

ENVIRONMENTAL HEALTH

WATER POLLUTION IDENTIFICATION & CORRECTION PROGRAM

2018 ANNUAL WATER QUALITY REPORT



Protecting Public Health and Improving Water Quality



KITSAP PUBLIC
HEALTH DISTRICT

345 6th Street
Suite 300
Bremerton, WA 98337

360-728-2235 t.

kitsappublichealth.org



Clean Water Kitsap
Partners in Stormwater Solutions

INTRODUCTION

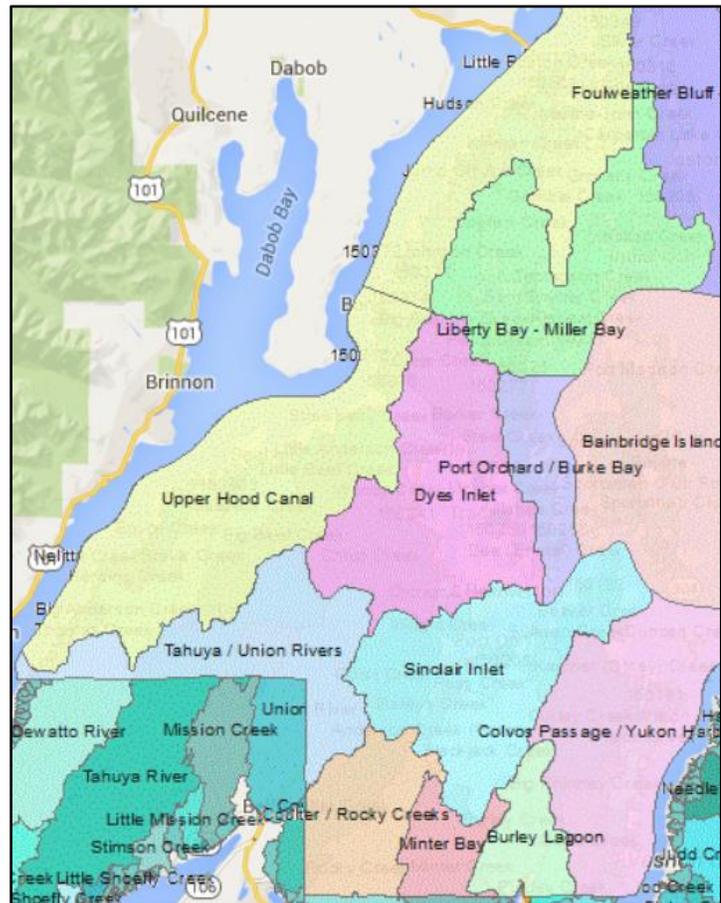
The overall goal of the Water Pollution Identification and Correction (PIC) program is to protect public health and prevent pollution of Kitsap County surface waters. To accomplish this, we have been monitoring the water quality of our streams, lakes and marine waters since 1995. We use monitoring data to identify areas affected by bacterial pollution, usually from human or animal waste. Then we work to find the sources and correct them by providing education, technical assistance and regulatory enforcement when necessary.

This report summarizes the Kitsap Public Health District's (Health District) recent annual water quality data for streams, lakes, and shoreline areas collected during the 2018 water year (October 2017-September 2018), and includes highlights of our clean-up efforts. The majority of this work is funded by Clean Water Kitsap¹ with grant funding provided by the Washington State Department of Ecology (Ecology) and the Department of Health (DOH).

The introductory section provides background information and explains our methods of data collection and analysis. Use the links below to access chapters discussing each of the watersheds shown on the adjacent map, plus our shoreline monitoring results, and lake sampling.

