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Subsurface     Surface     Vegetation Plot

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**Reference: February Water Sampling Event**

## 1.1 BACKGROUND

The site was substantially colder than it was in January 2018. The only apparent open water was at the toe of slope below the percolation beds. Surface water was only sampled at three locations, as the pond at SW-15 had ice thicker than 28", the max length of the drill bit (Photo 3 & 4). The pond at SW-5 had a total of 28" of ice, which was able to be penetrated by the drill bit (Photo 1). The stream at SW-17 was open and able to be sampled by dipping bottles into the stream (Photo 6). SW-18 was completely frozen (Photo 5), therefore a hole had to be drilled through the ice to collect water. At this location, ice was about 5 inches thick with running water underneath. Ice depths were not collected at any other locations.

The team observed the lagoon on site to come up with a sampling plan for water and sludge on future sampling events. A team of three is required when sampling the lagoon and a separate safety plan will need to be created. The team also measured the length of the hill above SW-18 so a new rope can be bought. 100 feet of rope is required.

## 1.2 SAMPLING EVENT HIGHLIGHTS

This event went smoothly as there were only 3 sample sites that were collected. The one discrepancy was that the stream gage at SW18 was still frozen, so flow was not measured at this site for this event (Photo 4). Water was able to be sampled as a hole was drilled through the ice, so the peristaltic pump could be used.

One difficulty encountered was that the tubing going in and out of the peristaltic pump kept freezing during sampling at SW-5. The water was extremely cold as it was resting in the column of ice formed by the drill bit and the weather outside was also below freezing. The tubing had to be placed inside a team members jackets to thaw the ice in the tubing. A flow-through cell was used to analyze intrinsic data (pH, temperature, DO, and conductivity). However, since the tubing kept freezing the DO was not determined to be accurate and was not recorded.

While walking to SW15, the origin of the stream was discovered (Photo 2). We believe the water from the percolation beds found an easy flow route to that location, which resulted in the start of the stream. It was previously believed that the stream was the collection of all the water in the wetland converging, however it may be more a function of the percolation beds. It will be interesting to see if that location dries up when the percolation beds are taken offline.

**Reference: February Water Sampling Event**
**Improvements for future sampling:**

We brought the largest drill bit we could buy at the store. It is likely that the ice will continue to thicken in the next month. It is possible that the only water accessible next month will be at flowing water, SW-17 and SW-18.

During the drilling at SW-15 a drill bit was lost in the ice. The location it was lost was marked with a tree branch to see if it can be recovered when some of the ice melts.

**1.3 OTHER ACTIVITIES**
Weir 1 (SW17)

Width: 2.21 -ft

Water depth: 0.7 -ft

Velocity: 0.3-ft/sec

Calculated flow: 0.46 -CF/sec

Weir 2 (SW18)

Width: NA -ft

Water depth: NA -ft

Velocity: NA -ft/sec

Calculated flow: NA -CF/sec

**1.4 SAMPLE RESULTS**

The attached table summarizes detected analytes. All others were below detectable limits. Complete results can be found in the SGS reports.

**1.5 DATA QUALITY**

SW18 was duplicated to verify lab result quality. The duplicate for this sample event produced very similar results to the actual sample. The one anomaly is the total suspended solids, as the duplicate had a non-detect. The table below summarizes the relative percent difference between the sample and the duplicate.

	Nitrate	Nitrite	Nitrate/ Nitrite	TSS	TKN	Ammonia	Total P	BOD	FC	E. Coli	TC
<b>SW18</b>	3.97	ND	4.00	1.16	ND	0.283	0.733	2.01	2	2	172
<b>Dup</b>	3.98	ND	3.98	ND	ND	0.373	0.742	2.03	1	1	115
<b>% Diff</b>	<b>0.3%</b>	<b>0%</b>	<b>0.5%</b>	<b>N/A</b>	<b>0%</b>	<b>27.4%</b>	<b>1.2%</b>	<b>1.0%</b>	<b>66.6%</b>	<b>66.6%</b>	<b>39.7%</b>

**Attachment: Photo Log**

## February Photo Log



Photo 1:  
Sampling pond at SW5



Photo 4:  
Drill bit length maxed out AT SW15



Photo 2:  
Origin of stream



Photo 5:  
Stream gage station at SW18



Photo 3:  
Full drill bit length at SW15



Photo 6:  
Stream gage station at SW17

**Attachment: Results Summary Table**

Detectable Results Summary Table and  
Data Quality Summary Table

February-2018

	SW5	SW17	SW18	SW18.1
Date Collected	2/16/2018	2/16/2018	2/16/2018	2/16/2018
Time	11:30	12:34	13:24	13:24
Sample Type	Surface	Surface	Surface	Surface
Water Temp (°C)	0.17	1.34	0.66	0.66
Conductivity	465	633	746	746
pH	5.75	4.56	5.32	5.32
DO	-	8.2	6.8	6.8
Nitrate	ND(0.100)	2.96	3.97	3.98
Total Nitrate/ Nitrite (mg/L)	ND(0.100)	2.96	4	3.98
TSS (mg/L)	63	6.08	1.16	ND(0.510)
Ammonia (mg/L)	0.25	0.497	0.283	0.373
Total P (mg/L)	0.101	0.279	0.733	0.742
BOD (mg/L)	8.28	2.03	2.01	2.03
FC (col/100mL)	ND(1)	3	2	1
E. Coli (col/100mL)	ND(1)	5	2	1
TC (col/100mL)	35	118	172	115