

Addendum to the 2009 Sanitary Survey Report of Birch Bay

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WASHINGTON STATE DEPARTMENT OF HEALTH
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SHELLFISH PROGRAMS

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Summary

This sanitary survey addendum reclassifies 129 acres of commercial shellfish harvest area in Birch Bay at the mouth of Terrell Creek from Prohibited to Approved. An evaluation of the growing area found lower fecal coliform levels in Terrell Creek and extensive efforts by Whatcom County, Whatcom Conservation District, the Birch Bay Shellfish Protection District and many others to find fecal coliform pollution sources and implement fixes.

Description of Growing Area

The Birch Bay Growing Area is a large embayment located on the northwest shore of Whatcom County in northern Puget Sound. Birch Bay is 2.5 miles wide and has approximately 9 miles of marine shoreline. Birch Bay consists of four classified public beaches, Point Whitehorn, Birch Bay State Park, North Terrell Creek, Birch Bay CP, and South Birch Point and two unclassified public beaches Cottonwood Beach Access and Cottonwood Park. Approximately 3,000 acres are classified Approved, 308 acres are Prohibited and 820 acres remain unclassified in the Birch Bay Growing Area. In 2008, the 129 acres around the mouth of Terrell Creek were downgraded in classification to Prohibited due to high fecal coliform levels in Terrell Creek. Map 1, page 2 shows the Birch Bay Growing Area, including the location of sampling stations, classifications and the area proposed for reclassification.