REPORT CHAPTERS

1. Introduction
2. [Burley /Minter](#)
3. [Colvos Passage / Yukon Harbor](#)
4. [Coulter Creek / Rock Creek](#)
5. [Dyes Inlet](#)
6. [Foulweather Bluff / Appletree Cove](#)
7. [Liberty Bay / Miller Bay](#)
8. [Port Orchard Passage / Burke Bay](#)
9. [Sinclair Inlet](#)
10. [Tahuyeh / Union Rivers](#)
11. [Upper Hood Canal](#)
12. [Shoreline Monitoring Program](#)
13. [Lakes & Swimming Beaches](#)

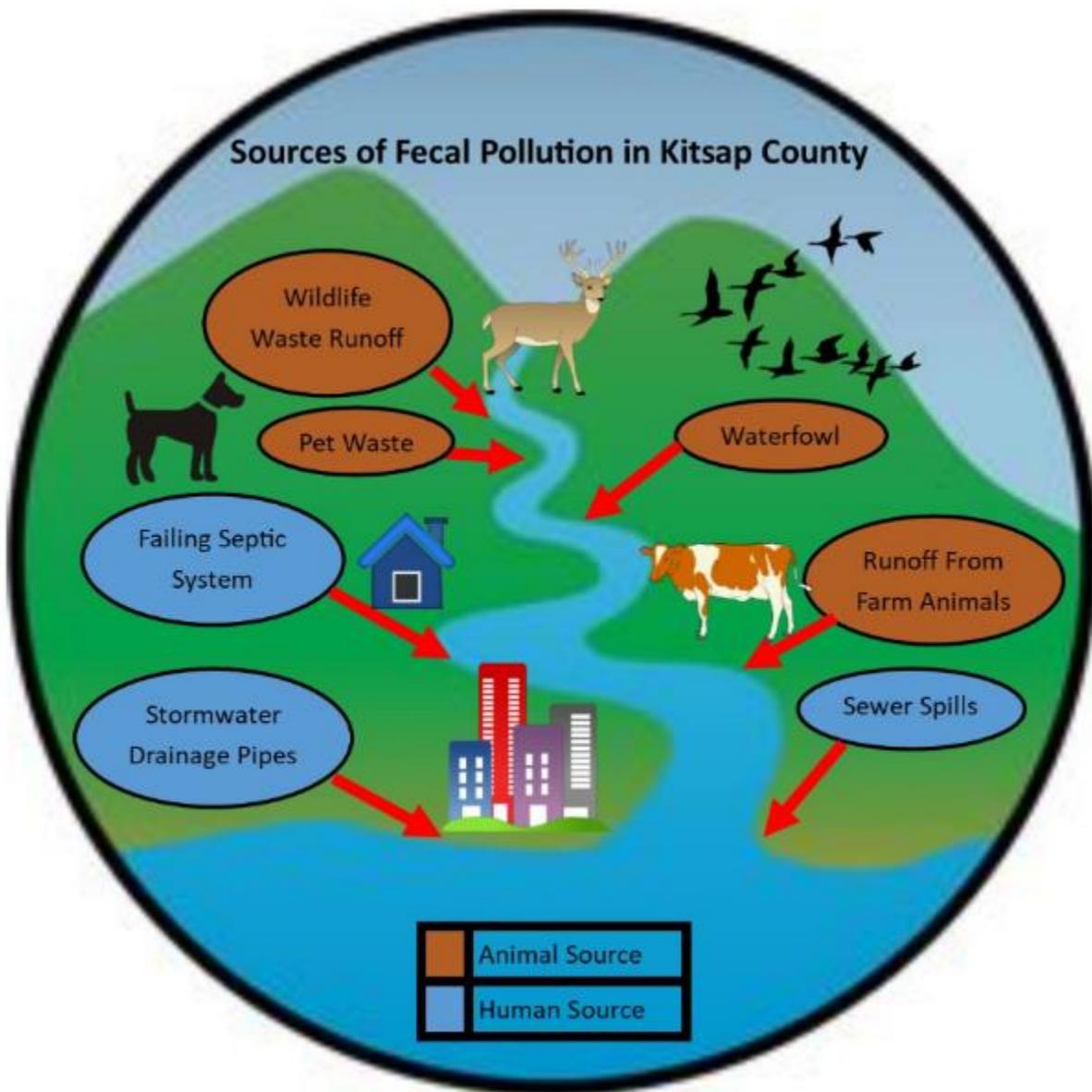


¹ Stormwater management fees from unincorporated Kitsap County fund a unique multiagency partnership managed by Kitsap County Public Works. Programs are implemented by Public Works Stormwater Division and partner agencies; Kitsap Public Health District, Kitsap Conservation District, Kitsap Public Utility District and Washington State University Extension Kitsap.

