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Project:	City of Wasilla WWTP Pilot Study	Field Crew:	Jake Alward, Riley Bronga, John Marshall, Cindi Pannone
File:	204700415	Date:	October 30, 2017 to October 31, 2017

Subsurface    Surface    Vegetation

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**Reference:    October Water Sampling Event**

## 1.1 BACKGROUND

Water samples were taken at all 18 surface water locations. The ground was beginning to freeze (Photo 1 & 4) in certain locations making the terrain slightly easier to navigate. The vegetation had lost nearly all of its green color (Photo 6). It rained for several days before the sampling event. It appeared as if the rain water was trapped on top of a layer on ice throughout the job site. There was plenty of surface water to collect even with the little bit of freezing. The site seemed to have more water than normal (Photo 3 & 5).

Detectable results summary tables and photo log are attached.

## 1.2 SAMPLING EVENT HIGHLIGHTS

There was one mistake made on October 31. The team believed they found SW15, but it was actually a staked out vegetation plot. A water sample was taken at this location. Later they found the actual SW15 site and used DUP 2 bottles at this location. No duplicate was taken this day. The water sampled at the vegetation plot was disposed of and not taken to the lab. A GPS could have been used in this circumstance to avoid misidentifying sites, but the team did not have one.

## IMPROVEMENTS FOR FUTURE SAMPLING

- Bring GPS to verify sampling site locations

## 1.3 STREAM GAGING

On October 31, when stream gage measurements were taken, the water level was the highest yet (Photo 2). At gaging station SW17 the water had risen enough to go around the weir pieces, allowing small flows to bypass.

### WEIR 1 (SW17)

Width: 2.21' (from previous measurement)

Water depth(s): Middle of stream 1ft

Velocity: 0.55 ft/sec

Calculated flow: 1.22 CF/Sec

**Reference: October Water Sampling Event**

**WEIR 2 (SW18)**

Width: 3.22' (from previous measurement)  
 Water depth(s): Middle of stream: 1 ft  
 Velocity: 0.52 ft/sec  
 Calculated flow: 1.67 CF/sec

**1.4 LAB RESULTS**

The attached table summarizes detected analytes. All others were below detectable limits. Complete results can be found in SGS Reports. Note that speciation between nitrate and nitrite is not reported, along with ammonia results.

**1.5 DATA QUALITY**

SW2 was duplicated to verify lab results. The duplicate does not have detectable total phosphorous results due to the test having a higher detectable limit than the sample did due to lab practices. This result is not of concern. The table below summarizes the relative percent difference between the sample and duplicate.

	Nitrite/Nitrite	TSS	TKN	Ammonia	TP	BOD	FC	E. Coli	TC
<b>SW15</b>	ND	77.7	ND	-	0.0569	3.04	320	Positive	2421
<b>Duplicate</b>	ND	100	ND	-	ND	3.87	200	Positive	2421
<b>% Difference</b>	<b>0.0%</b>	<b>21.1%</b>	<b>0.0%</b>	-	<b>N/A</b>	<b>24.0%</b>	<b>46.2%</b>	<b>0.0%</b>	<b>0.0%</b>