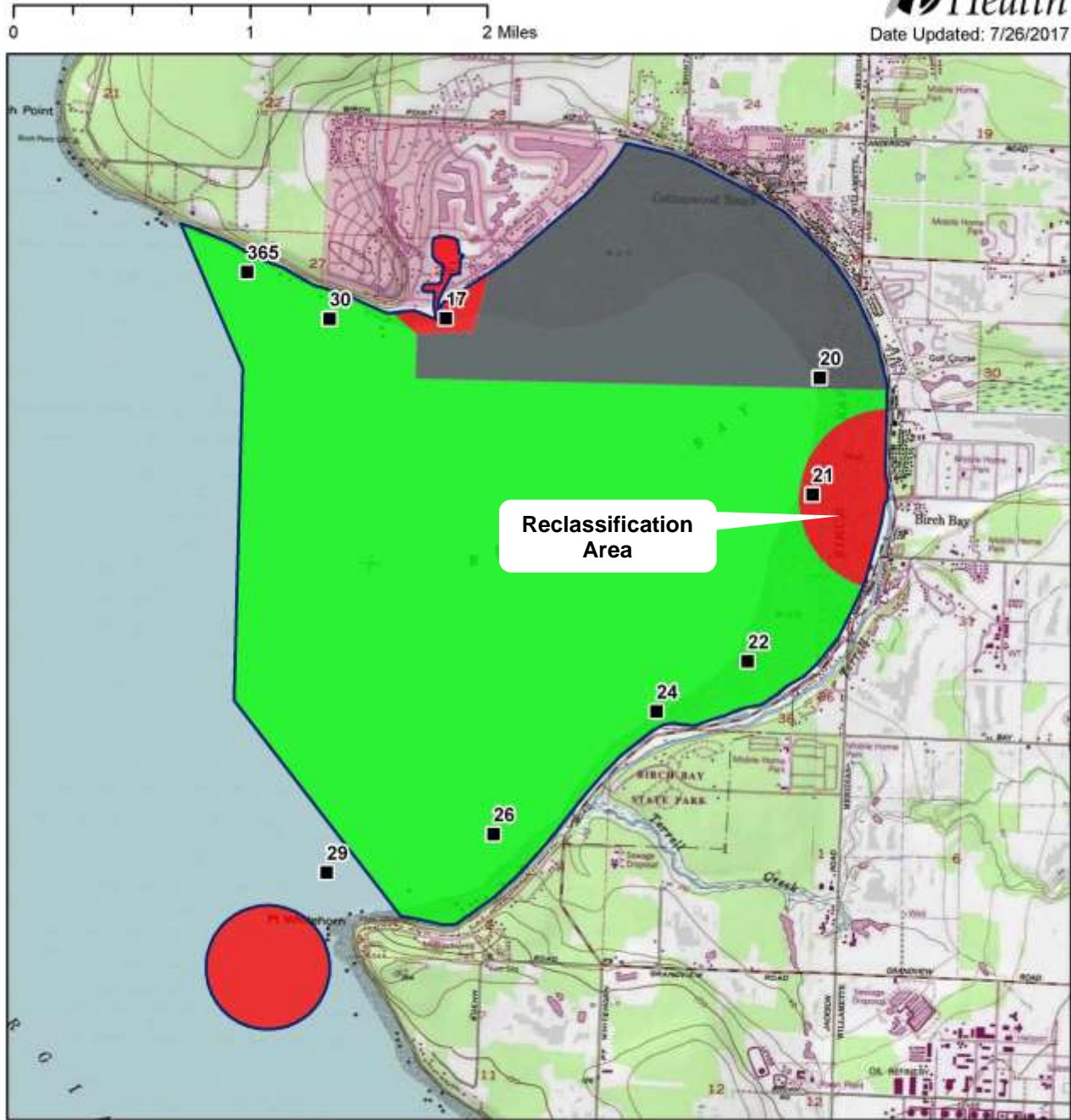
Pollution Source Survey

Whatcom County Public Works Department (WCPW) samples 16 freshwater sample locations in the Terrell Creek watershed (11 on the mainstem and 5 tributaries) twice a month for fecal coliform (Map 2, page 4). Terrell Creek is approximately 8.7 miles long with seven tributaries consisting of drainage ditches, creeks, and Terrell Lake. The Creek originates at Terrell Lake and meanders approximately 7 miles before turning and paralleling the shoreline of Birch Bay for nearly 2 miles. The tributary sites are seasonal creeks with low to no flow during the dry season.

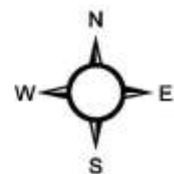
Table 1, page 3 provides water quality summary information for both last year and the last three years at the Terrell Creek watershed routine monitoring sites. Ten of the eleven mainstem sites are meeting the freshwater fecal coliform geometric mean standard (50 FC/100mL) for both the three year and one year time period. Only one mainstem site (Ter3.3) meets the 90th percentile portion (100 FC/100mL) of the standard for both the three year and one year time period, however seven sites met the 90th percentile standard for the last year. When comparing the last three years data to the last year, all eleven mainstem sites had lower geometric means and 90th percentiles during the last year showing improved water quality.

Three of the five tributary sample locations show a similar pattern of reduced fecal coliform levels (Table 1, page 3). Two sites (TribTerBC1 and TribFERN1) had higher geometric means and 90th percentiles during the last year. TribFERN1 is a seasonal creek in the upper watershed that discharges upstream of Ter8.4. A windshield survey of small farms was recently completed in this drainage and bracket sampling, community outreach and technical assistance is planned in the wet season. TribTerBC1 is a small seasonal tributary discharging into Terrell Creek between Ter0.7 and Ter0.1* and is included in the Terrell Creek Urban Area subwatershed plan. Pollution identification and correction efforts are planned in TribTerBC1 during the wet season.

Table 2, page 4, compares fecal coliform results at the mouth of Terrell Creek (Ter0.1) from the 2008 Shoreline Survey with the results from both last year and the last three years. The 2004-2007 Terrell Creek elevated fecal coliform levels led to the downgrade in classification to Prohibited in Birch Bay, but fecal coliform levels have decreased since 2008. The 90th percentile at site Ter0.1 was 354 FC/100mL in 2004-2007, decreased to 156 FC/100mL in 2014-2017 and finally met water quality standards this last year (2016-2017) at 79 FC/100mL. The geometric mean has also decreased from 40.2 FC/100mL (2004-2007) to 26.2 FC/100mL in 2016/2017.



Classification	Sampling Stations
Approved	■
Conditional	
Prohibited	
Restricted	
Unclassified	