SOURCES OF WATER POLLUTION IN KITSAP COUNTY

The Health District focuses on fecal coliform (FC) bacteria as the primary indicator of surface water quality. High levels of this bacteria have been correlated with the presence of viruses or other pathogens that can cause human illness.

The primary cause of pollution in Kitsap County’s streams, lakes, and marine water is “nonpoint source” pollution. Nonpoint source pollution can generally be defined as pollutants that come from many smaller sources, rather than a few large sources. This accumulation of fecal pollution sources occurs in both urban and rural areas and can often be prevented by using best management practices. Some major sources of fecal pollution are shown below.



Significant risks to our health can come from pollution caused by human sewage and animal waste. Sources of this pollution include failing on-site sewage systems, inadequate livestock keeping practices, pet and wildlife waste, sewage spills, combined sewer overflows, and sewage discharges from boats. Human and animal waste may contain organisms that can cause a variety of diseases and illnesses including giardia, cholera, hepatitis A, shigella, salmonella, and viral gastroenteritis. Humans are exposed to these pathogens through activities such as swimming in contaminated water or eating shellfish that have grown in polluted areas.

BACTERIAL WATER POLLUTION CLEANUP EFFORTS

Kitsap Public Health District (Kitsap Health) implements Pollution Identification and Correction (PIC) methods to solve fecal pollution in Kitsap County streams. The goal is to protect public health and restore shellfish beds by identifying and correcting fecal pollution sources through a combination of GIS mapping, monitoring, permit and maintenance information, parcel inspections and investigations, enforcement, and targeted public education in accordance with Kitsap Health's Water Pollution Identification & Correction Protocol Manual 2016 (PIC Protocol Manual). Kitsap Health prioritizes education to help Kitsap residents understand the importance of proper use and maintenance to get the most life from their septic systems.

The intent of this program is to implement a proven and effective approach to reduce fecal pollution and associated pathogens and pollutants in surface waters and shellfish growing areas. Water quality improvements will be achieved through intensive stream segment and parcel bracket sampling, stream surveys, septic system records evaluation, and prioritized parcel surveys and investigations. Kitsap Health will proactively provide information to help Kitsap residents identify potential fecal pollution sources and to get the most life possible from their septic system investment.

MONITORING FREQUENCY

During the 2017-18 water year, stream stations were sampled once each month. Fewer samples may be collected at a monitoring station due to lack of flow during the dry season, hazardous weather conditions, equipment failures, or other circumstances. Sampling frequency for lake swimming beaches is based on beach usage; popular lakes are sampled more frequently during the summer, e.g. weekly.

BACTERIAL ANALYSIS METHOD

The Health District contracts with a laboratory for analysis of water samples. The contract lab uses the membrane filtration (or MF) method for bacterial analysis of water samples. The MF results for marine water range from less than one (<1) to greater than two hundred (>200). Freshwater samples are diluted by a factor of 1:10 so the results range from less than ten (<10) to greater than two thousand (>2000).

WASHINGTON STATE WATER QUALITY STANDARDS

Surface water quality standards are established by the Washington Department of Ecology, and described in Chapter 173-201A of the Washington Administrative Code (WAC). The water quality standards which apply in Kitsap County are summarized below. State law classifies bodies of water as either Primary or Extraordinary, depending on designated beneficial uses such as human recreation and/or fish habitat.

