Sequim-Dungeness Clean Water District
Pollution Identification & Correction Plan
Trends Monitoring Program
Annual Report
May 2016 - March 2017

***Prepared by*:**
Clallam County Health & Human Services, Environmental Health Section
and Clallam County Roads, Streamkeepers Program

June 2017

Funding provided by DOH contract C17104

Sequim-Dungeness Clean Water District
Pollution Identification & Correction Plan
Trends Monitoring Program
Annual Report
May 2016 - March 2017

In May 2015, Clallam County Environmental Health, with the assistance of staff and volunteers from Streamkeepers of Clallam County, initiated a monthly Trends Monitoring project in the Sequim-Dungeness Clean Water District (District) as part of the Pollution Identification and Correction (PIC) Plan that had been devised for the District in 2014 (Clallam Conservation District 2014). The study area covered all streams within the District, which is a shellfish protection district formed after the downgrade of commercial growing areas in Dungeness Bay in 2000, and is basically equivalent to the Marine Recovery Area (MRA) designated by Clallam County in 2007. This is the second annual PIC Trends Monitoring report.[1]

Sampling Approach and Results

The objective of the Trends Monitoring program is to consistently monitor long-term water quality in order to evaluate trends at or near the mouths of waterways throughout the District. This information helps prioritize waterways for further targeted investigation and eventual pollution cleanup. Further, trends monitoring builds upon at least two decades of prior water quality studies. As in past investigations, we focused on water quality parameters associated with human sewage and animal waste such as fecal coliforms and nutrients.

Sampling locations were chosen as close to the discharge points of the streams as practical given ownership, access, and tidal conditions. Twelve streams were designated Tier 1 sites and nine streams were designated Tier 2 sites. Tier 1 sites were sampled monthly for both fecal coliforms (fecals) and nutrients (NH4, NO2, NO3, TN, PO4, TP, and silicates), and Tier 2 sites were sampled quarterly (January, April, August, November) for fecals only.

In addition to bacteria and nutrients sampling, temperature, dissolved oxygen, pH, conductivity, salinity, turbidity, and barometric pressure were recorded at all sample sites. Discharge was recorded for the Dungeness River and McDonald Creek given the availability of real-time gauges. Elsewhere, stream water level (stage) measurements were taken. Table 1 describes sites and sampling conducted while Figures 1-3 show sample site locations.

[1] This report covers eleven months as April 2016 data have been included in the 2015-2016 annual trends monitoring report.

Table 1. Site locations and type of sampling performed from May 2016 - March 2017.

Tier 1 sites were sampled monthly for fecal coliforms (F) and nutrients (N), and Tier 2 sites were sampled quarterly for fecal coliforms only. At all sites, standard water quality measurements were taken of temperature, dissolved oxygen, pH, conductivity, salinity, turbidity, and barometric pressure, though the project QAPP (Chadd and Bond 2015) called for temperature and salinity measurements only.

Dung. Bay/R. = Dungeness Bay/River; Seq. Bay = Sequim Bay; SJF = Strait of Juan de Fuca

Tier	Stream/Site Name	Receiving Waters	5/16	6/16	7/16	8/16	9/16	10/16	11/16	12/16	1/17	2/17	3/17
1	Dungeness 0.7	Dung.Bay	F	F	F	F	F	F	F	F	F	F	F
			N	N	N	N	N	N	N	N	N	N	N
1	Meadowbrook 0.1, 0.2, 0.6, 1.8***	Dung.Bay	F	F	F	F	F	F	F	F	F	F	F
			N	N	N	N	N	N	N	N	N	N	N
1	Meadowbrook Slough 0.23	Dung.Bay	F	F	F	F	F	F	F	F	F	F	F
			N	N	N	N	N	N	N	N	N	N	N
1	Golden Sands Slough 0.0	Dung.Bay	F	F	F	F	F	F	F	F	F	F	F
			N	N	N	N	N	N	N	N	N	N	N
1	Cooper 0.1	Dung.Bay	F	F	F	F	F	F	F	F	F	F	F
			N	N	N	N	N	N	N	N	N	N	N
1	Cassalery 0.0/0.6 (depending on tidal conditions)	Dung.Bay	F*	F	F	F	F	F	F	F	F	F	F
			N	N	N	N	N	N	N	N	N	N	N
1	Matriotti 0.3a	Dung. R.	F*	F	F	F	F	F	F	F	F	F	F
			N	N	N	N	N	N	N	N	N	N	N
1	Lotzgesell 0.1	Dung. R.	F	F	F	F	F	F	F	F	F	F	F
			N	N	N	N	N	N	N	N	N	N	N
1	Sequim Bay State Park Creek 0.0	Seq. Bay	F	F	F	F	**	F	**	F	F	F	**
			N	N	N	N		N		N	N	N	
1	Bell 0.2	Seq. Bay	F	F	F	F	F	F	F	F	F	F	F
			N	N	N	N	N	N	N	N	N	N	N
1	Johnson 0.0	Seq. Bay	F	F	F	F	F	F	F	F	F	F	F
			N	N	N	N	N	N	N	N	N	N	N
1	Jimmycomelately 0.15	Seq. Bay	F	F	F	F	F	F	F	F	F	F	F
			N	N	N	N	N	N	N	N	N	N	N
2	Bagley 0.7a	SJF				F			F		F		
2	Siebert 1.0	SJF				F			F		F		
2	Agnew Ditch @1079 Finn Hall Rd	SJF				F			F		F		
2	McDonald 01.6	SJF				F			F		F		
2	Hurd 0.2	Dung. R.				F			F		F		
2	Gierin 1.8	Dung.Bay	F*			F			F		F		
2	Dean 0.17	Seq. Bay				F			F		F		
2	No Name 0.03	Seq. Bay				F			F		F		
2	Chicken Coop 0.24	Seq. Bay				F			F		F		

*One special tour was undertaken in May 2016 to follow up on April 2016 results.
** Sequim Bay State Park Creek was inaccessible for several months due to construction.
***Meadowbrook Creek was the site of the 3 Crabs Estuary Restoration Project and, subsequent to this project, the regular sampling site was changed from 0.1 to 0.2 (during construction some temporary sites were also sampled).

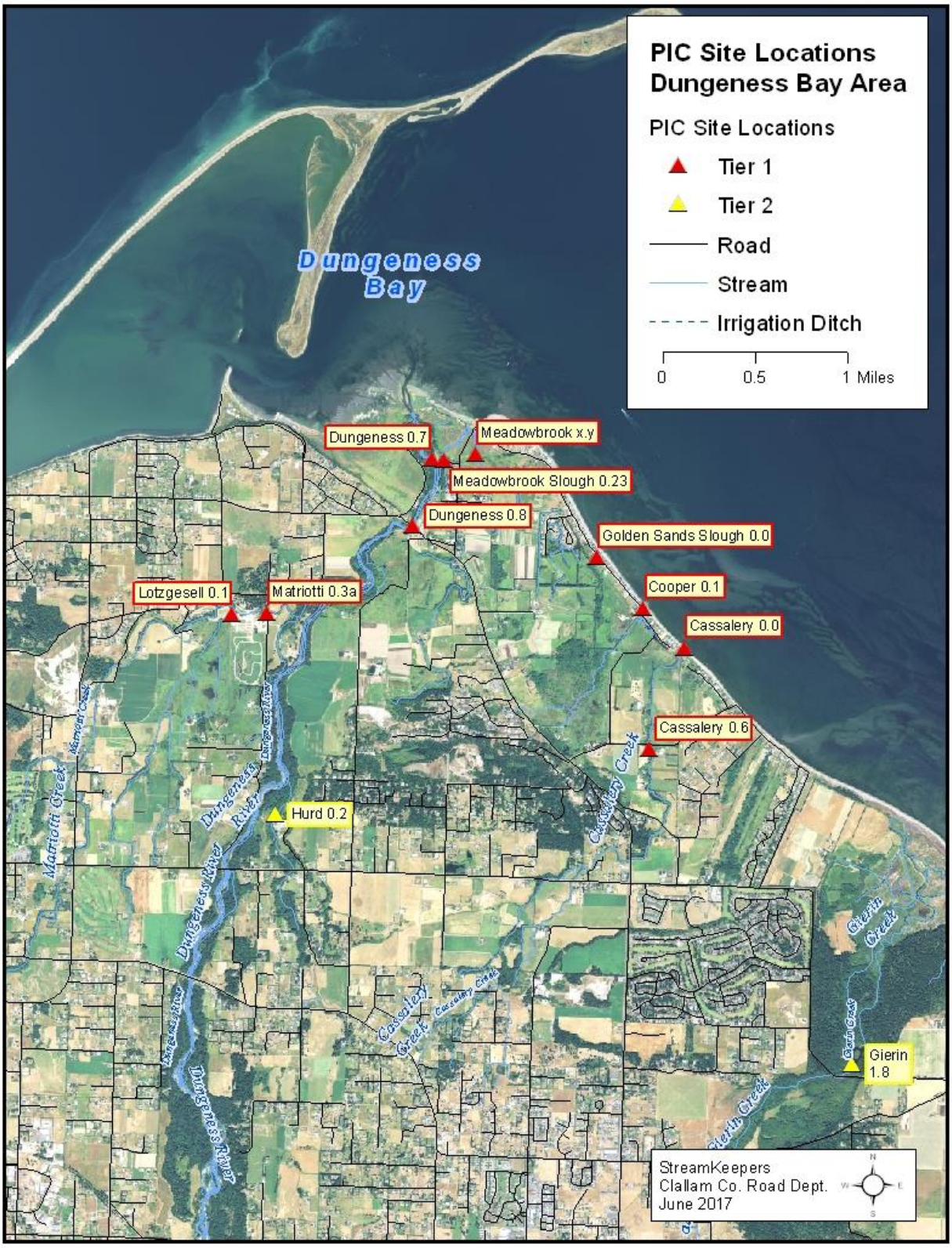

Figure 1. Sampling sites for Clean Water District PIC Trends monitoring, Dungeness Bay area. Dungeness 0.8 is the location of the Dept. of Ecology real-time flow meter from which we recorded data.

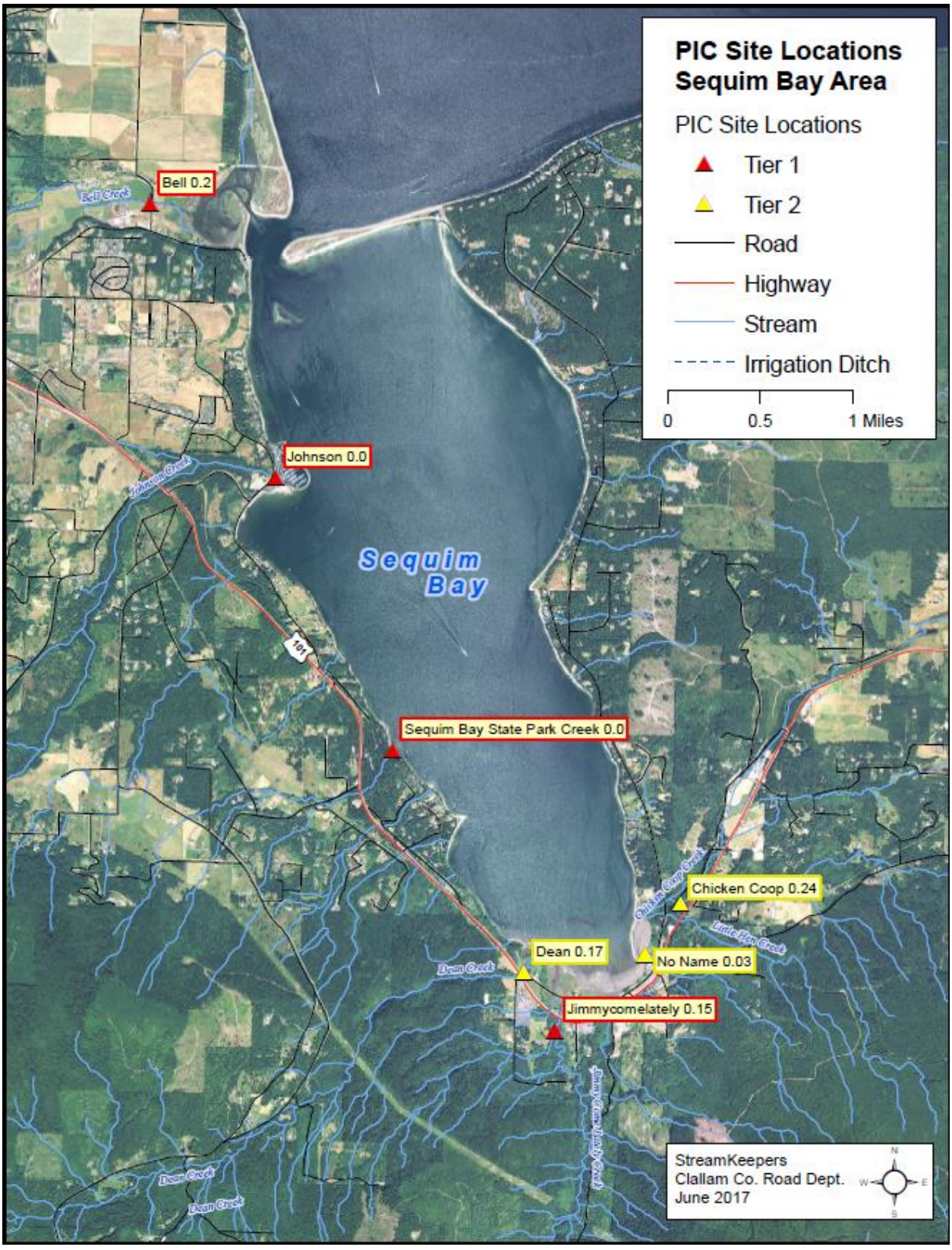

Figure 2. Sampling sites for Clean Water District PIC Trends monitoring, Sequim Bay area.

Figure 3. Sampling sites for Clean Water District PIC Trends monitoring, streams west of Dungeness Bay.

Data caveats

- Nutrients samples were analyzed by the University of Washington Marine Chemistry Lab (UW). As of 2015, the WA Dept. of Ecology no longer recognizes the validity of UW nutrients analysis procedures for data interpretation for the 303(d) list under the Clean Water Act. Hence, nutrients data are for general descriptive purposes only. We chose to use the UW lab because 1) it has traditionally been used for nutrients samples in the Clean Water District, 2) it is inexpensive and logistically more accommodating, 3) side-by-side comparisons between the UW and Ecology labs in 2013-14 showed generally good correlation (Environmental Health Services and Streamkeepers Program 2014), and 4) we do not intend to use nutrients data to guide regulatory decisions.
- Data qualifiers used are per Ecology's Environmental Information Management (EIM) system.
- No rejected (REJ) data were used in our analyses.
- Field replicates were averaged with regular samples.
- Field blanks were recorded and used for quality control (QC) analyses but were not used in this report in generating statistics or figures.