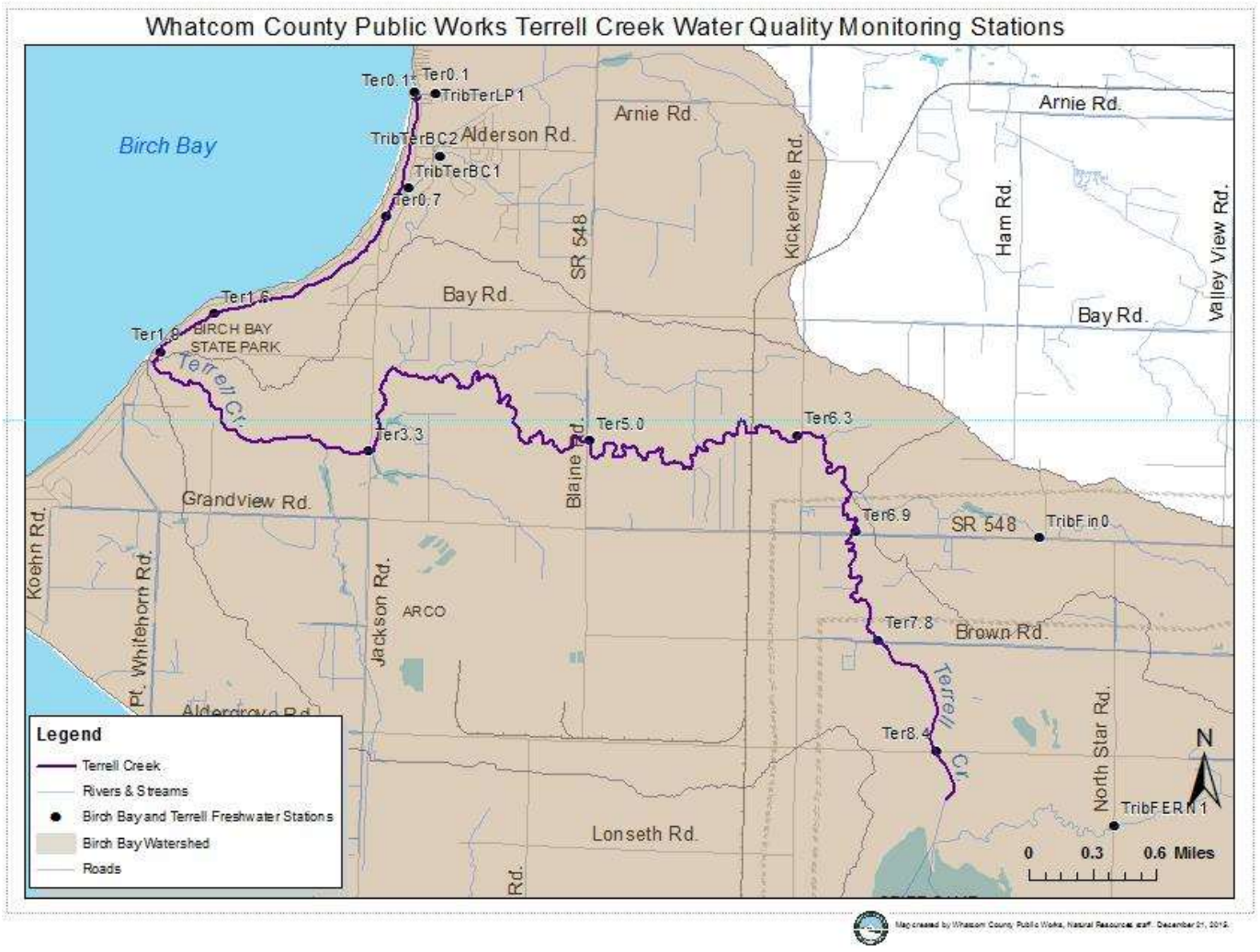


Map 1. Birch Bay Growing Area Classification and Marine Water Stations

Table 1. Whatcom County Public Works Department Freshwater Monitoring Summary Fecal Coliform Data from the Terrell Creek Watershed

Site	Last Year Fecal Coliform (2016-17)				Last Three Year Fecal Coliform (2014-17)			
	Range	Geometric Mean (FC/100mL)	90 th percentile (FC/100mL)	% exceeding 100 FC/100mL	Range	Geometric Mean (FC/100mL)	90 th percentile (FC/100mL)	% exceeding 100 FC/100mL
Mainstem Sites								
Ter0.1	2-637	26.2	79	9.1	2-637	34.9	156	14.5
Ter0.1*	2-470	25.9	102	13.6	2-691	27.3	102	11.4
Ter0.7	2-200	21.8	98	9.1	2-590	34.9	148	14.3
Ter1.6	2-928	16.1	50	4.8	2-2,100	34.2	354	18.8
Ter1.9	2-1,155	22.7	240	13.6	2-4,400	54.3	480	30.4
Ter3.3	2-33	8.4	31	0.0	2-1,028	13.8	74	7.1
Ter5.0	4-300	29.0	280	20.0	2-2,600	40.3	320	23.9
Ter6.3	2-320	26.5	144	12.5	2-14,100	47.1	292	27.1
Ter6.9	2-156	18.6	82	5.6	2-3,300	25.7	156	17.6
Ter7.8	2-70	17.4	60	0.0	2-7,300	33.1	470	19.6
Ter8.4	2-60	12.3	42	0.0	2-3,000	23.2	136	10.9
Tributary Sites								
TribTerLP1	2-1,346	39.1	322	22.7	2-2,400	71	751	41.2
TribTerBC2	2-3,000	25.0	144	13.3	2-3,000	35.4	182	20.5
TribTerBC1	2-1,755	98.5	620	46.2	2-1,755	88.1	534	39.4
TribFin0	2-340	30.8	180	15.4	2-6,200	58.2	1,080	28.9
TribFern1	7-2,400	137.1	1,001	53.8	2-3,700	98.9	1,416	39.5