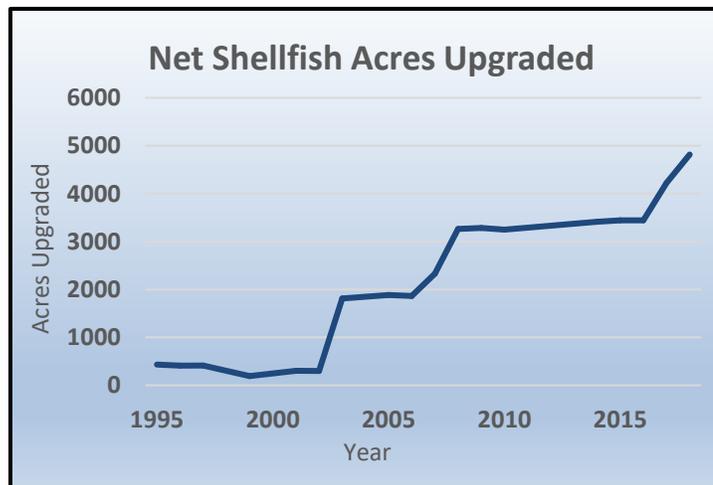
Parameters	Freshwater Standard	
	Extraordinary Primary Contact	Primary Contact
Fecal Coliform Bacteria (FC)	<p>Part 1: ≤50 FC/100 ml (geometric mean)</p> <p>Part 2: Not more than 10% of all samples obtained for calculating a geomean >100 FC/100 ml</p>	<p>Part 1: ≤100 FC/100 ml (geometric mean)</p> <p>Part 2: Not more than 10% of all samples obtained for calculating a geomean >200 FC/100 ml</p>

These standards use a geometric mean value (GMV) for bacteria, which measures the central tendency of a data set. The GMV is especially useful for groups of data that contain a broad range of values. Since sample results for bacterial concentrations tend to be highly variable, the geometric mean is a more appropriate tool for analyzing this type of data than using an arithmetic mean or average.

SHELLFISH CLASSIFICATIONS

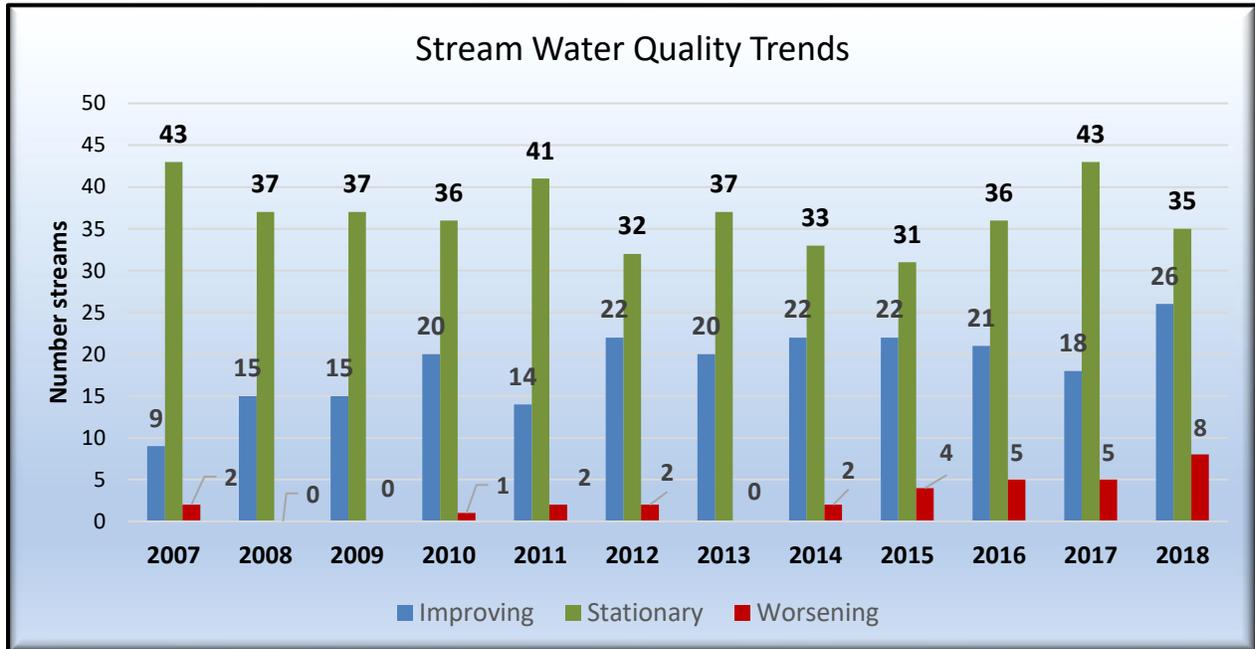
The Washington State Department of Health (DOH) Office of Shellfish and Water Protection is responsible for classifying [Commercial Shellfish Growing Areas](#) in Washington State. Areas are classified as *Approved*, *Conditionally Approved*, *Restricted*, or *Prohibited*. These classifications are based on DOH shoreline investigations for potential contamination sources, and marine water monitoring for bacterial pollution. Please be sure to refer to your location on the [Shellfish Safety Map](#) before recreationally harvesting any shellfish in Washington.