**Attachment: Photo Log**

## October Photo Log



Photo 1:  
Ice beginning to form at SW5



Photo 2:  
Weir 1 Flooded



Photo 3:  
No ice formed on pond at SW15



Photo 4:  
Ice beginning to form



Photo 5:  
More water than usual at SW4



Photo 6:  
Vegetation no longer having green color

**Attachment: Results Summary Table**

Site ID	SW1	SW2	SW2.1*	SW3	SW4	SW5	SW6	SW7	SW8	SW9	SW10
Date Collected	10/30/2017	10/30/2017	10/30/2017	10/30/2017	10/30/2017	10/30/2017	10/30/2017	10/30/2017	10/30/2017	10/30/2017	10/30/2017
Time	10:24	10:45	10:45	11:05	12:13	11:58	12:31	12:44	13:55	14:05	14:20
Sample Type	Surface										
Water Temp (°C)	2.14	0.41	0.41	1.33	0.77	3.02	1.53	1.78	2.61	2.28	1.88
Conductivity	244	122	122	261	338	348	414	214	262	314	201
pH	3.4	2.61	2.61	3.88	4.62	4.05	4.41	4.16	4.21	4.73	3.7
DO	2.85	8.55	8.55	5.13	7.52	4.39	7.6	5.38	4.87	8.87	4.9
Total Nitrate/ Nitrite (mg/L)	ND										
TSS (mg/L)	5	77.7	100	106	16.2	25.3	8.88	3.13	42.2	4.35	30.3
Total P (mg/L)	0.0534	0.0569	ND	0.0518	ND	0.0838	0.0266	ND	0.0235	ND	ND
BOD (mg/L)	ND	3.04	3.87	2.62	ND	2.39	5.53	ND	ND	ND	ND
FC (col/100mL)	ND	320	200	90	ND	164	8	280	181	12	3
E. Coli	Positive										
TC (col/100mL)**	2421	2421	2421	2421	2421	2421	2421	2421	2421	2421	2421

Site ID	SW11	SW12	SW13	SW14	SW15	SW16	SW17	SW18
Date Collected	10/31/2017	10/31/2017	10/31/2017	10/31/2017	10/31/2017	10/31/2017	10/31/2017	10/31/2017
Time	10:17	10:36	10:54	12:48	12:24	12:10	13:35	14:10
Sample Type	Surface							
Water Temp (°C)	3.13	1.76	1.87	1.78	1.32	2.86	2.37	3.37
Conductivity	373	215	199	349	273	160	364	438
pH	5.48	4.47	4.57	4.71	4.35	4.37	4.83	5
DO	9.81	4.43	9.49	8.93	11.59	6.43	9.38	9.38
Total Nitrate/ Nitrite (mg/L)	ND	ND	ND	0.338	ND	ND	ND	ND
TSS (mg/L)	25.9	49.2	5.25	15.5	1.44	154	ND	2.5
Total P (mg/L)	0.0534	0.0281	ND	ND	ND	0.0651	0.123	0.657
BOD (mg/L)	ND	ND	ND	ND	ND	3.57	ND	ND
FC (col/100mL)	ND	23	13	4	40	8	79	23
E. Coli (col/100mL)	ND	32	37	14	115	6	201	82
TC (col/100mL)**	308	579	1414	1414	980	1046	2420	1300

\* denotes duplicate sample

\*\* Value of "2421" means result was greater than 2420

**Attachment: Data Collection Forms**



Field Report

FIELD DATA

Collected by/ Team Lead: <i>John Marshall</i>		Collection Date: <i>10/30/17</i>	
Field Team: <i>Cindi Pannone, Riley Bronza</i>		Weather: <i>Cloudy, Cool</i>	
RSM01 reviewed and RSM02 Completed? <input checked="" type="radio"/> Yes <input type="radio"/> No	Temperature: <i>43°</i>	Equipment Used:	Equipment Calibrated? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>

Site ID	Time	Sample Type	Water Temperature (all)	Conductivity (subsurface)	pH (surface)	DO (surface)	Well Purged? (Yes or No)	Visible Surface Water? Depth? (Yes or No)	Depth to Groundwater (feet bgs)	Photo Taken? (Yes or No)	Lab Sample ID (complete COC)	Comments
SW1	10:24	Surface / Subsurface Duplicate	2.14°c	244	3.40	2.85	N/A	Y		Y		Substrate Ice
SW2	10:45	Surface / Subsurface Duplicate	.41°c	122	2.61	8.55	N/A	Y		Y		Substrate Ice
Dup 1	10:48	Surface / Subsurface Duplicate	.41°c	122	2.61	8.55	N/A	Y		Y		Substrate Ice
SW3	11:05	Surface / Subsurface Duplicate	1.33°c	261	3.88	5.13	N/A	Y		Y		Substrate Ice
SW5	11:58	Surface / Subsurface Duplicate	3.02°c	348	4.05	4.39	N/A	Y		Y		Recalibrated PH - 2 point
SW4	12:13	Surface / Subsurface Duplicate	.77°c	338	4.62	7.52	N/A	Y		Y		
SW6	12:31	Surface / Subsurface Duplicate	1.53°c	414	4.41	7.60	N/A	Y		Y		
SW7	12:44	Surface / Subsurface Duplicate	1.78°c	214	4.16	5.38	N/A	Y		Y		
SW8	13:55	Surface / Subsurface Duplicate	2.16°c	262	4.21	4.87	N/A	Y		Y		