- Some of the sites are tidally influenced to varying degrees, as can be seen in the figure below presenting salinity data. We tried sampling during low-tide conditions, but this was not always possible.

Data quality analysis

Blanks Analysis

All fecal coliform blanks were non-detects. For nutrients blanks, results were as follows:

Table 2. Nutrients field blank (FB) results and QC analysis. Synthesized Reporting Limit (RL) is the larger of (3.18 * the lab's reported Minimum Detection Limit [MDL] for that year) OR (FB mean + 1 Standard Deviation), per Chadd and Bond, 2015. FB means and standard deviations are based on the entire dataset for the PIC Trends project. Blanks > the RL are highlighted; results corresponding to these cases have been qualified per the QAPP.

All values in µg/l	[PO_4-P]	[SiO_4-Si]	[NO_3-N]	[NO_2-N]	[NH_4-N]	TP	TN
17-May-16	0.1	2.4	0.3	0.2	12.0	1.6	59.8
21-Jun-16	0.0	19.6	58.1	-0.1	2.0	0.1	137.6
19-Jul-16	0.4	2.0	0.0	0.1	2.4	4.5	88.4
15-Aug-16	0.3	0.0	2.4	0.2	4.0	1.8	28.6
20-Sep-16	2.1	69.3	4.7	0.0	8.3	2.2	104.0
18-Oct-16	0.0	6.5	0.0	0.0	3.6	1.5	56.4
14-Nov-16	1.2	11.0	1.3	0.0	12.0	4.6	121.8
13-Dec-16	0.0	2.4	1.3	0.0	3.0	1.1	42.9
09-Jan-17	0.3	6.6	0.0	0.0	0.6	1.3	51.2
14-Feb-17	0.8	15.9	5.4	0.1	10.3	1.6	25.0
14-Mar-17	0.3	5.1	0.1	0.0	0.9	2.2	77.4
FB means 2015-17	**0.6**	**20.4**	**3.3**	**0.1**	**3.5**	**2.0**	**66.7**
St Dev of field blanks	**0.6**	**23.5**	**12.0**	**0.1**	**3.7**	**1.7**	**32.0**
2015 MDL(ug/L)	0.5	13.2	2.0	0.3	0.5	0.5	4.8
2016 MDL(ug/L)	0.6	17.7	6.4	0.2	1.6	0.5	4.7
2017 MDL(ug/L)	0.4	6.3	4.0	0.2	0.7	0.4	9.5
2013-14 synthesized RL	2.9	158.0	6.7	1.0	5.4	3.5	96.7
2015 synthesized RL	1.6	43.8	15.4	1.0	7.1	3.7	98.7
2016 synthesized RL	1.9	56.3	20.4	0.6	7.1	3.7	98.7
2017 synthesized RL	1.3	43.8	15.4	0.6	7.1	3.7	98.7

Field Replicate Analysis: Fecal Coliforms

Fecal coliform field replicate results passed all QC criteria, as shown below.

Table 3. Fecal coliform field replicate results and QC analysis.

Date	QC Type	Fecal CFU	Mean rep CFU	Primary/ Rep RSD%	RSD% excluded from dataset*
5/2/16	Primary_Sample	22		32.3%	
5/2/16	Field_Replicate	38	35		
5/2/16	Field_Replicate	32			
5/17/16	Primary_Sample	114		24.8%	
5/17/16	Field_Replicate	76	80		
5/17/16	Field_Replicate	84			
6/21/16	Primary_Sample			14.4%	
6/21/16	Field_Replicate	358	325		missing datum;
6/21/16	Field_Replicate	292			used the 2 reps
7/19/16	Primary_Sample	310		3.3%	
7/19/16	Field_Replicate	282	325		
7/19/16	Field_Replicate	368			
8/15/16	Primary_Sample	426		18.4%	
8/15/16	Field_Replicate	328	328		
8/15/16	Field_Replicate	328			
9/20/16	Primary_Sample	40		3.6%	
9/20/16	Field_Replicate	44	38		
9/20/16	Field_Replicate	32			
10/18/16	Primary_Sample	52		35.8%	
10/18/16	Field_Replicate	28	31		
10/18/16	Field_Replicate	34			
11/14/16	Primary_Sample	64		23.1%	
11/14/16	Field_Replicate	50	46		
11/14/16	Field_Replicate	42			
12/13/16	Primary_Sample	26			37.9%
12/13/16	Field_Replicate	12	15		
12/13/16	Field_Replicate	18			
1/9/17	Primary_Sample	24		15.7%	
1/9/17	Field_Replicate	22	30		
1/9/17	Field_Replicate	38			
2/14/17	Primary_Sample	44		19.4%	
2/14/17	Field_Replicate	44	58		
2/14/17	Field_Replicate	72			
3/14/17	Primary_Sample	150		3.2%	
3/14/17	Field_Replicate	160	157		
3/14/17	Field_Replicate	154			

*** Excluded datum < 20cfu per QAPP**

Total qualifying Pairs: 11

	Total	%	% Criterion	Passed?
Pairs < 20% RSD:	**7**	**64**	**50**	**YES**
Pairs < 50% RSD:	**11**	**100**	**90**	**YES**
Pairs < 85% RSD:	**11**	**100**	**100**	**YES**

Field Replicate Analysis: Nutrients and Water Chemistry

Nutrients and water quality field replicate results passed all QC criteria, as shown below.

Table 4. Nutrients and water quality field replicate results and QC analysis. RSD = Relative Standard Deviation. *Where two criteria are listed for water chemistry parameters, values must fall within one of them.

Analyte	# data pairs	Median RSD	RSD Criterion	Max Diff Observed	Diff Criterion	Data Qualified
Ammonia	11	3.53%	15%			none
Nitrate	11	0.41%	10%			none
Nitrite	11	0.66%	10%			none
Phosphate	11	1.48%	10%			none
Silicate	11	0.97%	10%			none
Total N	10	1.32%	10%			none
Total P	10	1.22%	10%			none
		Max RSD (by pairs)				
BP	13			0.01	0.05	none
DO(mg/L)	13	0.2%	1% per pair	0.02	0.20	none
pH	13			0.10	0.20	none
Salinity	13	0.0%	5% per pair	0.00	0.02	none
Sp Cond	13	0.5%	5% per pair			none
Water Temp	13			0.10	0.20	none
Turbidity	13	15.7%	7% per pair	1.00	1.00	none*

Nutrients Laboratory Standards Checks

UW lab standards check results all passed QC criteria, as shown below.

Table 5. Laboratory nutrients standards checks QC analysis.

	PO4-P	SiO4-Si	NO3-N	NO2-N	NH4-N	TP	TN
# results*	22	22	22	22	22	11	11
StDev of % differences	0.58%	0.31%	0.49%	0.72%	1.15%	2.11%	0.68%
StDev allowable per QAPP	20%	15%	15%	20%	20%	10.00%	10.00%
# results > allowable	0	0	0	0	0	0	0
% measurements which pass QC	100%	100%	100%	100%	100%	100%	100%

* Dissolved nutrients standards are checked before and after nutrients analysis; total nutrients standards are checked only after nutrients analysis.

Deviations from QAPP

These adjustments have been made from the original QAPP (Chadd and Bond, 2015):

- Additional water quality parameters were added in September 2015, per Table 1.
- QAPP holding temperature for all laboratory samples was listed at 4°C. After correspondence with Washington Department of Ecology personnel and review of EPA 40 CFR and Standard Methods, holding temperatures were revised as follows:
    - Fecal coliform samples: 10°C

- Nutrients samples: 6°C
- Samples held less than two hours do not need to meet the above temperatures but do need to show signs of chilling down toward those temperatures.

Environmental data summary

Data are detailed in Appendix 1. The following section presents a summary of the data.

Fecal Coliforms

Water samples were stored in ice chests and analyzed at Clallam County Environmental Laboratory for fecal coliforms. Holding time was less than 8 hours. Results by site are summarized in Figure 4.

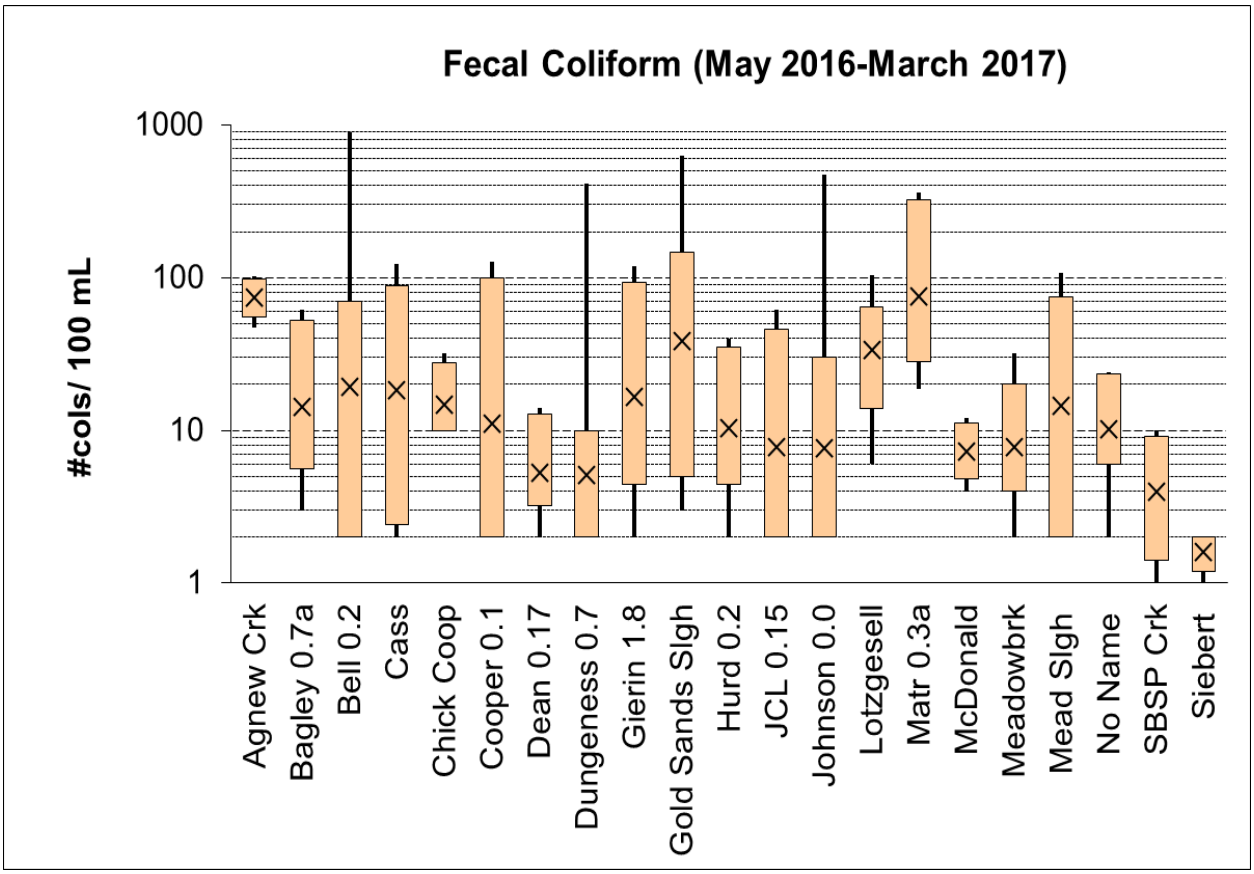

Figure 4. Fecal Coliforms. Note log scale. X marks geometric mean; bottom and top of box represent10th and 90th percentiles; ends of whiskers represent extremes.

In general, these results indicate lower fecal coliform levels than in 2015-16. Of particular interest is Golden Sands Slough, which received targeted remediation attention in 2015-17. Figure 5. Fecal Coliform values vs. time at Golden Sands Slough, in Colony-Forming Units (CFU).Figure 5 presents fecal coliforms vs. time at this site since 2010.

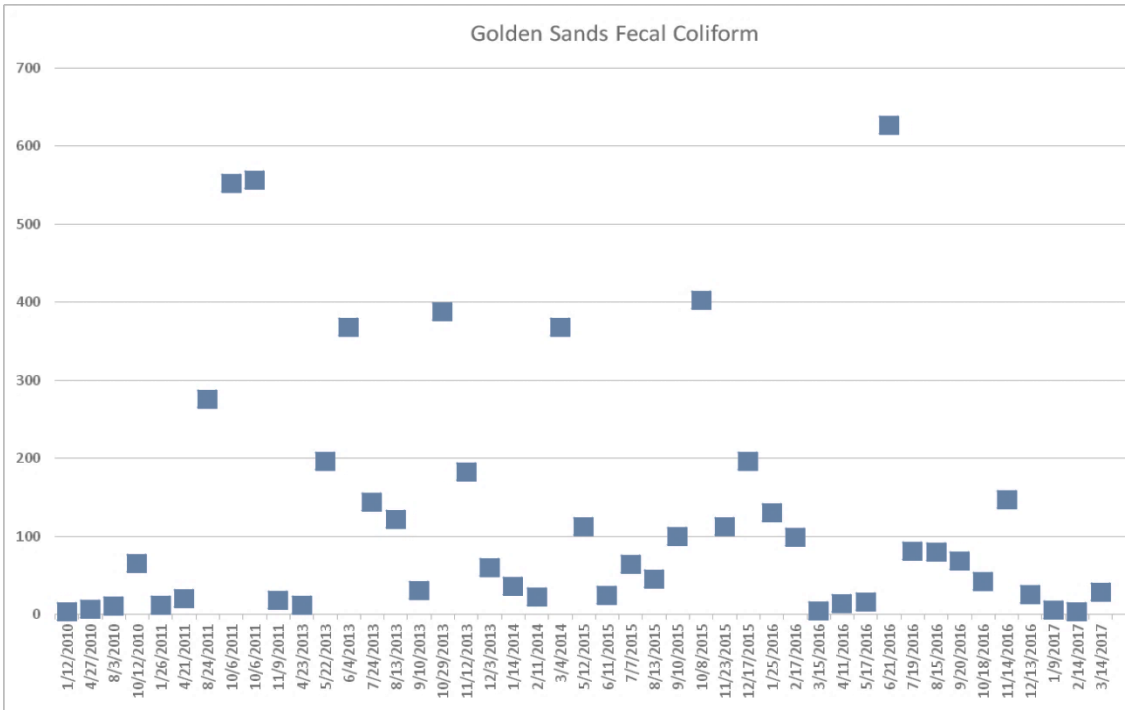

Figure 5. Fecal Coliform values vs. time at Golden Sands Slough, in Colony-Forming Units (CFU).

Nutrients: Nutrients results are summarized below. Note logarithmic graph scales.