Since Pollution Identification and Correction efforts began approximately 23 years ago, there has been a net **increase of shellfish growing areas approved for harvest of 4,817 acres** in Kitsap County! This is one benefit of completing comprehensive pollution source identification and correction projects.



BACTERIAL POLLUTION TREND ANALYSIS FOR STREAMS

Streams are sampled monthly to determine which are being affected by bacterial pollution, and whether conditions are statistically improving, staying the same (stationary) or worsening. Statistical analysis for long term trends began in 2007. An overall improving water quality trend is occurring in many of our streams.



Long term and short term trend analysis is performed on the FC data collected at all stream mouth stations. For a given station, *long term trend* is determined over the entire data set (approximately 23 years) and a *short term trend* is determined over the last three (3) years. Trends are identified as “stationary”, “worsening”, or “improving”. In each watershed section, the water quality summary chart shows long term trend for each stream.

An unusual aspect of the trend analysis this year is that several of the streams with statistically worsening trends have very low levels of bacteria, and still meet the state water quality standard. These streams; Coulter Creek, Stavis Creek, Tahuyeh River and Dewatto River, are all in watersheds with large forested areas and tend to have relatively little development. These worsening trends are not a reflection of declining water quality but rather a statistical anomaly.

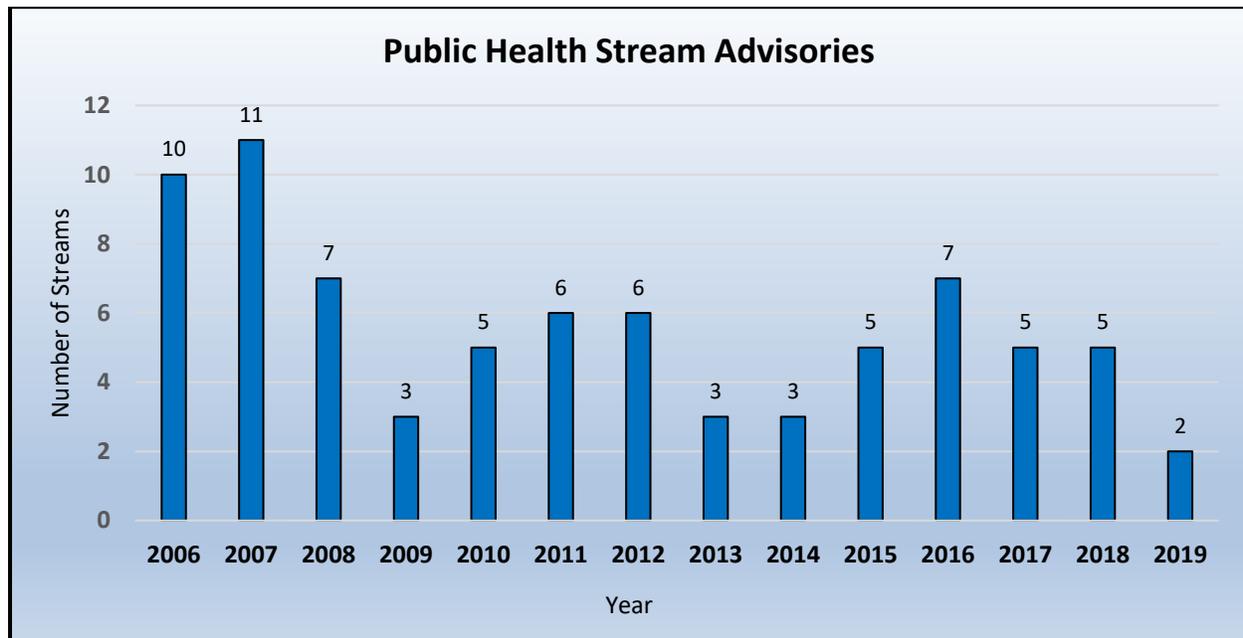
PUBLIC HEALTH STREAM ADVISORIES

The Health District issues public health advisories for streams that have chronic problems with high bacteria levels during the summer. (3-year geometric mean value > 270 FC/100 ml) High levels of fecal coliform bacteria indicate the presence of viruses and other pathogens that can make people sick. The Health District issues these advisories to protect the health of people, especially children, who may play in streams. The advisory uses data from the summer months when people are more likely to come into contact with streams.