Field Report

FIELD DATA

Collected by/ Team Lead: <u>John Marshall</u>		Collection Date: <u>10/30/17</u>
Field Team: <u>Cindi Pannone, Riley Bronora</u>		Weather: <u>Cloudy, Cool</u>
RSM01 reviewed and RSM02 Completed? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Temperature: <u>430</u>	Equipment Used: _____ Equipment Calibrated? Yes <input type="checkbox"/> No <input type="checkbox"/>

Site ID	Time	Sample Type	Water Temperature (all)	Conductivity (subsurface)	pH (surface)	DO (surface)	Well Purged? (Yes or No)	Visible Surface Water? Depth? (Yes or No)	Depth to Groundwater (feet bgs)	Photo Taken? (Yes or No)	Lab Sample ID (complete COC)	Comments
SW9	14:05	Surface / Subsurface Duplicate	2.28°C	314	4.73	8.87	N/A	Y				Visible Surface flow
SW10	14:20	Surface / Subsurface Duplicate	1.88°C	201	3.70	4.90	N/A	Y				Visible Surface flow
		Surface / Subsurface Duplicate										
		Surface / Subsurface Duplicate										
		Surface / Subsurface Duplicate										
		Surface / Subsurface Duplicate										
		Surface / Subsurface Duplicate										
		Surface / Subsurface Duplicate										
		Surface / Subsurface Duplicate										



Field Report

FIELD DATA

Collected by/ Team Lead: <i>John Marshall</i>		Collection Date: <i>10/31/17</i>
Field Team: <i>Jake Alward, Cindi Pannone</i>		Weather: <i>cloudy, misty, 36° Fog</i>
RSM01 reviewed and RSM02 Completed? Yes <input type="checkbox"/> No <input type="checkbox"/>	Temperature: <i>36°</i>	Equipment Used: Equipment Calibrated? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>

Site ID	Time	Sample Type	Water Temperature (all)	Conductivity (subsurface)	pH (surface)	DO (surface)	Well Purged? (Yes or No)	Visible Surface Water? Depth? (Yes or No)	Depth to Groundwater (feet bgs)	Photo Taken? (Yes or No)	Lab Sample ID (complete COC)	Comments
SW11	10:17	Surface / Subsurface	3.13°C	373	5.48	9.81	N/A	Y		Y		
		Duplicate										
SW12	10:36	Surface / Subsurface	1.76°C	215	4.47	4.43	N/A	Y		Y		
		Duplicate										
SW13	10:54	Surface / Subsurface	1.87°C	199	4.57	9.49	N/A	Y		Y		
		Duplicate										
SW16	12:10	Surface / Subsurface	2.86°C	160	4.37	6.43	N/A	Y		Y		
		Duplicate										
SW15	12:24	Surface / Subsurface	1.32°C	273	4.35	11.59	N/A	Y		Y		
		Duplicate										
SW14	12:48	Surface / Subsurface	1.78°C	349	4.71	8.93	N/A	Y		Y		
		Duplicate										
SW17	13:35	Surface / Subsurface	2.37°C	364	4.83	9.38	N/A	Y		Y		
		Duplicate										
SW18	14:10	Surface / Subsurface	3.37°C	438	5.00	9.38	N/A	Y		Y		
		Duplicate										
		Surface / Subsurface										
		Duplicate										

Label (14) (Dup 2)

SW15 (veg plot) (Dumped out)

Flow  
Near SW17 0.55 ft/sec 1 ft deep 5.2 ft wide  
Near SW18 0.52 ft/sec 1 ft minus