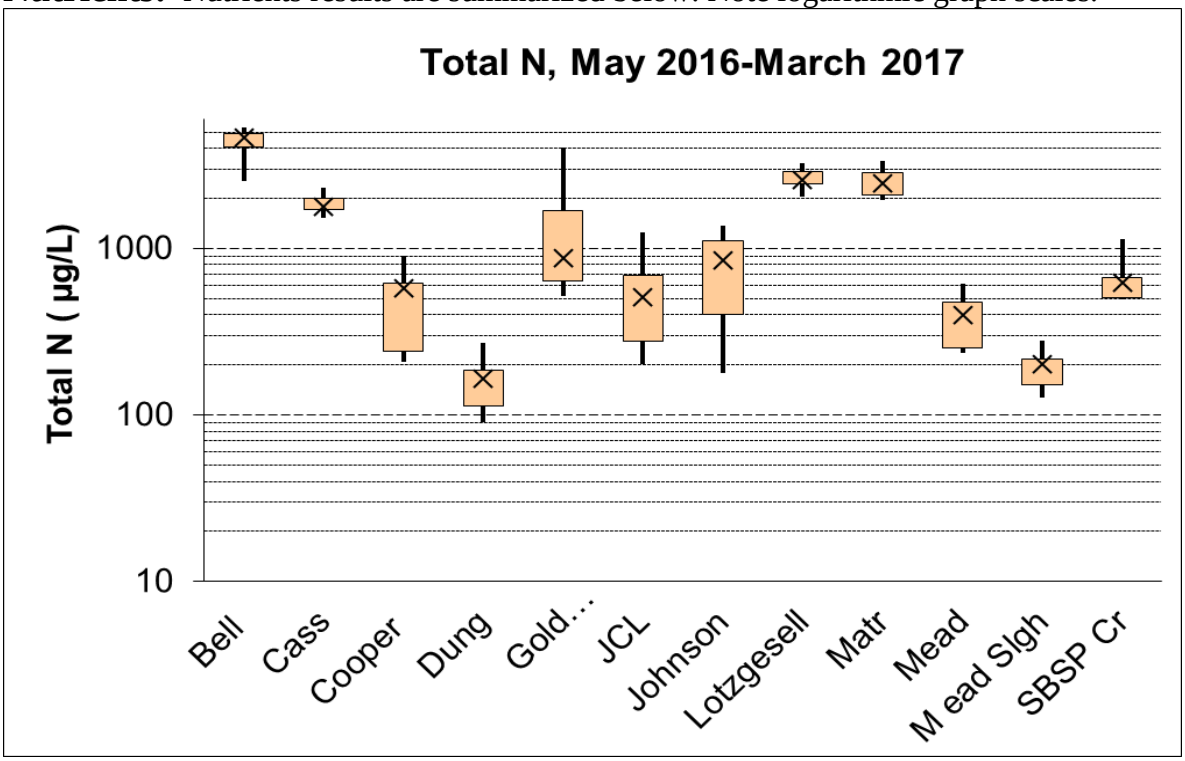

Figure 6. Total nitrogen. X marks median; bottom and top of box represent 1st and 3rd quartiles; ends of whiskers represent min. and max. values. .

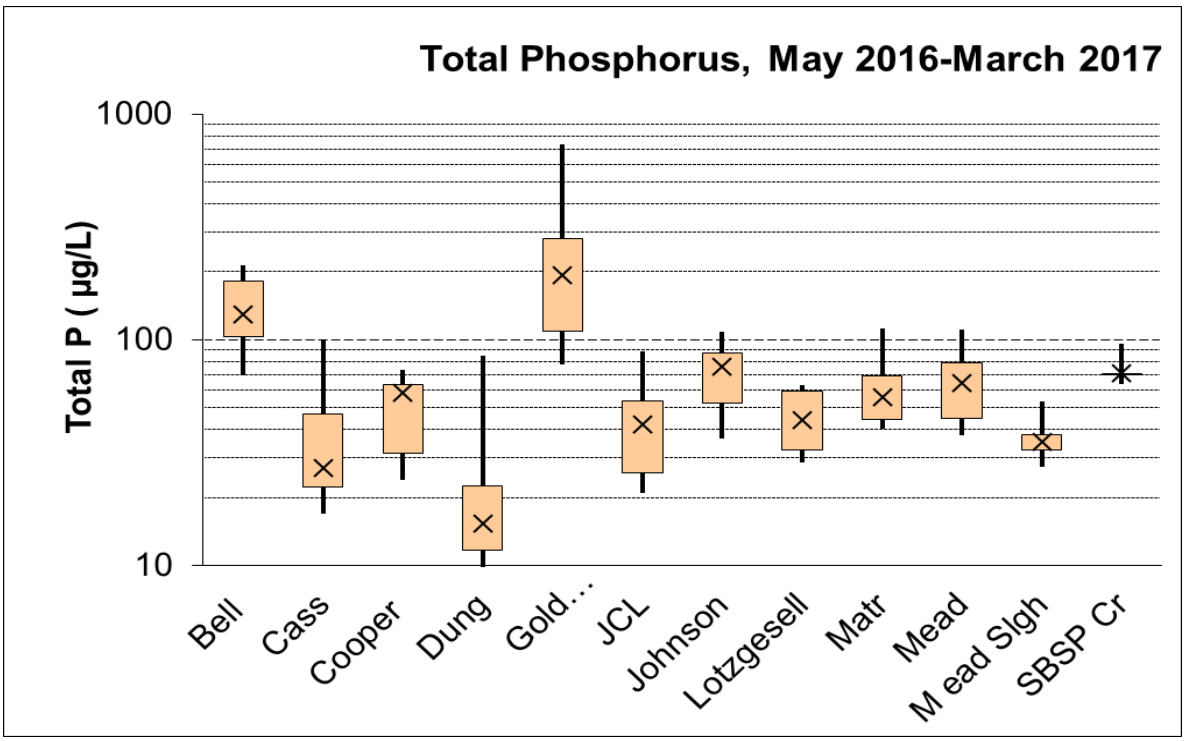

Figure 7. Total phosphorus. X marks median; bottom and top of box represent 1st and 3rd quartiles; ends of whiskers represent min. and max. values.

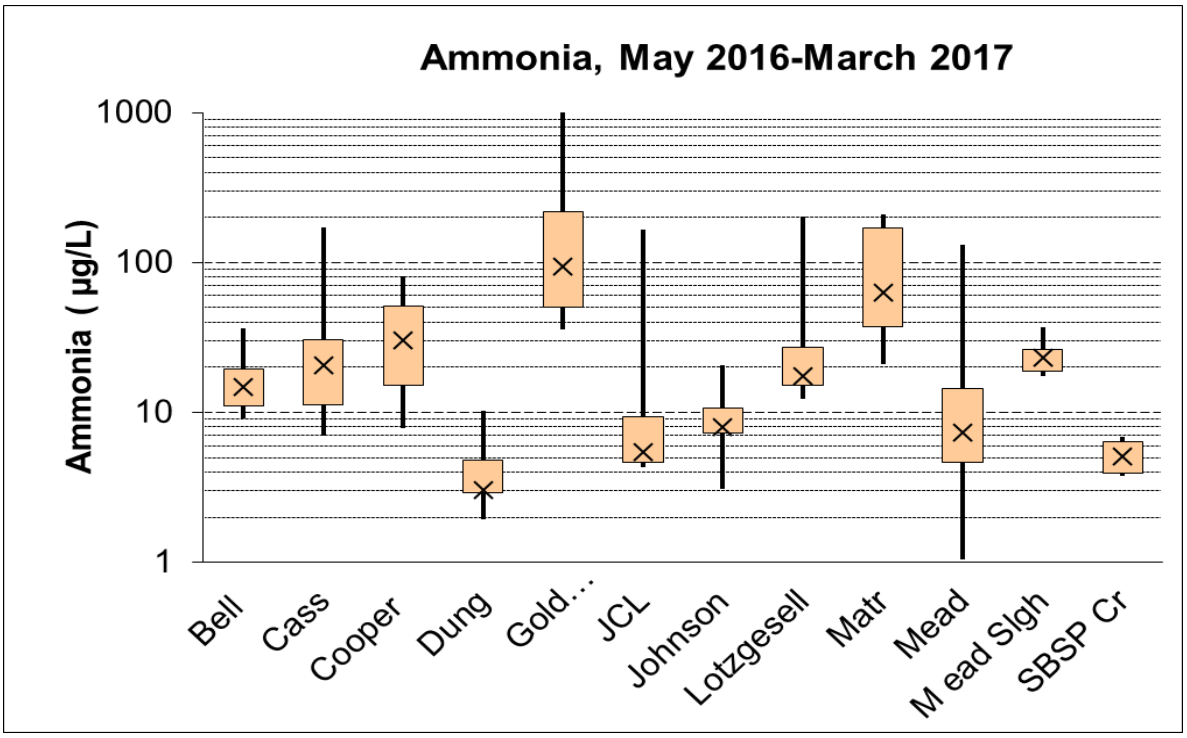

Figure 8. Ammonia (NH3). X marks median; bottom and top of box represent 1st and 3rd quartiles; ends of whiskers represent min. and max. values.

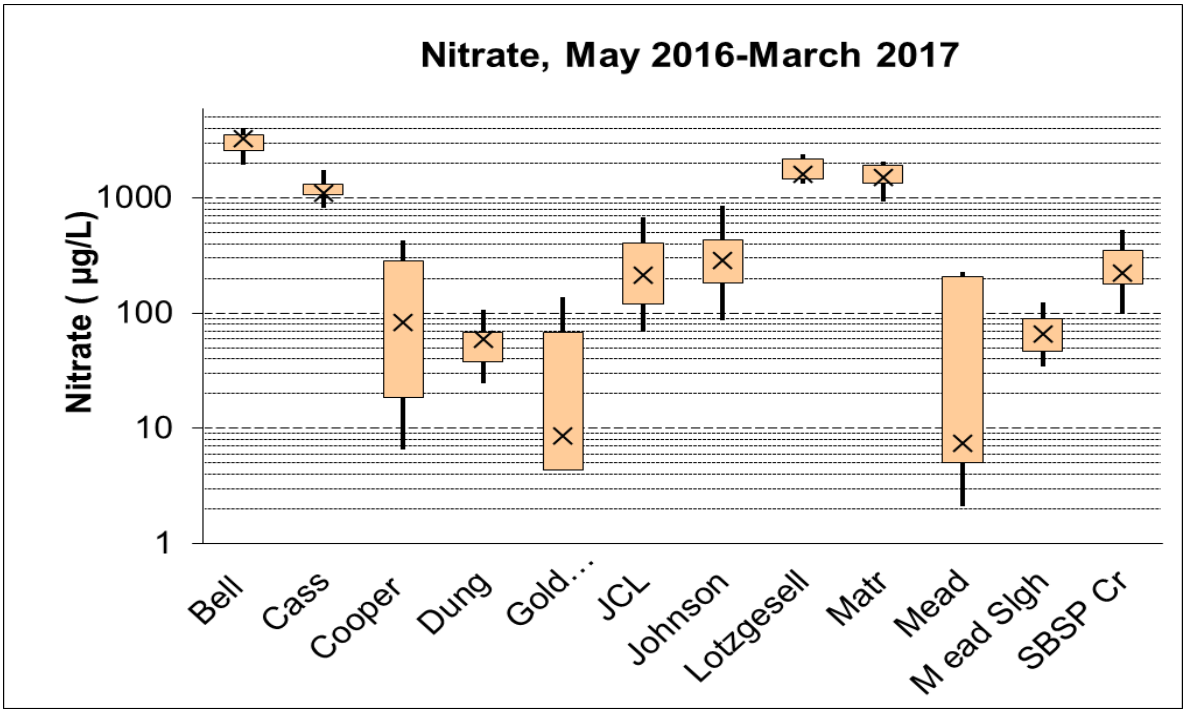

Figure 9. Nitrate as N. X marks median; bottom and top of box represent 1st and 3rd quartiles; ends of whiskers represent min. and max. values.

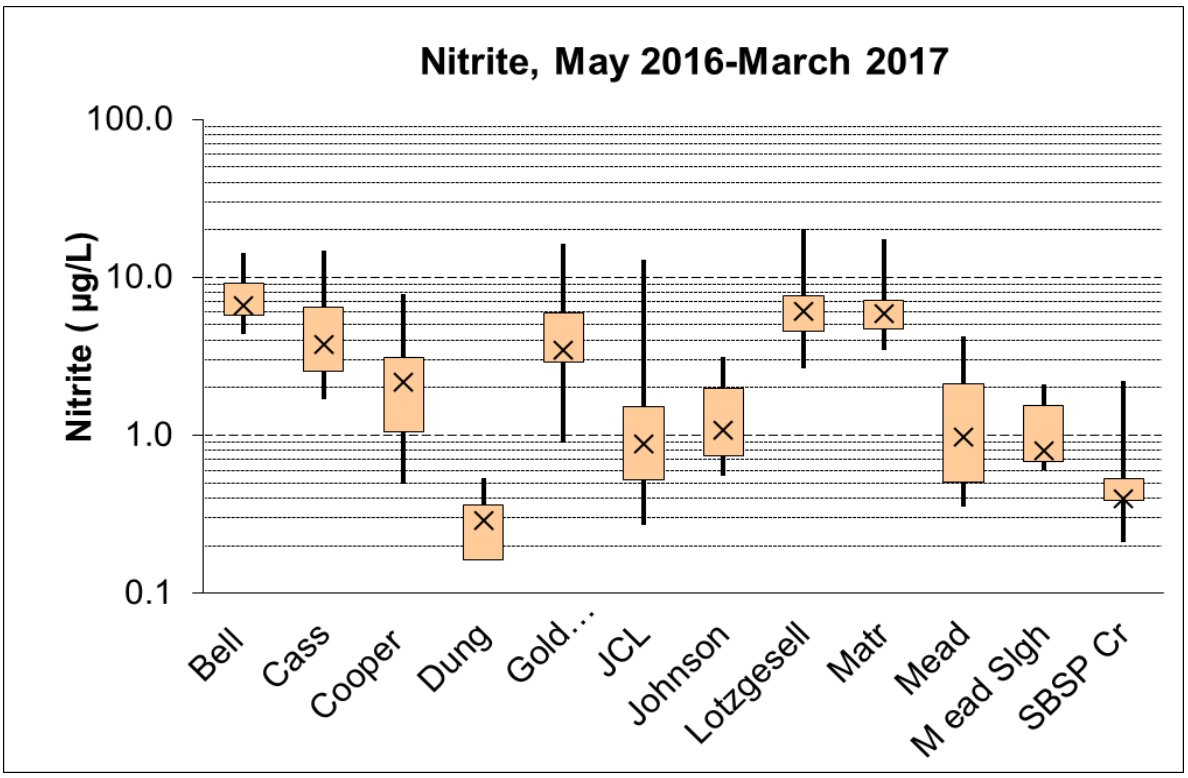

Figure 10. Nitrite as N. X marks median; bottom and top of box represent 1st and 3rd quartiles; ends of whiskers represent min. and max. values.