Based on the water quality monitoring results for 2016-18, **TWO**² streams will have public health advisories in 2019; Lofall Creek and Ostrich Bay Creek, both of which are continuations of 2018 public health advisories.

Stream Name	Summer Fecal coliform Bacteria GMV
Lofall (LF01)	440
Ostrich Bay (OB01)	674

The chart below shows that the number of streams with health advisories changes each year, and the trend over time is that fewer streams in Kitsap County contain this level of pollution.



BACTERIA LEVELS IN KITSAP COUNTY STREAMS

The Health District began sampling all the major streams in Kitsap County in 1995. At that time our monitoring program included 56 streams, and only 13 of them met the state water quality standard for fecal coliform bacteria. In 2018 our program included 69 streams, and 35 of those met the state standard, although this number varies from year to year.

Each stream is also evaluated to determine whether there is a statistically significant trend in bacteria levels over time. A long term trend is calculated for each stream using all the data collected since the trend monitoring program began roughly 23 years ago, and is shown as either; improving, worsening, or stationary. See page 1-6 for a comparison of changes in stream trends over time.

² One additional stream (Pahrmann Creek) exceeded the 3-year geometric mean value > 270 FC/100 ml standard. Pahrmann Creek is a seasonal stream and dries up in the summer months, resulting in a very limited data set. The Health District does not issue public health advisories on seasonal streams.

The following table summarizes stream monitoring results for the 2018 water year. Streams are listed by watershed. A map of the watersheds is shown on page 1-2. The colors used in the “FC Standard” columns indicate whether each stream met the applicable state water quality standard for fecal coliform bacteria, as explained on page 1-5.

- Red - the stream had high levels of bacteria and failed Part 1 & 2 of the standard.
- Yellow - the stream had periodic bacteria problems and failed only part 2 of the standard.
- Green - the stream had low levels of bacteria & met both parts of the standard.

2018 KITSAP STREAM WATER QUALITY SUMMARY

Stream (Station)	FC Standard			2018 FC GMV	Long term trend
	Met Both Standards	Met Part 1 of Standard	Failed both standards		
Burley/Minter Watershed					
Burley Creek (BL01)				54	Stationary
Bear Creek (BR01)				42	Stationary
Huge Creek (HG01)				18	Stationary
Minter Creek (MN01)				29	Stationary
Purdy Creek (PR01)				22	Stationary
Coulter Creek / Rock Creek Watershed					
Coulter Creek (CU01)				6	Worsening
Colvos Passage / Yukon Harbor Watershed					
Olalla Creek (OC02)				84	Stationary
Salmonberry Creek (SM01)				11	Improving

Wilson Creek (WN01)				32	Improving
Curley Creek (CY01)				20	Stationary
Fragaria Creek (FG01)				12	Stationary
Duncan Creek (DC01)				36	Stationary
Dyes Inlet Watershed					
Barker Creek (BK01)				29	Improving
Clear Creek (CC01)				22	Improving
Chico Creek (CH01)				22	Stationary
Kitsap Mall Creek (KM01)				14	Stationary
Kitsap Mall Creek West (KW01)				16	Improving
Mosher Creek (MS01)				19	Stationary
Ostrich Bay Creek (OB01)			Health  Advisory	154	Stationary
Pahrman Creek (PA01)				77	Worsening
Phinney Creek (PH01)				52	Improving
Strawberry Creek (SR01)				18	Improving
Foulweather Bluff / Appletree Cove Watershed					
Carpenter Creek (CA02)				24	Stationary