The standard for Extraordinary Primary Contact Recreation is fecal coliform geometric mean not greater than 50 organisms / 100 mL with an 90th percentile not greater than 100 organisms / 100 mL. The above table shows bacteriological results in relation to program standards.



Map 2. Whatcom County Public Works Department Freshwater Monitoring Sites in the Terrell Creek Watershed

Table 2. Comparison of Fecal Coliform) Results (FC/100mL) at the Mouth of Terrell Creek (Ter0.1)

	(2004-2007)	(2014-2017)	(2016-2017)
Number of Samples	22	36	12
Minimum	<1.8	<2.0	<2.0
Maximum	520	637	637
Geometric Mean	40.2	34.9	26.2
90 th Percentile	354	156	79

In 2015, the Leisure Park drainage (TribTerLP1) was identified with elevated fecal coliform levels during the dry season with low flows. In the spring 2016, a human sewage scent trained dog was used to investigate this drainage and the dog alerted along the lower portion of the tributary. The WCPW conducted follow up bracket sampling of the drainage to find the potential pollution sources. The side sewer as-built and home permits were reviewed in this watershed. A dye study of the sewage system was completed at one property with incomplete records and was determined to be working properly. In the spring 2017, Microbial Source Tracking analysis was completed for human biomarkers at an upper and lower site on the Leisure Park drainage. No human or pet sources were identified and both the geometric mean and 90th percentile were lower in 2016-17 versus the last three years.

The overall improvements in fresh water quality in Terrell Creek was in response to efforts by Whatcom County Public Works Department (WCPW), the Birch Bay Watershed and Aquatic Resources Management District (BBWARM), the Whatcom County Conservation District (WCD), state agencies, and the Birch Bay Shellfish Protection District to reduce bacteria loading in the watershed. The WCPW and WCD received EPA grant funding from 2010 to 2015 to implement a Terrell Creek Landowner Stewardship Program (part of the Chums of Terrell Creek) which provides technical assistance to assess non-dairy agricultural activities, septic system maintenance and operation practices, and fixes identified fecal coliform problems. This program included 48 landowner contacts, 26 farms assessed, 5,729 feet of exclusion fencing installed, 5 manure storage facilities installed, 4 heavy use areas installed or enhanced, 56,630 feet of riparian area improved and protected and over 27,000 native plants established. Additionally nine septic systems were inspected with three repaired and two replaced through the Stewardship Program through a partnership with the Whatcom County Health Department.

Whatcom County Health Department continues to implement their onsite septic system operation and maintenance program, which requires system evaluations of all property transfers and notifications are mailed to landowners as a reminder for regular system inspections. From 2015 – 2017, six onsite septic systems were repaired and three systems were connected to sewer. In addition, a variety of stormwater management actives are implemented throughout the Birch Bay urban area as parts of the BBWARM program and Whatcom County's NPDES Phase II Municipal Stormwater Permit. From 2015 to date, 827 inspections were completed, 298 of those inspections required maintenance actions, and 323 catch basins were cleaned; 42 repaired and 1 replaced.

In January 2014, a small dairy had a manure discharge event in Terrell Creek as a result of poor management. This discharge entered the Kickerville Road ditch in the upper portion of the watershed and impacted bacterial levels in Terrell Creek from site Ter6.3 (creek mile 6.3) downstream to the mouth of the creek. In response, Washington State Department of Agriculture (WSDA) and WCD worked with the dairy operator to identify problems and necessary changes in management practices. To rule out other sources of pollution from adjacent properties, Whatcom County Health Department repaired/replaced two septic systems and one small farm received technical assistance from WCD resulting in improved manure management.