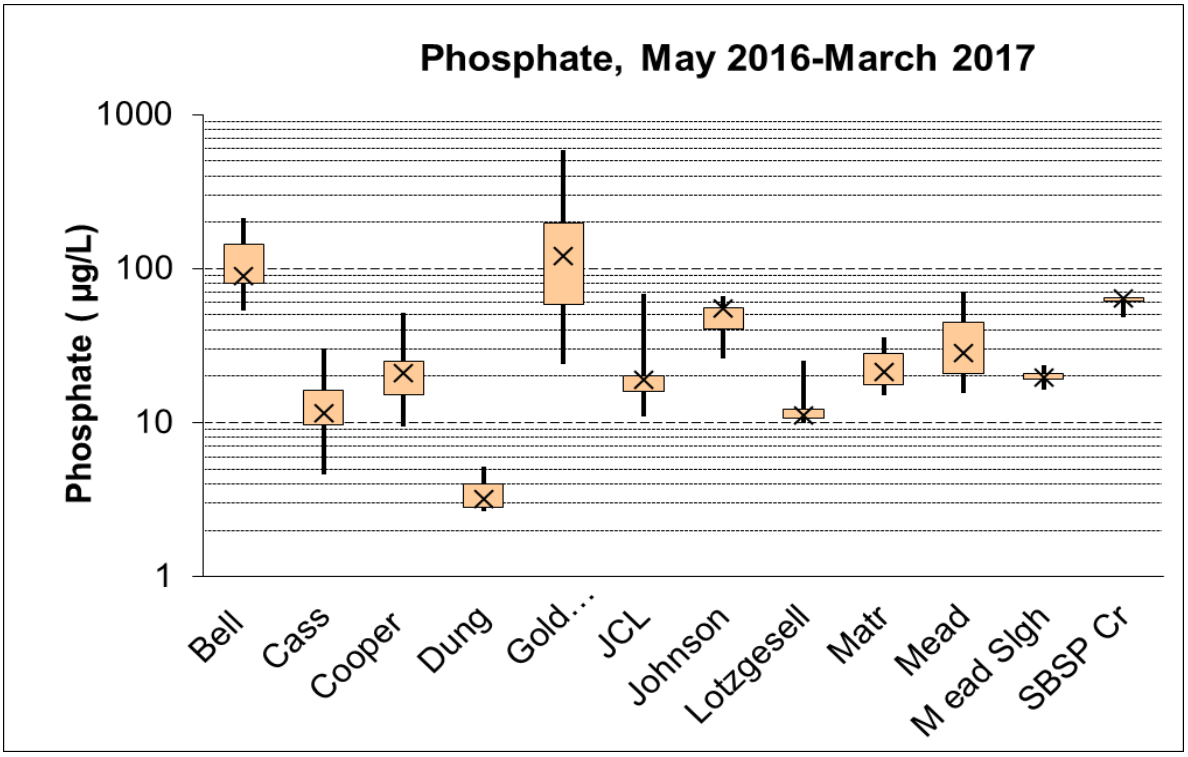

Figure 11. Phosphate as P. X marks median; bottom and top of box represent 1st and 3rd quartiles; ends of whiskers represent min. and max. values.

Water Chemistry

Common water quality parameter measurements (temperature, DO concentration, pH, conductivity, salinity, turbidity) were taken with a YSI ProDSS field meter which was calibrated prior to sampling episodes and then checked afterward. The next several figures illustrate results.

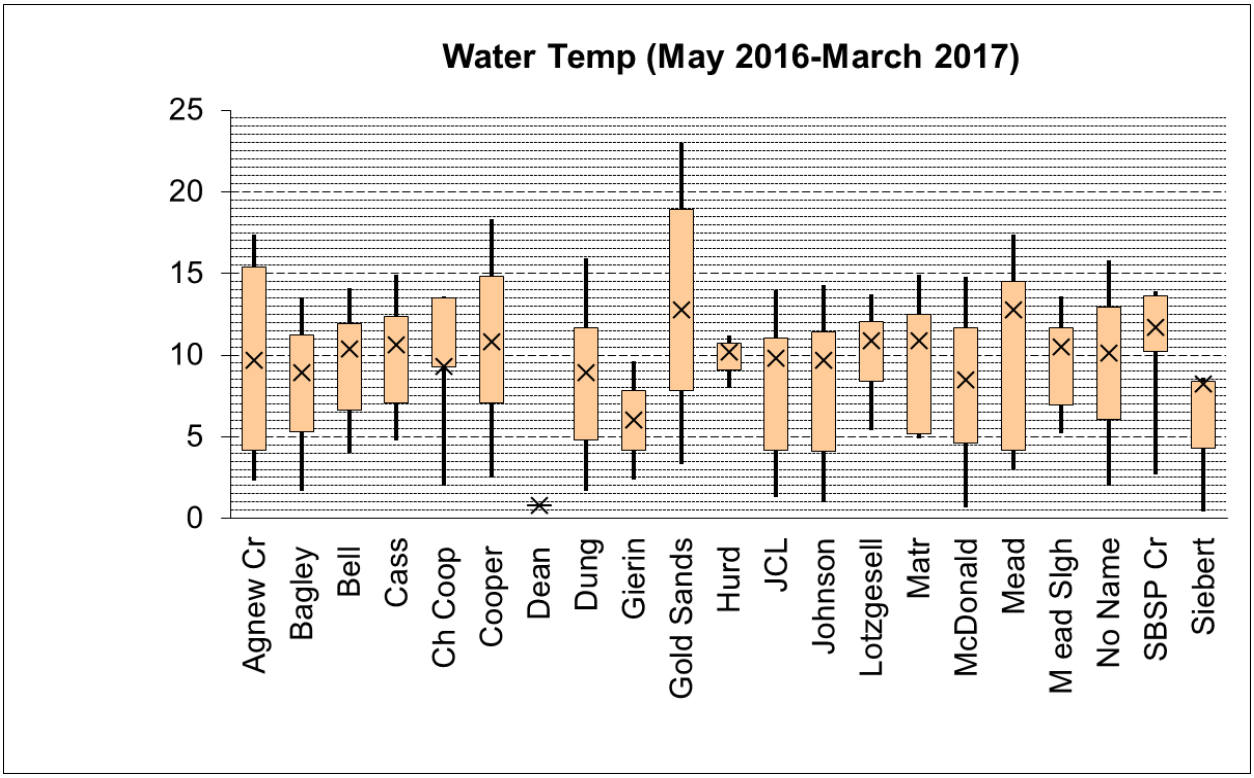

Figure 12. Water temperature. X marks median; bottom and top of box represent 1st and 3rd quartiles; ends of whiskers represent min. and max. values. For evaluative purposes, the State's maximum 7-day average of daily maxima for salmonid core summer habitat (the designated use for all these sites) is 16°C (Washington Department of Ecology 2006).

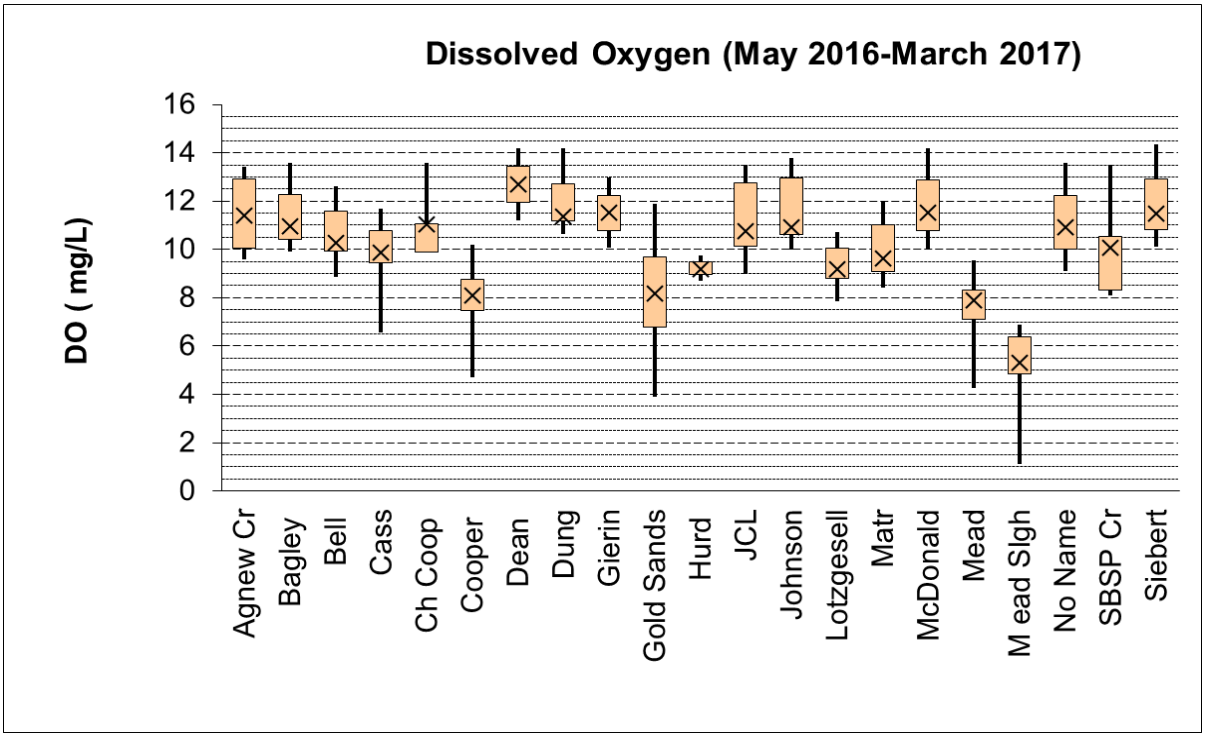

Figure 13. Dissolved Oxygen. X marks median; bottom and top of box represent 1st and 3rd quartiles; ends of whiskers represent min. and max. values. For evaluative purposes, the State one-day minimum for the salmonid core summer habitat critical period (the designated use for all these sites) is 9.5 mg/L (Washington Department of Ecology 2006).

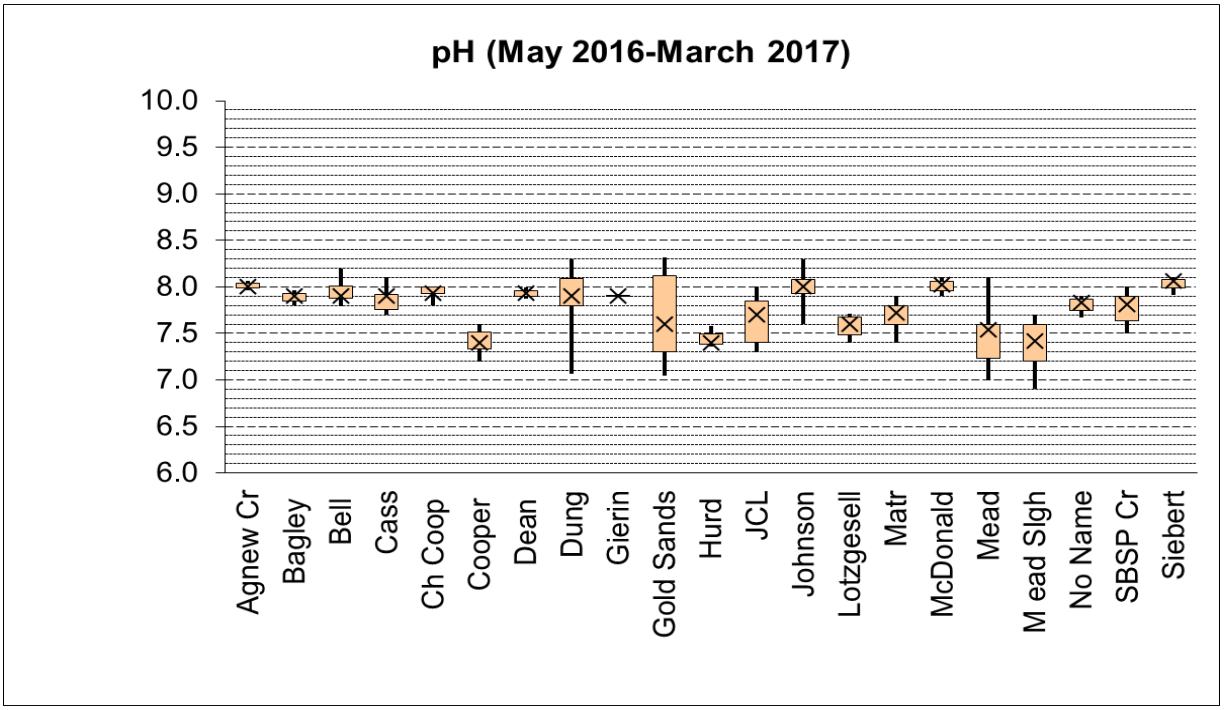

Figure 14. pH. X marks median; bottom and top of box represent 1st and 3rd quartiles; ends of whiskers represent min. and max. values. For evaluative purposes, the State standard for the designated uses of all these sites (Washington Department of Ecology 2006) is from 6.5-8.5.

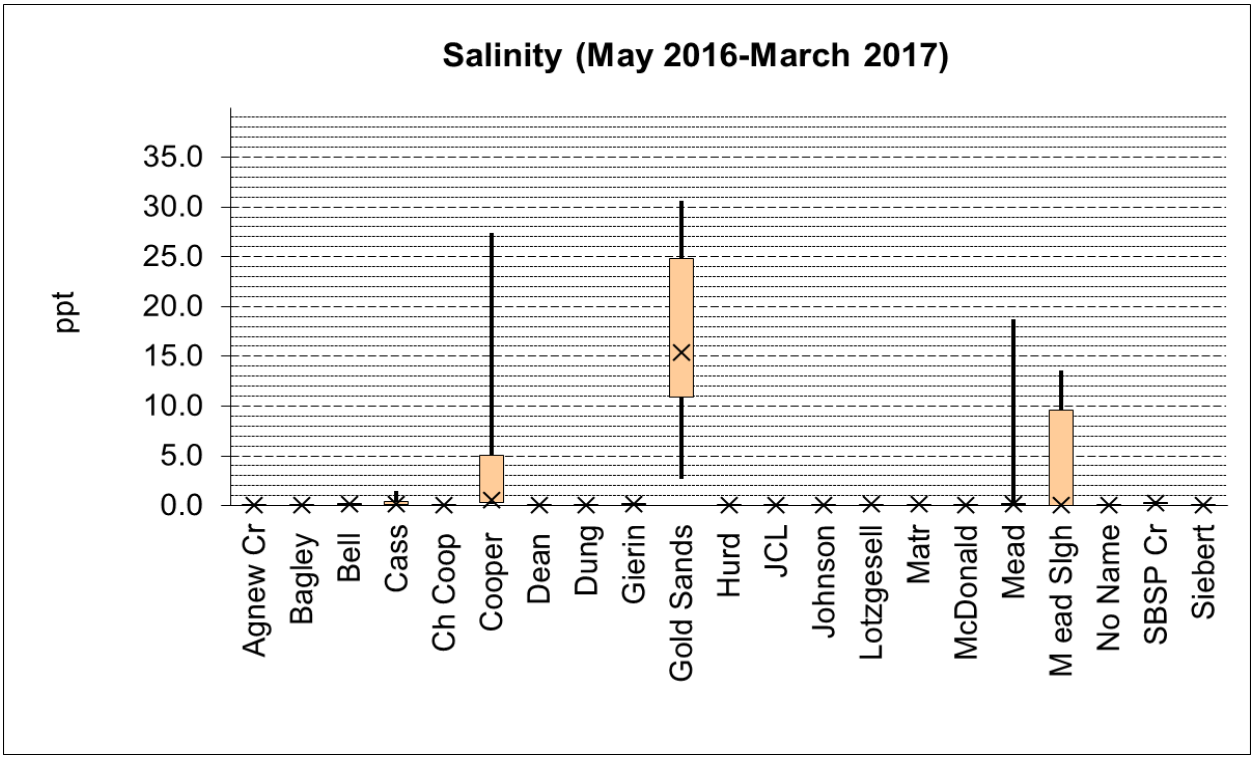

Figure 15. Salinity (PSS). X marks median; bottom and top of box represent 1st and 3rd quartiles; ends of whiskers represent min. and max. values.