Liberty Bay / Miller Bay Watershed					
Barrantes Creek (BAR01)				55	Improving
Bjorgen Creek (BN01)				74	Stationary
Big Scandia Creek (BS01)				37	Stationary
Cowling Creek (CW01)				19	Improving
Daniels Creek (DC01)				66	Improving
Dogfish Creek (DF01)				25	Improving
Grovers Creek (GC01)				57	Stationary
Indianola Creek (IN01)				22	Improving
Johnson Creek (JC01)				14	Improving
Kitsap Creek (KT01)				25	Stationary
Lemolo Creek (LEM01)				31	Stationary
Little Scandia Creek (LS01)				49	Improving
Poulsbo Creek (PB01)				103	Stationary
Perry Creek (PER01)				48	Stationary
Sam Snyder Creek (SAM01)				11	Stationary
South Dogfish Creek (SF01)				26	Improving

Unnamed Stream (UNN00)				50	Stationary
Unnamed Stream (UNN01)				20	Stationary
Port Orchard Passage / Burke Bay Watershed					
Enetai Creek (DE01)				16	Improving
Illahee Creek (IC01)				12	Stationary
State Park Creek (SP01)				20	Improving
Steele Creek (ST01)				19	Improving
Sinclair Inlet Watershed					
Beaver Creek (BV01A)				17	Improving
Karcher Creek (KA01)				19	Improving
Anderson Creek (AN01)				15	Stationary
Annapolis Creek (AP01)				34	Improving
Blackjack Creek (BJ01)				35	Stationary
Gorst Creek (GC01)				29	Improving
Ross Creek (RS02)				12	Improving
Sacco Creek (SC01)				25	Improving
Wright Creek (WR01)				10	Stationary

Tahuyeh / Union River Watershed					
Tahuyeh River (TR01)				10	Worsening
Union River (UN01)				29	Stationary
Dewatto River (DW01)				15	Worsening
Upper Hood Canal Watershed					
Big Anderson Creek (BA01)				13	Stationary
Big Beef Creek (BB01)				9	Stationary
Boyce Creek (BY01)				13	Stationary
Jump Off Creek (JJ01)				29	Improving
Kinman Creek (KN01)				45	Worsening
Little Anderson Creek (LA02)				10	Stationary
Lofall Creek (LF01)			Health  Advisory	500	Worsening
Martha John Creek (MJ01)				25	Improving
Port Gamble Creek (PG01)				42	Worsening
Seabeck Creek (SB01)				16	Stationary
Stavis Creek (SV01)				11	Worsening
Vinland Creek (VC01)				40	Stationary

WASHINGTON STATE WATER QUALITY ASSESSMENT

The federal Clean Water Act, adopted in 1972, requires that all states restore their waters to be “fishable and swimmable.” Washington's Water Quality Assessment lists the water quality status for water bodies in the state. This assessment meets the federal requirements for a report under Sections 303(d) and 305(b) of the Clean Water Act, which is submitted to the federal Environmental Protection Agency (EPA). The assessment divides waterbodies into 5 different categories based on impairment. These impairments may be due to such things as high bacteria levels, increased temperature, or low dissolved oxygen. The most current assessment was finalized and approved by the EPA in 2016. Additional information about the State’s assessment may be found at www.ecy.wa.gov/programs/wq/303d.

- Category 1: meets standard for clean waters
- Category 2: waters of concern (some evidence of problems)
- Category 3: insufficient data
- Category 4A: waterbodies that have an approved TMDL in place and are actively being implemented
- Category 4B: has a pollution control program other than a TMDL
- Category 5: polluted waters that require a TMDL; traditionally known as the 303(d) list

For copies of reports on specific projects, please check our website or call us for further information.

Kitsap Public Health District

Water Pollution Investigation & Correction Program

345 6th Street, Suite 300

Bremerton, WA 98337-1866

(360) 728-2235

www.kitsappublichealth.org

INTERNET ADDRESSES FOR OTHER PROGRAMS AND DOCUMENTS

Clean Water Kitsap

<http://www.cleanwaterkitsap.org>

Washington State Department of Health

<http://www.doh.wa.gov>

Washington State Department of Ecology

<http://www.ecy.wa.gov>

Water Quality Standards for Surface Waters of the State of Washington

[Chapter 173-201A WAC](#)

United States Environmental Protection Agency

<http://www.epa.gov/>