After the 2014 dairy discharge event, WSDA increased their site visits and identified a manure application with discharge to Brown Road ditch in November 2015. It was not confirmed that the discharge to Brown Road ditch reached Terrell Creek. The WSDA has conducted more frequent inspections of the dairy facility along with water quality sampling to determine compliance with a settlement agreement from the 2014 discharge. While the facility and operational issues remained from 2014-2017, no substantial discharge has been documented since the spring of 2014. Currently, the small dairy is no longer operating, but still has a few animals. The WCPW and WSDA intends to continue monitoring this area and respond to any changes in the farm's operations.

Water Quality Studies

Table 3, page 7 summarizes and provides individual fecal coliform results from the last 30 water samples collected at Marine Water Station 21. Marine Water Station 21 easily meets the National Shellfish Sanitary Program standard for an Approved classification with an estimated 90th percentile of 10.0 FC/100mL. Elevated bacterial levels in marine samples are infrequent and random under normal conditions.

Conclusions

As a result of improvements in fresh water quality in Terrell Creek and pollution identification and correction actions in the watershed this report recommends reclassifying 129 acres of the Birch Bay Growing Area at the mouth of Terrell Creek from Prohibited to Approved. Map 3, on page 8, displays the proposed classification change.

The GPS coordinates for the reclassified Approved area are as follows:

A radius of 670 yards extending in each shoreline direction from the mouth of Terrell Creek, which is located at 48.9265° N, 122.7454° W.

Table 3. Individual Sample Results for Marine Water Station 21 in Birch Bay

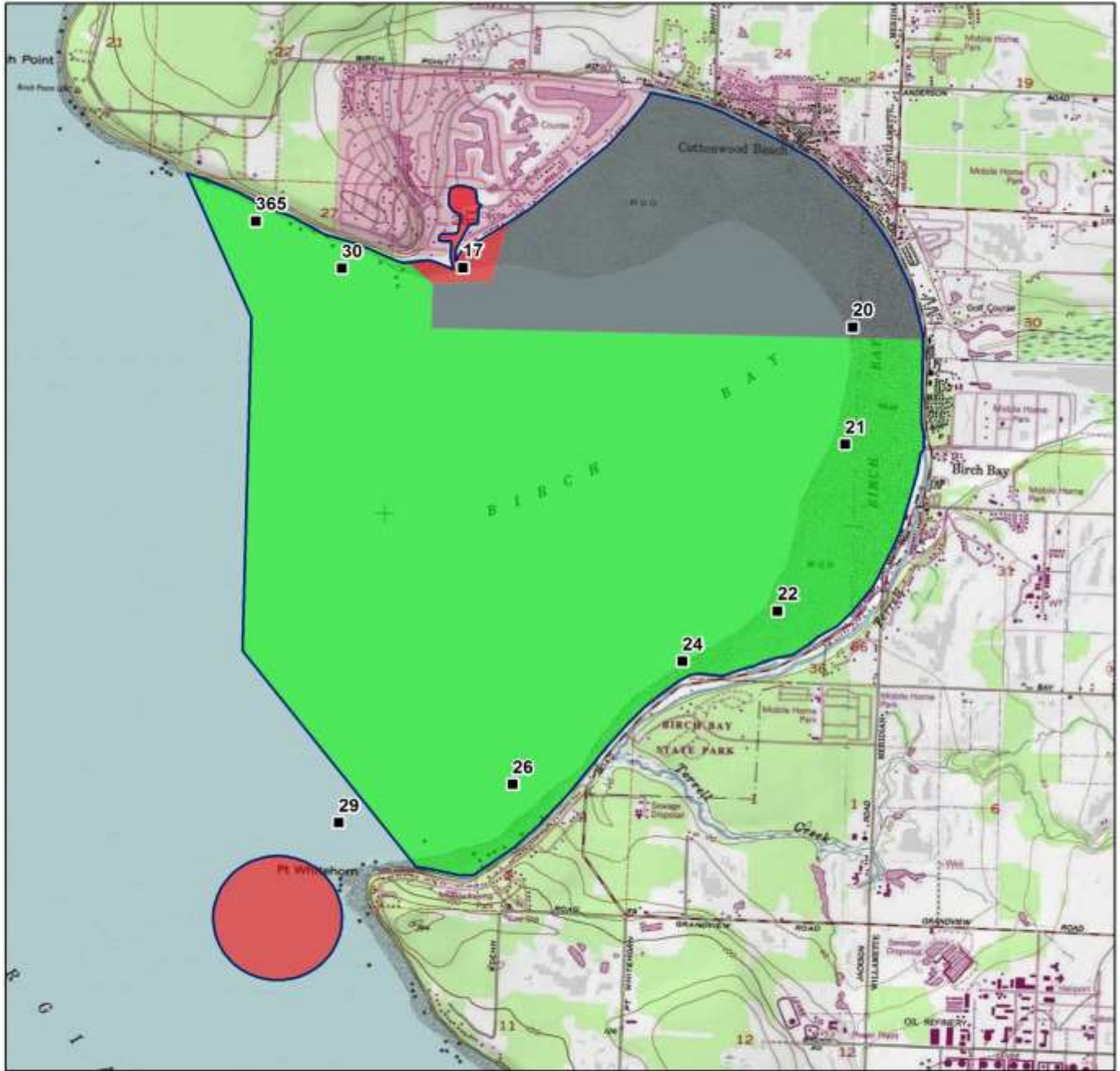
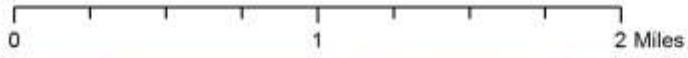
Station 21