Data Comments:

- Fecal coliforms:
  - Matriotti and Lotzgesell Creeks accounted for a good portion of the loading in the Dungeness in our 2013-14 study, as shown in Table 6 below. This system does not seem to have improved, and Matriotti has a geometric mean > 50 cfu/100 mL.
  - Agnew Creek/Ditch has a geometric mean > 50 cfu/100 mL.
  - Golden Sands Slough's geometric mean has declined to below 50 cfu/100 mL but still has a 90th percentile > 100 cfu/100 mL. This has been an area of emphasis for PIC pollution correction.
  - Bell and Cassalery Creeks both had geometric means that declined from above 50 cfu/100 mL in the previous reporting period to below 50 cfu/100 mL. Recent state Dept. of Health sampling indicates generally good water quality in marine waters near the outlets of these creeks (Washington Department of Health 2017).
  - A caveat on fecal coliform loading: though the Dungeness River has one of the lowest geometric mean concentrations, it was by far the greatest source of loading to Dungeness Bay in our 2013-14 study (see Table 6 below). Matriotti and Lotzgesell Creeks account for roughly half the loading in the lower Dungeness, but the other half comes from points upstream of the Matriotti confluence. We need to keep this significant loading source in mind as we proceed in our water quality remediation activities. Below we reprint a table from our 2013-14 study (Environmental Health Services and Streamkeepers Program 2014) pertaining to loading.

Table 6. Fecal coliform loading in 2013-14, in units of 1000 colony-forming units (CFU) per second, arranged in order from upstream to downstream, where tributaries to sites below are indented. Fecal coliform concentrations reported as <2 cfu/100 mL are interpreted as 1 cfu/100 mL. N/A = not available due to lack of fecal and/or flow data. Dungeness 3.0 flows were estimated by subtracting the flow at Matriotti 0.1 from that at Dungeness 0.8. (Environmental Health Services and Streamkeepers Program 2014)

Site / Date	4/13	5/13	6/13	7/13	8/13	9/13	10/13	11/13	1213	1/14	2/14	3/14
Dungeness 3.0	N/A	172	362	336	564	729	399	105	272	104	527	425
Matriotti 4.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Matriotti 3.2	28	61	5	90	6	27	9	1	11	18	14	39
Matriotti 1.9	11	17	17	144	31	241	59	N/A	13	10	17	42
Lotzgesell 1.5	N/A	N/A	2	17	13	69	5	9	2	8	1	2
Matriotti 0.1	116	491	1273	309	583	753	141	41	412	153	748	202
Dungeness 0.8	79	2112	2954	1217	1281	1295	680	777	481	216	1053	111
Meadowbrook 2.0	24	43	31	15	9	78	17	12	18	10	156	10
Meadowbrook 0.1	2	38	64	105	27	50	24	N/A	31	8	32	N/A
Cassalery 1.6	13	105	144	141	104	121	255	71	32	14	73	4
Cassalery 0.6	2	52	92	22	9	14	34	6	768	4	2	2
Cassalery 0.0	N/A	N/A	152	56	N/A	N/A	85	N/A	N/A	N/A	N/A	28
Cooper 0.1	10	198	48	94	N/A	109	77	N/A	34	N/A	N/A	55
Golden Sands Slough	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

- Nutrients:
    - Highest nitrogen and nitrate concentrations were observed in Bell Creek, with concentrations in Lotzgesell, Matriotti, and Cassalery Creeks approximately half those in Bell Creek.
    - Highest phosphorus and phosphate levels were observed in Golden Sands Slough, with Bell Creek close behind. Golden Sands Slough, like various other waterways in the study area, experiences a degree of tidal influence. On occasion sediments block action of the Golden Sands Slough tide gate.
    - Highest ammonia levels occur in Golden Sands Slough and Matriotti Creek.
    - Note frequent to constant tidal influence at sampling sites at Golden Sands, Cooper, Meadowbrook Slough, and Meadowbrook Creek, as described by the salinity graph above. Tidal influence suggests a caveat on interpretation of the freshwater influence to marine waters from these water bodies.

Conclusion

There is some indication of progress in identifying and remediating pollution sources in the lower Dungeness. The PIC program aims to systematically clean up these sources by using trends sampling data to identify priority areas for targeted sampling and pollution correction. Though still in its early stages, the PIC program is designed to bring about long-term progress in our shellfish recovery district.

REFERENCES

Chadd, EA and J. Bond. 2015. Quality Assurance Project Plan: Sequim-Dungeness Clean Water District Pollution Identification and Correction, trends, and project monitoring [Internet]. Port Angeles (WA): Clallam County Department of Public Works—Roads, Clallam County Department of Health and Human Services, Clallam Conservation district; [cited 2017 Jul 6]. Available from http://static1.squarespace.com/static/52a1fa6fe4b0b2685d1ec5f9/t/56a00f9da12f44d8a5d7863d/1453330355256/PIC_QAPP_03-05-15_FINAL.pdf

Clallam Conservation District. 2014. Pollution Identification and Correction plan for the Sequim Bay-Dungeness Watershed Clean Water District [Internet]. Port Angeles (WA): Clallam Conservation District; [cited 2017 July 6]. Available from http://static1.squarespace.com/static/52a1fa6fe4b0b2685d1ec5f9/t/56a00a911115e0b6f3b87f2c/1453329080557/Final-PIC-Plan-%26-Appendices.pdf

Environmental Health Services and Streamkeepers Program. 2014. Draft Sequim-Dungeness Clean Water District monitoring results. Port Angeles (WA): Clallam County Department of Health and Human Services and Clallam County Road Departments.

Washington Department of Ecology. 2006. Water quality standards for surface waters of the State of Washington [Internet]. Olympia (WA): Washington Department of Ecology; [cited 2017 Jul 6]. Available from: https://fortress.wa.gov/ecy/publications/publications/0610091.pdf

Washington Department of Health. 2017. Shellfish growing area annual reports by county [Internet]. Olympia (WA): Washington Department of Health; [cited 2017 Jun 26]. Available from http://www.doh.wa.gov/CommunityandEnvironment/Shellfish/GrowingAreas/AnnualReports/ListedbyCounty

Special thanks go to the Streamkeepers volunteers who helped with this project:

- **Field monitoring--Sarah Miller, Bob Phreaner, Linda Sumner, Peggy McClure, Janet Bruening, Kathe Smith, Debi Maloney**
- **Data input and checking--Donna Spence, Marilyn Harbaugh, Suzette Williams**
- **Equipment wrangling--Karen Robinson**
- **Data analyses, graphics, lab data import--Dr. Ron Sidwell**
- **Database management and upload of data to Ecology's EIM database--Walt Johnson and Steve Belcher**

Appendix 1: Data from May 2016 – March 2017

Site	Date	Fecal	TN	TP	NO3-N	NO2-N	NH3-N	PO4-P	SiO4-Si	Pres-sure	DO	DO %	Temp	pH	Sal	Sp Cond	Turb	Flow	Stage
Agnew Creek/Ditch 0.3	11/24/2015	623								29.87	11.9		6.5	7.8	0.1	231	37		0.57
Agnew Creek/Ditch 0.3	1/26/2016	135											6.6		0.1	225			0.64
Agnew Creek/Ditch 0.3	4/12/2016	28								29.90	12.4		11.8	8.7	0.1	235	5		0.25
Agnew Creek/Ditch 0.3	8/16/2016	87								29.96	9.6		17.3	8.0	0.1	176	4		
Agnew Creek/Ditch 0.3	11/15/2016	101								29.65	11.4	101	9.7	8.1	0.1	247	5		0.25
Agnew Creek/Ditch 0.3	1/10/2017	47								29.55	13.4	99	2.3	8.0	0.1	269	14		0.22
Agnew Creek/Ditch 0.3	4/18/2017	44								29.79	12.8	116	10.5	8.6	0.1	183	5		-0.32
Bagley 0.7a	11/24/2015	346								29.89	12.6		5.5	7.6	0.0	94	66		
Bagley 0.7a	1/26/2016	4											5.9		0.1	114			-12.36
Bagley 0.7a	4/12/2016	14								29.94	11.1		9.3	7.9	0.1	189	2		-12.52
Bagley 0.7a	8/16/2016	62								29.96	9.9	99	13.5	7.9	0.1	246	1		-12.13
Bagley 0.7a	11/15/2016	3								29.67	11.0	96	8.9	8.0	0.1	209	2		-12.40
Bagley 0.7a	1/10/2017	16								29.55	13.6	99	1.7	7.8	0.1	210	10		-12.41
Bagley 0.7a	4/18/2017	2								29.83	11.1	98	9.7	8.0	0.1	147	5		-12.40
Bell 0.2	5/12/2015	182											12.1		0.2				0.94
Bell 0.2	8/13/2015	4											14.8		0.2				0.96
Bell 0.2	10/8/2015	136	3888	109	2524	3	7	51	8534	30.11	9.8		12.4	8.0	0.2	444	5		1.00
Bell 0.2	11/23/2015	14	6299	139	4752	11	25	117	11589	29.86	11.2		6.6	7.9	0.2	505	3		1.10
Bell 0.2	12/17/2015	18	4637	139	2390	8	24	109	11078	29.70	11.6		6.0	7.7	0.2	361	5		1.52
Bell 0.2	1/25/2016	132	4526	123	2538	13	26	93	9408				5.8		0.2	377			1.30
Bell 0.2	2/17/2016	1000	3693	194	1760	23	129	105	8416	29.40	11.0		8.2	7.5	0.1	372	9		1.54
Bell 0.2	3/15/2016	102	3545	135	1272	12	82	90	10469	30.20	11.8		6.6	7.5	0.2	343	7		1.52
Bell 0.2	4/11/2016	23	4811	100	3337	7	10	90	7801	30.13	11.2		10.3	8.1	0.2	460	4		1.00

Site	Date	Fecal	TN	TP	NO3-N	NO2-N	NH3-N	PO4-P	SiO4-Si	Pres-sure	DO	DO %	Temp	pH	Sal	Sp Cond	Turb	Flow	Stage
Bell 0.2	5/17/2016	40	3159	214	3174	6	13	212	8125	30.30	10.4		10.9	8.1	0.2	440	4		0.92
Bell 0.2	6/21/2016	70	4882	202	3477	6	15	164	8890	30.30	9.8		12.4	7.9	0.2	454	4		0.46
Bell 0.2	7/19/2016	888	5066	194	3912	14	36	168	9170	30.10	8.9		14.1	7.8	0.2	466	4		0.76
Bell 0.2	8/15/2016	54	4143	110	3272	5	10	90	8564	30.09	9.4		14.0	8.0	0.2	435	2		0.88
Bell 0.2	9/20/2016	20	4452	97	3460	4	12	53	9116	30.17	10.3		11.4	8.0	0.2	457	2		1.00
Bell 0.2	10/18/2016	2	4061	122	2302	7	10	77	9305	29.98	10.1	91	10.4	7.9	0.2	481	1		1.06
Bell 0.2	11/14/2016	2	4653	69	2790	6	20	89	9212	30.04	10.1	90	10.3	7.8	0.2	464	1		1.06
Bell 0.2	12/13/2016	36	5375	170	3500	8	18	126	9050	30.33	12.1	94	5.4	8.2	0.2	488	4		1.04
Bell 0.2	1/9/2017	6	4967	130	1947	14	19	83	4342	29.60	12.0	94	4.6	7.9	0.2	492	2		1.04
Bell 0.2	2/14/2017	10	4609	143	4033	10	26	83	18025	30.01	12.6	96	4.0	8.0	0.2	452	4		1.14
Bell 0.2	3/14/2017	6	2548	93	1986	7	9	55	7287	29.68	11.1	95	7.9	7.8	0.2	398	4		1.39
Cassalery 0.0	5/12/2015	4	1693	27	1184	4	15	14	6202				12.5		0.3				
Cassalery 0.0	6/11/2015	2	1693	28	1316	4	23	17	481				12.9		0.4			2.0	
Cassalery 0.0	7/7/2015	2	2057	29	1191	3	19	14	6321				15.0		0.5			2.0	
Cassalery 0.0	8/13/2015		1719	19	1251	3	12	9	8610										
Cassalery 0.0	4/11/2016	310	2398	46	1562	10	52	28	6193	30.15	9.9		11.6	7.8	0.8	1495	6	6.1	
Cassalery 0.0	5/17/2016	30	2561	71	1969	5	14	14	6700	30.32	10.0		11.7	8.0	0.2	404	6	4.6	
Cassalery 0.0	6/21/2016	26	2307	28	1745	4	25	17	6474	30.32	9.7		12.8	7.9	0.2	456	2		
Cassalery 0.0	7/19/2016	16	2079	24	1609	3	16	14	6383	30.11	6.6		14.9	7.9	0.5	1019	2		
Cassalery 0.0	8/15/2016	92	1779	20	1337	2	10	10	5897	30.11	9.3		14.5	7.9	0.1	263	2		
Cassalery 0.0	9/20/2016	34	1697	22	1273	2	16	10	6204	30.17	9.9		11.9	7.9	0.4	722	2		
Cassalery 0.0	2/14/2017	14	1539	76	981	7	171	18	12401	30.02	11.7	92	4.8	7.7	1.5	2840	11		-3.05
Cassalery 0.0	3/14/2017	122	1745	100	828	7	31	30	5874	29.72	10.4	92	9.3	7.7	1.0	2030	7		
Cassalery 0.6	6/11/2015																		0.55
Cassalery 0.6	7/7/2015																		0.58
Cassalery 0.6	8/13/2015	20											13.7		0.1				0.44
Cassalery 0.6	9/10/2015	194	1608	19	1117	3	10	7	8700	30.10	9.3		13.2	7.9	0.1	240	6		0.58
Cassalery 0.6	10/8/2015	122	1768	41	1008	3	6	8	6696	30.08	9.5		12.1	7.8	0.1	240	0		0.63
Cassalery 0.6	11/23/2015	12	1570	20	1064	5	17	12	9268	29.86	9.8		6.5	7.8	0.1	269	1		0.66
Cassalery 0.6	12/17/2015	522	2142	51	1181	8	25	21	8800	29.70	10.2		6.8	7.8	0.1	275	4		0.80

