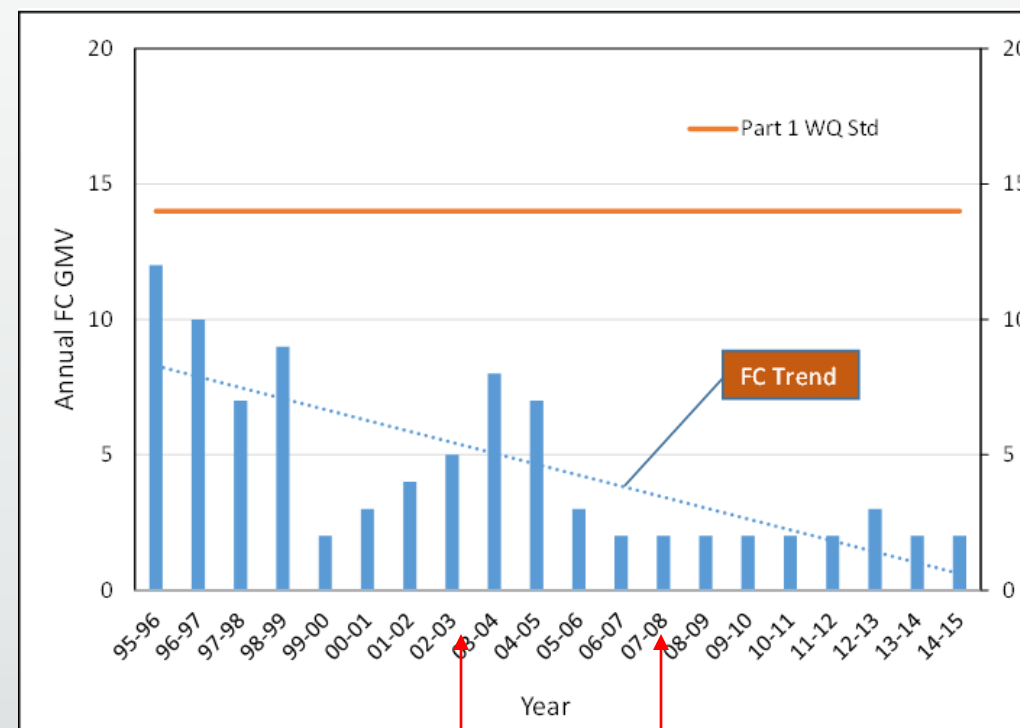


Figure 2-12. Trend for Liberty Bay Marine Station LB05

STREAM LOAD DECREASING – 10 YEAR TREND

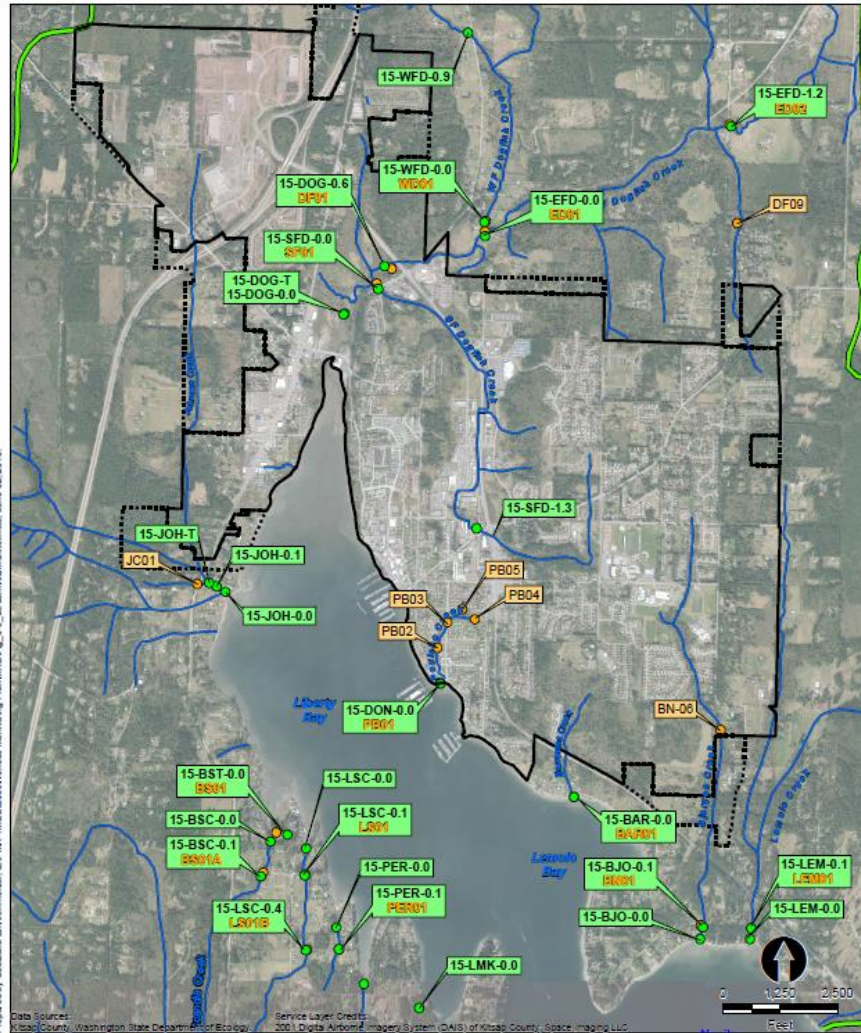
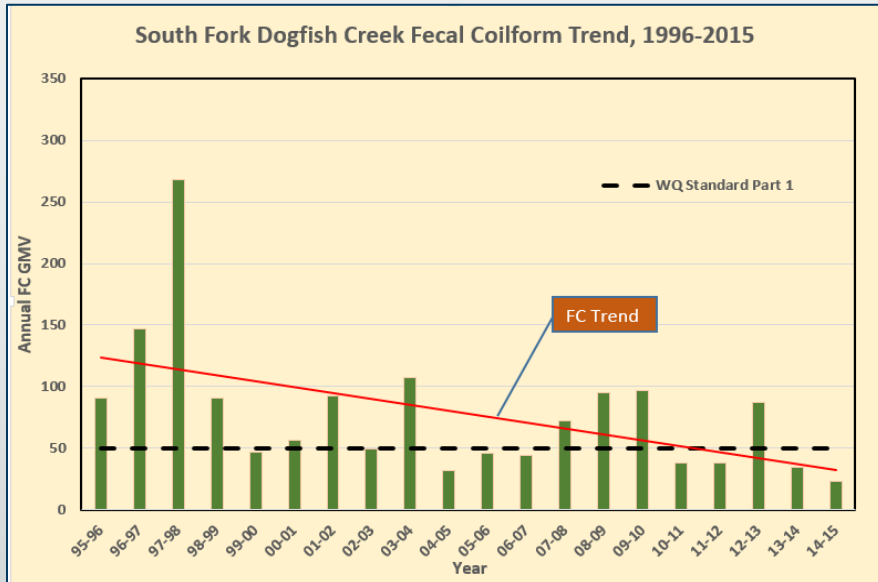
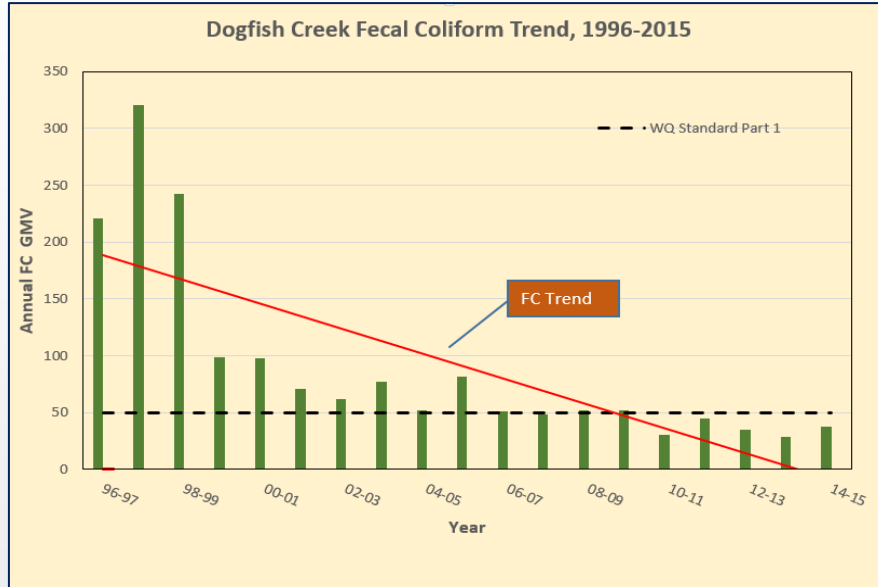


Figure 2-18
Historical Stream Water
Quality Monitoring Stations
TMDL Implementation Plan
City of Poulsbo

Legend:
 - Liberty Bay Watershed
 - City of Poulsbo
 - PUTA
 - Fresh WQ Station - WDOE
 - Fresh WQ Station - KPHD/CoP



WHY IS THIS IMPORTANT?

- Marine water quality critical to social, economic and cultural identity
- We are a waterfront community with tourism based economy





QUESTIONS?