Classification: Prohibited
 Meets Standard*: Yes
 Total Samples: 30

Range (FC/100 mL): 1.7 – 49.0
 GeoMean (FC/100mL): 3.0
 E90th (FC/100mL): 10.0

Sample Date	Event Type	Time	Tide	Surface Water Temperature	Salinity (ppt)	Fecal Coliform (FC/100mL)
10/23/2012	Regulatory	10:53	Flood	9	32	2.0
12/11/2012	Regulatory	11:01	Flood	7	30	11.0
02/21/2013	Regulatory	15:22	Ebb	7	30	1.7
04/04/2013	Regulatory	12:57	Ebb	11	30	6.8
06/18/2013	Regulatory	10:28	Flood	17	25	1.7
08/14/2013	Regulatory	11:25	Flood	19	25	1.7
10/15/2013	Regulatory	11:44	Flood	11	30	1.7
12/10/2013	Regulatory	14:06	Ebb	6	30	4.5
01/22/2014	Regulatory	13:25	Ebb	8	30	23.0
03/11/2014	Regulatory	12:18	Flood	9	28	1.7
05/06/2014	Regulatory	10:49	Ebb	12	30	2.0
09/03/2014	Regulatory	10:31	Flood	16	27	2.0
09/17/2014	Regulatory	11:17	Flood	14	30	1.7
11/19/2014	Regulatory	13:55	Flood	10	25	1.7
02/03/2015	Regulatory	11:56	Flood	9	15	2.0
03/31/2015	Regulatory	13:39	Flood	11	30	7.8
06/09/2015	Regulatory	10:50	Flood	17	20	4.5
08/24/2015	Regulatory	14:05	Flood	19	25	1.7
10/20/2015	Regulatory	13:16	Ebb	13	30	49.0
12/01/2015	Regulatory	12:20	Ebb	8	30	1.7
01/20/2016	Regulatory	09:54	Flood	8	32	4.5
03/29/2016	Regulatory	11:38	Ebb	11	30	1.7
05/03/2016	Regulatory	10:07	Ebb	15	24	1.7
07/28/2016	Regulatory	15:20	Ebb	21	20	2.0
09/14/2016	Regulatory	11:12	Flood	17	26	1.7
11/09/2016	Regulatory	11:35	Flood	12	27	22.0
02/08/2017	Regulatory	14:21	Flood	4	28	1.7
04/05/2017	Regulatory	10:38	Flood	9	27	1.7
06/21/2017	Regulatory	15:09	Flood	17	20	1.7
08/30/2017	Regulatory	15:06	Flood	19	23	1.7

*The standard for approved shellfish growing waters is fecal coliform geometric mean not greater than 14 organisms / 100 mL with an estimated 90th percentile not greater than 43 organisms / 100 mL. The above table shows bacteriological results in relation to program standards.



Classification	Sampling Stations
Approved	
Conditional	
Prohibited	
Restricted	
Unclassified	



* Some sampling stations are highlighted with grey box for ease of reading.

Map 3. Proposed Reclassification of the Birch Bay Growing Area