Site	Date	Fecal	TN	TP	NO3-N	NO2-N	NH3-N	PO4-P	SiO4-Si	Pres-sure	DO	DO %	Temp	pH	Sal	Sp Cond	Turb	Flow	Stage
Cassalery 0.6	1/25/2016	122	2442	48	1476	16	27	29	7145				7.0		0.1	273			0.74
Cassalery 0.6	2/17/2016	84	2737	82	1624	19	46	40	6905	29.39	9.9		9.4	7.4	0.1	299	6		0.74
Cassalery 0.6	3/15/2016	100	2675	38	1770	6	10	13	8126	30.20	11.1		7.7	7.5	0.1	278	8		0.74
Cassalery 0.6	4/11/2016																		0.62
Cassalery 0.6	5/2/2016	60																	0.66
Cassalery 0.6	5/17/2016																		0.68
Cassalery 0.6	6/21/2016																		0.68
Cassalery 0.6	7/19/2016																		0.70
Cassalery 0.6	8/15/2016																		0.70
Cassalery 0.6	9/20/2016																		0.64
Cassalery 0.6	10/18/2016	2	1807	17	1095	3	7	7	6582	29.98	9.6	86	10.4	7.9	0.1	247	1		0.68
Cassalery 0.6	11/14/2016	16	2312	26	1052	3	8	5	6844	30.06	9.0	81	10.6	7.7	0.1	245	0		0.72
Cassalery 0.6	12/13/2016	6	1620	29	1109	5	28	10	6601	30.33	11.4	88	4.9	8.1	0.1	250	1		0.58
Cassalery 0.6	1/9/2017	2	1809	53	1094	15	75	13	6457	29.59	11.2	88	4.8	7.8	0.1	250	4		0.66
Cassalery 0.6	2/14/2017																		0.58
Cassalery 0.6	3/14/2017																		0.56
Chicken Coop 0.24	11/24/2015	10								29.88	12.4		5.5	7.7	0.1	173	10		-2.56
Chicken Coop 0.24	1/26/2016	2											6.4		0.1	111			-2.30
Chicken Coop 0.24	4/12/2016	6								30.04	11.5		8.6	7.8	0.1	161	2		-4.20
Chicken Coop 0.24	8/16/2016	10								30.08	9.9	99	13.6	8.0	0.1	240	1		-4.81
Chicken Coop 0.24	11/15/2016	10								29.76	11.1	97	9.3	7.9	0.1	168	2		-3.22
Chicken Coop 0.24	1/10/2017	32								29.65	13.6	99	2.0	7.8	0.1	155	11		-3.14
Chicken Coop 0.24	4/18/2017	2								29.85	11.7	97	7.2	7.8	0.1	127	7		-3.12
Cooper 0.1	5/12/2015	2	272	40	18	1	18	20	7983				17.1		0.8				
Cooper 0.1	6/11/2015	4	288	52	16	1	12	25	9570				16.8		0.6				
Cooper 0.1	7/7/2015	2	255	45	7	1	7	23	8401				16.6		0.8				

Site	Date	Fecal	TN	TP	NO3-N	NO2-N	NH3-N	PO4-P	SiO4-Si	Pres-sure	DO	DO %	Temp	pH	Sal	Sp Cond	Turb	Flow	Stage
Cooper 0.1	8/13/2015	12	206	35	4	1	5	16	10886				18.8		0.3				
Cooper 0.1	9/10/2015	26	243	35	9	1	12	15	11089	30.14	7.3		15.8	7.4	0.2	391	7		
Cooper 0.1	10/8/2015	114	327	38	21	1	12	16	8621	30.12	6.1		11.5	7.2	0.2	468	0		
Cooper 0.1	11/23/2015	88	729	98	282	6	67	47	7837	29.86	4.5		7.1	7.1	27.7	43507	11		
Cooper 0.1	12/17/2015	26	706	47	263	2	42	18	10807	29.68	10.9		5.2	7.9	1.3	2448	2		
Cooper 0.1	1/25/2016	20	740	57	297	3	55	33	8461				5.9		3.7	6780			
Cooper 0.1	2/17/2016	6	606	53	223	2	16	33	5472	29.38	6.5		9.1	7.1	2.6	4750	2		
Cooper 0.1	3/15/2016	2	500	37	113	2	14	22	7820	30.20	7.8		7.5	6.9	5.6	10033	3		
Cooper 0.1	4/11/2016	6	386	46	47	2	28	31	6923		7.0		12.3	7.3	1.4	2590	3		
Cooper 0.1	5/17/2016	2	242	44	37	1	24	21	7546	30.31	8.3		15.0	7.6	0.6	1111	3		
Cooper 0.1	6/21/2016	2	238	31	7	1	8	13	7895	30.33	7.7		14.7	7.4	0.6	1105	2		
Cooper 0.1	7/19/2016	22	214	33	9	1	9	17	8455	30.11	8.1		17.4	7.4	0.3	528	2		
Cooper 0.1	8/15/2016	128	263	30	15	2	81	13	8564	30.10	9.0		18.3	7.4	0.3	665	3		
Cooper 0.1	9/20/2016	22	209	24	22	0	12	9	8586	30.16	7.6		12.3	7.3	0.2	465	1		
Cooper 0.1	10/18/2016	100	662	64	83	4	19	28	8484	30.00	4.7	42	10.1	7.2	0.4	710	2		
Cooper 0.1	11/14/2016	2	576	74	241	8	71	39	2957	30.06	7.4	78	10.8	7.5	27.4	4278	5		-3.21
Cooper 0.1	12/13/2016	6	853	70	324	3	57	51	2829	30.34	10.2	80	5.0	7.6	23.5	34500	5		-3.19
Cooper 0.1	1/9/2017	6	901	58	427	4	45	18	8099	29.60	8.5	64	2.5	7.6	1.8	3436	0		-2.37
Cooper 0.1	2/14/2017	8	582	63	324	2	38	22	15631	29.98	9.5	74	4.1	7.4	2.8	5263	5		-3.67
Cooper 0.1	3/14/2017	20	585	62	231	2	30	22	7490	29.72	7.1	63	9.2	7.3	7.3	4210	1		-3.58
Dean 0.17	11/24/2015	126								29.91	12.7		5.0	7.9	0.1	129	24		
Dean 0.17	1/26/2016	58											5.8		0.1	113			
Dean 0.17	4/12/2016	2								30.05	11.7		8.7	8.0	0.1	196	3		
Dean 0.17	11/15/2016	2								29.77	11.2	97		8.0	0.1	92	4		-5.31
Dean 0.17	1/10/2017	14								29.68	14.2	100	0.8	7.9	0.1	160	14		-5.27
Dean 0.17	4/18/2017	2								29.88	11.0	92	12.7	7.8	0.1	130			-4.45
Dungeness 0.7	5/12/2015	2	143		35	1	3	3	3154				12.4		0.1				
Dungeness 0.7	6/11/2015	2	260	15	42	1	5	5	4018				13.7		0.1				

Site	Date	Fecal	TN	TP	NO3-N	NO2-N	NH3-N	PO4-P	SiO4-Si	Pres-sure	DO	DO %	Temp	pH	Sal	Sp Cond	Turb	Flow	Stage
Dungeness 0.7	7/7/2015	4	173	12	61	1	9	5	3417				14.9		0.1				
Dungeness 0.7	8/13/2015	4	168	10	96	2	8	5	4629				17.6		0.1				
Dungeness 0.7	9/10/2015	12	320	17	174	4	59	11	4693	30.10	9.6		13.3	7.9	0.1	168	17		
Dungeness 0.7	10/8/2015	114	426	24	166	13	62	16	3705	30.10	10.3		12.1	7.9	0.1	177	0		
Dungeness 0.7	11/23/2015	2	176	16	96	0	3	9	4262	29.84	12.4		5.2	8.0	0.1	124	9		
Dungeness 0.7	12/17/2015	14	240	27	92	0	0	5	4787	29.65	12.4		5.2	7.9	0.1	134	14		
Dungeness 0.7	1/25/2016	2	265	61	80	1	3	12	3742				4.6		0.1	115			
Dungeness 0.7	2/17/2016	2	262	21	80	0	2	5	3353	29.34	12.1		6.4	7.4	0.1	113	16		
Dungeness 0.7	3/15/2016	2	197	15	58	0	0	6	5128	30.22	12.6		5.4	7.5	0.1	131	14		
Dungeness 0.7	4/11/2016	2	97	7	27	0	1	4	3035	30.14	11.8		8.5	7.9	0.1	116	4		
Dungeness 0.7	5/17/2016	2	106	15	24	0	4	3	2623	30.30	11.4		10.1	7.9	0.1	100	5		
Dungeness 0.7	6/21/2016	8	189	13	49	0	3	3	3027	30.30	11.2		10.6	7.9	0.1	122	3		
Dungeness 0.7	7/19/2016	10	106	7	38	0	2	3	3057	30.11	10.6		13.9	7.7	0.1	123	1		
Dungeness 0.7	8/15/2016	2	91	6	38	1	3	3	3239	30.10	10.8		15.9	8.3	0.1	140	1		
Dungeness 0.7	9/20/2016	4	194	11	70	0	10	4	3359	30.15	11.2		12.8	8.2	0.1	159	0		
Dungeness 0.7	10/18/2016	4	156	21	59	0	2	5	3036	30.06	11.4	97	8.9	7.8	0.1	108	9		
Dungeness 0.7	11/14/2016	4	178	33	27	0	3	3	2642	30.07	11.6	98	8.3	7.1	0.1	97	13		
Dungeness 0.7	12/13/2016	2	122	13	64	0	4	4	3475	30.34	13.5	100	3.4	8.2	0.1	145	1		
Dungeness 0.7	1/9/2017	2	164	24	65	0	5	3	3349	29.60	14.2	103	1.7	7.8	0.1	149	7		
Dungeness 0.7	2/14/2017	2	181	19	108	0	5	5	7087	29.92	13.2	100	3.7	8.0	0.1	133	5		
Dungeness 0.7	3/14/2017	412	273	85	82	0	3	4	3645	29.75	12.2	99	5.9	7.9	0.1	125	36		
Dungeness 0.8	5/12/2015																	235.0	
Dungeness 0.8	6/11/2015																	200.0	
Dungeness 0.8	7/7/2015																	89.1	
Dungeness 0.8	8/13/2015																	64.2	
Dungeness 0.8	9/10/2015																	80.6	
Dungeness 0.8	10/8/2015																	80.5	
Dungeness 0.8	11/23/2015																	557.0	
Dungeness 0.8	12/17/2015																	656.0	
Dungeness 0.8	1/25/2016																	793.0	

Site	Date	Fecal	TN	TP	NO3-N	NO2-N	NH3-N	PO4-P	SiO4-Si	Pres-sure	DO	DO %	Temp	pH	Sal	Sp Cond	Turb	Flow	Stage
Dungeness 0.8	2/17/2016																	883.0	
Dungeness 0.8	3/15/2016																	644.0	
Dungeness 0.8	4/11/2016																	584.0	
Dungeness 0.8	5/17/2016																	604.0	
Dungeness 0.8	6/21/2016																	420.0	
Dungeness 0.8	7/19/2016																	336.0	
Dungeness 0.8	8/15/2016																	191.0	
Dungeness 0.8	9/20/2016																	103.0	
Dungeness 0.8	10/18/2016																	632.0	
Dungeness 0.8	11/14/2016																	856.0	
Dungeness 0.8	12/13/2016																	283.0	
Dungeness 0.8	1/9/2017																	242.0	
Dungeness 0.8	2/14/2017																	467.0	
Dungeness 0.8	3/14/2017																	810.0	
Gierin 1.8	11/24/2015	48								29.93	10.9		6.8	7.9	0.2	385	5		-0.81
Gierin 1.8	1/26/2016	16											6.4		0.2	394			-1.03
Gierin 1.8	4/12/2016	70								30.04	11.0		9.3	7.6	0.1	278	12		-0.90
Gierin 1.8	5/2/2016	118																	-0.79
Gierin 1.8	8/17/2016	33																	-0.90
Gierin 1.8	11/15/2016	2								29.78	10.1	89	9.6	7.9	0.2	382	4		-0.85
Gierin 1.8	1/10/2017	10								29.67	13.0	96	2.4	7.9	0.2	362	11		-1.00
Gierin 1.8	4/18/2017	12								29.89	11.1	95	8.1	8.1	0.2	414	12		-1.14
Golden Sands Slough 0.0	5/12/2015	112	1146	177	2	2	76	80	4552				22.7		7.6				-0.86
Golden Sands Slough 0.0	6/11/2015	24	281	64	1	1	20	24	2179				21.1		13.7				-0.84
Golden Sands Slough 0.0	7/7/2015	64	1411	146	0	1	23	55	2585				18.5		22.3				-0.75
Golden Sands Slough 0.0	8/13/2015	45	586	73	1	5	32	15	4287				22.0		22.8				-0.62
Golden Sands Slough 0.0	9/10/2015	100	1677	298	2	2	538	110	10908	30.13	4.5		22.3	7.8	10.1	235	15		-0.75

Site	Date	Fecal	TN	TP	NO3-N	NO2-N	NH3-N	PO4-P	SiO4-Si	Pres-sure	DO	DO %	Temp	pH	Sal	Sp Cond	Turb	Flow	Stage
Golden Sands Slough 0.0	10/8/2015	402	1088	279	0	2	96	112	6821	30.11	10.5		15.1	7.7	16.0	26048	10		-0.75
Golden Sands Slough 0.0	11/23/2015	112	1347	169	527	9	131	135	3941	29.86	4.6		7.6	7.1	27.3	42850	7		-0.43
Golden Sands Slough 0.0	12/17/2015	196	1405	167	240	6	117	106	6765	29.68	6.9		5.8	7.3	10.8	18100	7		0.39
Golden Sands Slough 0.0	1/25/2016	130	1438	164	174	4	47	89	9193				6.0		2.2	4125			
Golden Sands Slough 0.0	2/17/2016	98	1536	189	220	6	21	117	8462	29.36	5.2		8.5	6.9	1.5	2939	5		
Golden Sands Slough 0.0	3/15/2016	4	600	70	129	2	14	40	3842	30.22	8.1		9.3	7.1	18.9	31000	4		
Golden Sands Slough 0.0	4/11/2016	14	1023	157	4	1	19	75	5096	30.15	8.6		14.7	7.7	11.0	18600	8		-0.10
Golden Sands Slough 0.0	5/17/2016	16	871	330	5	3	79	237	4279	30.30	10.9		20.0	8.3	10.7	18101	4		-0.95
Golden Sands Slough 0.0	6/21/2016	626	1135	204	0	1	42	164	4909	30.30	8.5		17.8	8.3	12.6	20995	5		-0.75
Golden Sands Slough 0.0	7/19/2016	81	516	77	4	1	46	44	4403	30.11	7.3		21.6	8.0	26.6	41480	4		-0.70
Golden Sands Slough 0.0	8/15/2016	80	612	95	4	4	36	56	4691	30.10	11.9		23.0	8.2	23.0	36876	5		-0.82
Golden Sands Slough 0.0	9/20/2016	68	667	230	9	8	159	141	6068	30.16	11.4		15.4	8.0	19.2	30770	5		
Golden Sands Slough 0.0	10/18/2016	42	1701	415	78	16	328	231	6353	30.00	6.3	64	12.8	7.4	11.0	18573	7		
Golden Sands Slough 0.0	11/14/2016	147	4033	730	8	3	1274	592	11474	30.06	3.9	43	11.2	7.1	29.3	4533	3		-0.08
Golden Sands Slough 0.0	12/13/2016	25	1956	194	43	6	276	120	10600	30.34	4.9	37	3.3	7.6	2.7	3700	3		0.15
Golden Sands Slough 0.0	1/9/2017	5	1665	157	68	5	119	60	9746	29.59	8.2	80	5.4	7.3	30.6	47874	0		-0.24
Golden Sands Slough 0.0	2/14/2017	3	587	91	137	3	94	24	12052	29.97	8.2	72	5.7	7.3	15.4	25410	4		-0.18
Golden Sands Slough 0.0	3/14/2017	28	841	124	70	3	55	61	6246	29.74	7.4	70	10.0	7.3	9.6	16155	3		-0.31
Hurd 0.2	11/24/2015	36								29.94	9.0		9.5	7.3	0.1	170	1		

Site	Date	Fecal	TN	TP	NO3-N	NO2-N	NH3-N	PO4-P	SiO4-Si	Pres-sure	DO	DO %	Temp	pH	Sal	Sp Cond	Turb	Flow	Stage
Hurd 0.2	1/26/2016	2											9.0		0.1	175			-2.30
Hurd 0.2	4/12/2016	2								29.99	9.7		9.4	7.2	0.1	173	0		-2.25
Hurd 0.2	8/16/2016	40								30.05	9.2		11.2	7.4	0.1	170	0		-2.30
Hurd 0.2	11/15/2016	2								29.75	8.7	78	10.2	7.6	0.1	163	2		-2.46
Hurd 0.2	1/10/2017	14								29.64	9.8	83	8.0	7.4	0.1	168	20		-2.36
Hurd 0.2	4/18/2017	4								29.86	10.2	90	9.7	7.6	0.1	164	1		-2.41
Jimmycomelately 0.15	5/12/2015	2											9.9		0.1				0.76
Jimmycomelately 0.15	8/13/2015	2											14.3		0.0				0.61
Jimmycomelately 0.15	10/8/2015	6	2250	187	515	73	609	137	9380	30.12	8.2		11.1	7.6	0.2	305	5		0.69
Jimmycomelately 0.15	11/23/2015	30	1307	38	627	2	1	22	11153	29.88	12.7		3.9	7.6	0.1	150	5		0.78
Jimmycomelately 0.15	12/17/2015	4	649	37	287	2	0	10	11615	29.68	12.3		5.6	7.1	0.1	105	11		1.36
Jimmycomelately 0.15	1/25/2016	2	694	35	234	2	3	17	9088				4.7		0.0	103			1.22
Jimmycomelately 0.15	2/17/2016	2	466	28	182	1	3	13	8965	29.42	11.7		7.1	7.3	0.1	125	5		0.98
Jimmycomelately 0.15	3/15/2016	2	540	36	165	2	0	12	11659	30.18	12.5		5.4	7.2	0.1	96	17		
Jimmycomelately 0.15	4/11/2016	2	279	22	77	1	8	20	9419	30.13	11.0		8.8	7.7	0.1	177	2		
Jimmycomelately 0.15	5/17/2016	4	202	27	99	0	4	19	9925	30.30	10.7		10.0	7.8	0.1	202	1		0.76
Jimmycomelately 0.15	6/21/2016	26	290	21	107	1	4	16	8869	30.20	10.6		11.1	7.7	0.1	158	1		0.88
Jimmycomelately 0.15	7/19/2016	46	221	24	69	0	6	19	9303	30.11	9.7		13.5	7.9	0.1	222	1		0.67
Jimmycomelately 0.15	8/15/2016	10	263	23	135	1	5	23	9673	30.09	9.4		14.0	7.8	0.1	254	0		0.60
Jimmycomelately 0.15	9/20/2016	8	551	89	195	13	165	69	9390	30.17	9.0		11.0	7.4	0.1	269	4		0.68
Jimmycomelately 0.15	10/18/2016	2	1251	42	681	3	13	21	8629	29.97	10.9	95	9.3	7.4	0.1	132	6		1.14

Site	Date	Fecal	TN	TP	NO3-N	NO2-N	NH3-N	PO4-P	SiO4-Si	Pres-sure	DO	DO %	Temp	pH	Sal	Sp Cond	Turb	Flow	Stage
Jimmycomelately 0.15	11/14/2016	4	463	43	214	1	14	20	9722	30.06	10.8	94	9.8	7.7	0.1	171	1		0.85
Jimmycomelately 0.15	12/13/2016	2	507	37	305	0	4	15	9036	30.33	13.3	97	2.7	8.0	0.1	162	3		0.86
Jimmycomelately 0.15	1/9/2017	62	805	63	463	1	5	18	8459	29.60	13.5	97	1.3	7.3	0.1	152	7		1.04
Jimmycomelately 0.15	2/14/2017	4	714	46	469	1	5	14	17505	30.04	13.5	98	2.4	7.9	0.1	129	6		1.08
Jimmycomelately 0.15	3/14/2017	4	666	61	349	2	5	11	7715	29.68	12.2	98	5.7	7.4	0.1	97	16		1.70
Johnson 0.0	5/12/2015	18											10.8		0.1				0.68
Johnson 0.0	8/13/2015	26											15.1		0.1				0.47
Johnson 0.0	10/8/2015	64	247	70	60	1	11	62	8588	30.11	10.4		11.8	8.1	0.1	290	5		0.49
Johnson 0.0	11/23/2015	52	1216	83	349	2	0	54	12497	29.86	12.9		4.1	8.0	0.1	227	11		0.80
Johnson 0.0	12/17/2015	18	866	87	209	4	1	40	11739	29.69	12.6		5.2	7.7	0.1	170	19		0.88
Johnson 0.0	1/25/2016	14	757	76	177	3	4	46	9928				4.5		0.1	179			0.76
Johnson 0.0	2/17/2016	8	1178	90	208	3	5	51	9375	29.42	11.9		7.4	7.6	0.1	205	14		0.90
Johnson 0.0	3/15/2016	16	1209	81	165	3	0	44	11610	30.20	12.7		5.3	7.5	0.1	168	26		1.04
Johnson 0.0	4/11/2016	8	469	55	144	1	5	49	8826		11.4		9.3	8.2	0.1	280	2		0.48
Johnson 0.0	5/17/2016	8	178	36	86	1	8	26	5006	30.30	11.3		9.7	8.0	0.1	163	2		0.52
Johnson 0.0	6/21/2016	472	536	72	286	1	8	56	9409	30.30	10.6		12.0	8.1	0.1	288	2		0.38
Johnson 0.0	7/19/2016	30	340	47	118	1	3	40	6047	30.10	10.1		14.3	8.1	0.1	198	1		0.42
Johnson 0.0	8/15/2016	14	319	49	133	1	6	46	6912	30.09	10.0		14.2	8.1	0.1	220	1		0.35
Johnson 0.0	9/20/2016	6	466	80	230	1	12	66	9799	30.17	10.7		10.9	8.0	0.2	327	0		0.30
Johnson 0.0	10/18/2016	2	1370	56	846	3	15	63	10744	29.98	10.9	95	9.4	7.9	0.1	290	1		0.40
Johnson 0.0	11/14/2016	4	1200	81	248	1	21	55	10898	30.05	10.7	94	9.7	7.9	0.2	310	0		0.40
Johnson 0.0	12/13/2016	2	1013	76	452	1	8	55	10118	30.33	13.7	99	2.3	8.3	0.2	311	1		0.38
Johnson 0.0	1/9/2017	4	856	108	406	1	8	56	9054	29.60	13.8	98	1.0	7.8	0.2	390	4		0.46
Johnson 0.0	2/14/2017	2	1266	94	600	2	9	41	17985	30.03	13.8	100	2.2	8.1	0.1	212	15	0.6	
Johnson 0.0	3/14/2017	4	988	108	351	3	7	31	8825	29.69	12.2	99	5.9	7.6	0.1	159	28		0.90
Lotzgesell 0.1	5/12/2015	58	2097	47	1184	9	26	13	7402				18.5		0.1				-1.53
Lotzgesell 0.1	6/11/2015	28	2097	48	1630	15	37	16	9761				17.8		0.1				-1.38

Site	Date	Fecal	TN	TP	NO3-N	NO2-N	NH3-N	PO4-P	SiO4-Si	Pres-sure	DO	DO %	Temp	pH	Sal	Sp Cond	Turb	Flow	Stage
Lotzgesell 0.1	7/7/2015	64	2460	50	1458	24	30	12	8192				13.6		0.1				-1.70
Lotzgesell 0.1	8/13/2015	98	2584	54	1489	28	48	18	10530				20.1		0.1				-1.65
Lotzgesell 0.1	9/10/2015	52	2672	40	1725	5	17	8	10945	30.10	8.4		12.8	7.7	0.1	283	12		-1.33
Lotzgesell 0.1	10/8/2015	184	2151	78	1158	23	33	29	8485	30.07	7.9		12.6	7.5	0.1	290	13		-1.22
Lotzgesell 0.1	11/23/2015	6	2429	31	1384	9	30	14	10582	29.80	9.0		7.2	7.5	0.1	287	4		-0.94
Lotzgesell 0.1	12/17/2015	58	2345	37	1307	8	29	14	9876	29.62	9.5		7.0	8.1	0.1	284	5		-0.60
Lotzgesell 0.1	1/25/2016	34	2745	48	1692	8	27	13	8095				7.5		0.1	277			-0.85
Lotzgesell 0.1	2/17/2016	34	3489	50	1881	5	29	20	8270	29.30	9.6		9.5	7.1	0.1	292	10		-0.50
Lotzgesell 0.1	3/15/2016	6	3393	34	1940	4	23	10	10340	30.18	10.6		8.5	7.2	0.1	292	6		-0.99
Lotzgesell 0.1	4/11/2016	44	3349	24	2000	15			7894	30.11	10.3		11.5	7.7	0.1	283	9		-1.17
Lotzgesell 0.1	5/17/2016	64	2870	58	2371	7	15	11	8186	30.26	9.8		11.7	7.7	0.1	283	9		-1.30
Lotzgesell 0.1	6/21/2016	62	3248	32	2162	5	15	12	8281	30.30	9.0		12.2	7.6	0.1	281	9		-1.20
Lotzgesell 0.1	7/19/2016	104	3084	31	2236	6	19	10	8570	30.08	8.7		13.4	7.6	0.1	285	9		-1.18
Lotzgesell 0.1	8/15/2016	38	2480	28	2059	5	17	11	8323	30.06	8.9		13.7	7.7	0.1	284	9		-1.59
Lotzgesell 0.1	9/20/2016	36	2587	33	2143	4	16	11	8680	30.12	9.2		11.9	7.7	0.1	285	9		-1.33
Lotzgesell 0.1	10/18/2016	14	2472	53	1426	18	27	25	8752	30.00	7.9	71	10.7	7.4	0.1	293	3		-1.10
Lotzgesell 0.1	11/14/2016	28	2971	44	1315	7	12	12	8859	30.03	7.9	71	10.9	7.4	0.1	288	4		-1.02
Lotzgesell 0.1	12/13/2016	6	2063	39	1401	8	34	11	8226	30.31	9.9	78	5.6	7.7	0.1	283	4		-1.06
Lotzgesell 0.1	1/9/2017	42	2856	63	1488	20	201	10	8024	29.60	10.2	81	5.4	7.4	0.1	285	7		-1.24
Lotzgesell 0.1	2/14/2017	40	2394	61	1612	3	15	11	15910	29.88	10.7	88	6.9	7.6	0.1	280	14		-1.05
Lotzgesell 0.1	3/14/2017	28	2320	60	1472	4	27	13	7671	29.74	10.3	92	9.9	7.6	0.1	286	5		-0.88
Matriotti 0.3a	5/12/2015	179	1990	49	942	9	40	19	7245				16.4		0.1				-8.50
Matriotti 0.3a	6/11/2015	46	1990	52	1506	14	60	26	9042				16.9		0.1				-8.58
Matriotti 0.3a	7/7/2015	35	2361	49	1351	22	32	19	8153				13.9		0.1				-8.70
Matriotti 0.3a	8/13/2015	389	2740	76	1347	34	292	41	10619				19.4		0.1				-8.73
Matriotti 0.3a	9/10/2015	113	2518	43	1554	6	19	13	11143	30.10	8.6		13.3	7.8	0.1	301	9		-8.55
Matriotti 0.3a	10/8/2015	219	2158	89	1208	18	53	33	8725	30.07	8.3		12.6	7.6	0.2	309	8		-8.64
Matriotti 0.3a	11/23/2015	18	2500	43	1402	8	36	22	11162	29.80	9.7		6.9	7.6	0.2	310	4		-8.22
Matriotti 0.3a	12/17/2015	105	2205	63	1065	6	20	30	10330	29.62	10.7		6.1	7.8	0.1	263	9		-7.80
Matriotti 0.3a	1/25/2016	75	2574	76	1204	6	24	40	8658				6.9		0.1	269			-8.00

Site	Date	Fecal	TN	TP	NO3-N	NO2-N	NH3-N	PO4-P	SiO4-Si	Pres-sure	DO	DO %	Temp	pH	Sal	Sp Cond	Turb	Flow	Stage
Matriotti 0.3a	2/17/2016	187	2676	107	1203	6	25	41	8479	29.29	10.4		8.6	7.2	0.1	266	15		-7.60
Matriotti 0.3a	3/15/2016	54	1651	63	1195	4	22	26	10616	30.19	11.3		7.6	7.3	0.1	279	12		-7.97
Matriotti 0.3a	4/11/2016	185	2724	36	1949	6	75	25	8315	30.11	10.4		11.7	7.9	0.2	315	8		-8.44
Matriotti 0.3a	5/2/2016	31																	-8.46
Matriotti 0.3a	5/17/2016	91	2104	43	2072	6	35	24	8020	30.25	10.1		12.0	7.9	0.1	291	8		-8.39
Matriotti 0.3a	6/21/2016	325	3334	56	1930	6	191	32	8481	30.30	9.4		12.5	7.7	0.1	293	6		-8.10
Matriotti 0.3a	7/19/2016	320	2849	44	1904	6	131	26	8294	30.08	9.2		14.5	7.7	0.1	287	5		-8.67
Matriotti 0.3a	8/15/2016	361	2586	57	1604	6	208	35	8030	30.06	9.1		14.9	7.9	0.1	284	6		-8.68
Matriotti 0.3a	9/20/2016	39	2870	42	2041	4	63	20	8913	30.12	9.6		12.3	7.8	0.2	302	7		-8.60
Matriotti 0.3a	10/18/2016	38	2451	56	1401	17	59	29	9184	30.00	8.5	77	10.8	7.5	0.2	305	3		-8.44
Matriotti 0.3a	11/14/2016	52	3078	52	1239	7	134	17	9129	30.03	8.4	76	10.9	7.5	0.2	306	4		-8.34
Matriotti 0.3a	12/13/2016	19	2054	46	1396	7	43	15	8800	30.31	11.0	86	5.1	7.8	0.2	313	4		-6.43
Matriotti 0.3a	1/9/2017	28	2398	73	1490	17	180	16	8564	29.58	11.0	87	4.9	7.5	0.2	314	8		-8.43
Matriotti 0.3a	2/14/2017	53	2089	70	1329	3	26	21	16208	29.87	12.0	94	4.9	7.8	0.1	279	10		-8.13
Matriotti 0.3a	3/14/2017	155	2010	106	942	4	23	20	7465	29.75	11.2	99	9.0	7.7	0.1	274	7		-7.96
McDonald 01.6	11/24/2015	396								29.86	12.8		4.8	7.8	0.1	109	35	6.0	
McDonald 01.6	1/26/2016	26											4.9		0.0	96		37.0	
McDonald 01.6	4/12/2016	2								29.93	11.8		8.6	8.1	0.1	139	1	11.8	
McDonald 01.6	8/16/2016	12								29.98	10.0		14.8	8.1	0.1	202	0		
McDonald 01.6	11/15/2016	8								29.68	11.5	99	8.5	8.0	0.1	149	1		
McDonald 01.6	1/10/2017	4								29.60	14.2	100	0.7	7.9	0.1	155	5		
McDonald 01.6	4/18/2017	2								29.80	11.8	99	7.5	8.0	0.1	117	4	31.5	
McDonald 03.1	8/16/2016																	0.9	
McDonald 03.1	11/15/2016																	14.1	
McDonald 03.1	1/10/2017																	14.2	
Meadowbrook 0.1	5/12/2015	2	197	35	2	1	5	19	6070				15.5		0.1				2.23
Meadowbrook 0.1	6/11/2015	2	197	35	4	1	8	28	8157				15.2		0.4				2.22
Meadowbrook 0.1	7/7/2015	10	261	53	6	1	13	25	6729				16.2		0.5				2.23

Site	Date	Fecal	TN	TP	NO3-N	NO2-N	NH3-N	PO4-P	SiO4-Si	Pres-sure	DO	DO %	Temp	pH	Sal	Sp Cond	Turb	Flow	Stage
Meadowbrook 0.1	8/13/2015	2	203	38	4	1	2	16	8701				19.7		0.1				2.15
Meadowbrook 0.1	9/10/2015	2	209	31	10	1	12	16	9464	30.13	5.8		15.1	7.3	0.1	256	7		2.25
Meadowbrook 0.1	10/8/2015	90	329	46	11	1	12	23	7570	30.11	5.1		11.7	7.3	0.1	283	0		
Meadowbrook 0.1	11/23/2015	35	758	107	227	5	92	74	2953	29.84	6.4		8.7	7.6	27.3	42860	13		3.35
Meadowbrook 0.1	12/17/2015	56	814	117	267	5	64	73	4039	29.65	9.2		6.1	7.7	21.5	34600	17		3.70
Meadowbrook 0.1	1/25/2016	2	667	76	187	3	17	48	8477				6.1		0.4	748			2.79
Meadowbrook 0.1	2/17/2016	10	697	82	164	2	23	53	7625	29.36	6.2		8.9	6.9	12.0	15000	3		3.49
Meadowbrook 0.1	3/15/2016	4	535	70	67	1	14	33	9226	30.22	8.2		7.3	7.1	0.7	1329	2		2.82
Meadowbrook 0.1	4/11/2016	2	270	43	9	1	8	33	6450	30.14	7.6		12.4	7.3	0.2	381	1		2.62
Meadowbrook 0.1	5/17/2016	13	236	45	2	0	5	21	6343	30.30	7.9		14.5	7.4	0.1	240	1		2.58
Meadowbrook 0.1	6/21/2016	10	260	41	7	0	6	19	6741	30.30	5.1		13.9	7.2	0.1	228	2		2.50
Meadowbrook 0.1	7/19/2016	20	401	79	5	1	1	36	6842	30.12	4.3		17.2	7.2	0.3	560	6		2.65
Meadowbrook 0.1	8/15/2016	8	252	111	4	1	3	71	7236	30.10	7.6		17.4	7.6	0.2	399	2		2.58
Meadowbrook 0.1	9/20/2016	8	236	66	7	1	16	47	7249	30.15	7.1		12.8	7.5	0.2	410	4		2.50
Meadowbrook 0.1	11/14/2016																		3.04
Meadowbrook 0.2	12/13/2016	4	455	38	226	2	12	15	7733	30.34	8.0	60	4.2	8.1	0.1	244	1		
Meadowbrook 0.2	1/9/2017	2	617	84	208	4	132	45	3536	29.60	9.6	81	3.0	7.0	18.7	30810	7		-10.46
Meadowbrook 0.2	2/14/2017	32	481	58	215	2	14	24	14492	29.50	9.5	73	4.2	7.7	0.2	409	4		-10.84
Meadowbrook	3/14/2017	3	473	64	101	1	7	29	7014	29.75	8.3	73	9.4	7.6	0.2	317	1		-11.37

Site	Date	Fecal	TN	TP	NO3-N	NO2-N	NH3-N	PO4-P	SiO4-Si	Pres-sure	DO	DO %	Temp	pH	Sal	Sp Cond	Turb	Flow	Stage
0.2																			
Meadowbrook 0.6	11/14/2016	4	458	50	108	1	6	20	8349	30.07	4.3	38	5.5	7.8	0.1	253			
Meadowbrook 1.8	10/18/2016	10	588	37	176	1	10	18	7944	30.01	6.3	55	9.6	7.6	0.1	252	1		
Meadowbrook Slough 0.23	5/12/2015	14	166	24	51	1	19	15	4293				9.3		0.5				-2.53
Meadowbrook Slough 0.23	6/11/2015	4	236	30	55	1	57	23	5004				12.1		0.1				-2.25
Meadowbrook Slough 0.23	7/7/2015	2	304	47	57	1	58	25	3754				14.7		12.0				-2.54
Meadowbrook Slough 0.23	8/13/2015	2	192	33	99	2	15	23	5920				15.6		0.1				-2.65
Meadowbrook Slough 0.23	9/10/2015	72	294	29	108	1	27	20	5951	30.14	4.4		14.7	7.3	0.1	177	6		-2.64
Meadowbrook Slough 0.23	10/8/2015	590	522	40	195	2	31	26	3836	30.13	4.2		13.2	7.3	0.1	187	1		-2.60
Meadowbrook Slough 0.23	11/23/2015	84	367	34	225	3	52	26	6015	29.87	2.7		9.8	7.1	2.2	4055	2		-2.23
Meadowbrook Slough 0.23	12/17/2015	126	634	104	176	4	101	65	5517	29.69	8.3		6.2	7.3	20.6	32900	18		-0.80
Meadowbrook Slough 0.23	1/25/2016	55	333	63	105	1	73	43	4976				6.1		0.5	1071			-1.96
Meadowbrook Slough 0.23	2/17/2016	12	418	69	135	2	51	53	4862	29.39	4.9		7.1	6.8	0.9	1823	3		-1.18
Meadowbrook Slough 0.23	3/15/2016	4	308	39	60	1	35	29	4789	30.20	5.5			6.9	6.3	5560	2		-1.87
Meadowbrook Slough 0.23	4/11/2016	2	182	17	72	1	10	16	4225	30.15	5.0		8.5	7.1	5.2	9205	1		-2.12
Meadowbrook Slough 0.23	5/17/2016	32	128	35	49	1	18	19	4268	30.32	6.9		9.7	7.6	0.1	141	1		-2.20
Meadowbrook Slough 0.23	6/21/2016	75	161	32	36	1	19	20	4370	30.33	5.8		10.6	7.7	0.1	135	4		-1.25
Meadowbrook Slough 0.23	7/19/2016	2	145	28	51	1	19	19	4488	30.11	4.7		11.8	7.4	0.1	138	1		-2.12
Meadowbrook Slough 0.23	8/15/2016	108	129	53	44	1	18	24	4462	30.10	5.0		13.6	7.4	0.1	142	1		-2.22

Site	Date	Fecal	TN	TP	NO3-N	NO2-N	NH3-N	PO4-P	SiO4-Si	Pres-sure	DO	DO %	Temp	pH	Sal	Sp Cond	Turb	Flow	Stage
Meadowbrook Slough 0.23	9/20/2016	36	221	32	73	1	21	20	4590	30.17	5.3		13.0	7.5	0.1	161	1		-2.30
Meadowbrook Slough 0.23	10/18/2016	12	206	33	68	2	34	22	3910	30.01	1.1	11	11.5	7.0	11.2	18890	2		-1.90
Meadowbrook Slough 0.23	11/14/2016	12	193	42	34	2	37	21	3699	30.07	2.9	27	10.5	6.9	10.5	1784	5		-0.73
Meadowbrook Slough 0.23	12/13/2016	6	215	37	66	2	28	16	4142	30.35	5.2	46	8.0	7.4	8.7	15004	20		-1.64
Meadowbrook Slough 0.23	1/9/2017	8	234	39	123	2	25	20	4081	29.60	6.0	52	5.2	6.9	13.6	22824	7		-1.18
Meadowbrook Slough 0.23	2/14/2017	2	203	35	113	1	25	20	8049	30.00	6.8	55	5.9	7.6	0.6	1227	4		-1.30
Meadowbrook Slough 0.23	3/14/2017	24	282	37	106	1	23	19	4040	29.72	6.9	56	5.9	7.6	0.1	170	1		-1.59
No Name 0.03	11/24/2015	20								29.91	12.3		6.0	7.8	0.1	195	6		-2.42
No Name 0.03	1/26/2016	4											6.7		0.0	103			-2.34
No Name 0.03	4/12/2016	2								30.06	11.4		9.1	7.6	0.1	170	4		-2.44
No Name 0.03	8/16/2016	2								30.10	9.1		15.8	7.9	0.1	273	12		
No Name 0.03	11/15/2016	22								29.78	10.9	98	10.1	7.8	0.1	206	3		-2.41
No Name 0.03	1/10/2017	24								29.68	13.6	99	2.0	7.7	0.1	178	9		-2.40
No Name 0.03	4/18/2017	2								29.87	11.5	97	7.9	7.8	0.1	109	11		-2.32
SB State Park Creek 0.0	5/12/2015	2											10.0		0.4				-5.92
SB State Park Creek 0.0	8/13/2015	2											15.1		0.5				-6.00
SB State Park Creek 0.0	10/8/2015	2	752	71	264	2	78	58	8338	30.12	8.2		11.3	7.6	0.4	892	4	0.0	-5.98
SB State Park Creek 0.0	11/23/2015	2	2956	85	1664	2	0	62	11402	29.87	12.5		5.1	7.9	0.1	281	6		-5.79
SB State Park Creek 0.0	12/17/2015	12	2166	134	904	6	2	75	11365	29.68	12.5		5.6	7.5	0.1	176	19		-4.00
SB State Park Creek 0.0	1/25/2016	8	1301	116	363	4	6	68	9388				5.2		0.1	210			-5.70
SB State Park Creek 0.0	2/17/2016	14	1220	108	330	4	6	71	9032	29.41	11.9		7.5	7.5	0.1	201	17		-4.91
SB State Park	3/15/2016	10	1828	133	507	4	6	75	11699	30.19	12.6		5.6	7.5	0.1	163	27		-5.42

Site	Date	Fecal	TN	TP	NO3-N	NO2-N	NH3-N	PO4-P	SiO4-Si	Pres-sure	DO	DO %	Temp	pH	Sal	Sp Cond	Turb	Flow	Stage
Creek 0.0																			
SB State Park Creek 0.0	4/11/2016	2	541	63	70	1	7	61	9019	30.14	11.1		9.2	7.9	0.2	369	2		-5.78
SB State Park Creek 0.0	5/17/2016	1	509	71	178	0	6	61	9101	30.30	10.5		10.2	7.9	0.2	476	1		-6.81
SB State Park Creek 0.0	6/21/2016	10	498	71	99	0	4	64	8533	30.30	10.1		11.7	7.8	0.2	486	1		-5.80
SB State Park Creek 0.0	7/19/2016	8	625	71	222	0	4	65	8832	30.11	8.1		13.6	7.6	0.3	688	1		-5.85
SB State Park Creek 0.0	8/15/2016	2	673	63	352	1	5	64	8844	30.10	8.3		13.9	7.5	0.5	939	0		-5.87
SB State Park Creek 0.0	10/18/2016																		
SB State Park Creek 0.0	12/13/2016																		
SB State Park Creek 0.0	1/9/2017																		
SB State Park Creek 0.0	2/14/2017	6	1135	96	525	2	7	48	17505	30.03	13.5	99	2.7	8.0	0.1	240	11		-5.70
Siebert 1.0	11/24/2015	82								29.91	12.9		4.6	7.7	0.1	103	44		
Siebert 1.0	1/26/2016	14											5.2		0.0	90			-17.30
Siebert 1.0	4/12/2016	2								29.92	11.6		9.3	8.0	0.1	165	1		-17.95
Siebert 1.0	8/16/2016	2								29.98	10.1		8.3	8.1	0.1	218			-17.70
Siebert 1.0	11/15/2016	2								29.69	11.5	99	8.6	8.1	0.1	148	0		-17.30
Siebert 1.0	1/10/2017	1								29.58	14.4	100	0.4	7.9	0.1	150	4		-17.40
Siebert 1.0	4/18/2017	2								29.00	11.7	98	4.8	8.4	0.1	123			-17.35