

Summary of Activities

Date: August 13th, 2015

To: Ian Kitch
Conservation & Water Stewardship

From: Holly Urban & Brock Koutecky
Swan Valley Sport Fishing Enhancement
Contact: svsfe@mymts.net

Subject: Legacy Lake (Lake# 5)

Location: Legacy Lake, Porcupine Provincial Forest, 14U 334604 5831758

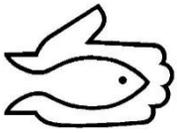
Research History: In the early 1970's, Fisheries Branch conducted preliminary surveys on Legacy Lake as part of the M-Series test netting program. Results indicated that the lake had depth of "32 feet in the north basin", and test netting results came up empty. SVSFE technicians and regional biologist, Ian Kitch suggested that the lake be resurveyed because of the promising findings in the M-Files assessment.

Summary of Activities: In early July 2015, SVSFE technicians assessed Legacy Lake to determine if the waterbody had potential for stocking game fish species. Pre-survey activities determined lake parameters using mapping software including lake area (13ha), lake shoreline (2,443m).

Lake surveys began on July 15th, 2015 with determining access and bathymetric mapping. The lake was mapped using 50 meter transects and two deep basins were discovered. In the north basin, a 9.5 m hole was located and in the south basin a 10 m hole was discovered. Habitat maps were created on site. Emergent and submergent vegetation percentages were documented and aquatic vegetation was identified. Modern bathymetric analysis and map can be viewed on page 5. The field habitat map created in 2015 can be viewed on page 6.



View of north basin from access point



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Fish sampling was conducted on July 16th 2015. One small mesh trap net was set on the east shore of the south basin for a duration of 21.5 hours. One 2" short set gill net was set in near the north basin for a duration of 1 hour and resulted in no fish. Due to a level of uncertainty regarding fish species present in the lake, one 2" gill net was set overnight for a total duration of 19.5 hours, which also came up empty. The fine mesh trap net catchment included 3,966 (72%) fathead minnows and 1507 (28%) sticklebacks, along with presence of leeches, giant diving beetles and dragonfly larvae. Fatheads appeared to be fairly healthy while the sticklebacks all displayed high levels of neascus (blackspot). CPUE was calculated at 254.56 fish per hour.

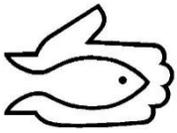
Water sampling, benthic sampling, and late summer vegetation mapping was conducted on August 11th 2015. Water parameters documented include pH, total dissolved solids (TDS), conductivity, dissolved oxygen, alkalinity, nitrates, nitrites, and phosphate levels. Water stations were conducted in two locations over the two deep basins of the lake. Water samples were taken and



Lake access point

Forage species



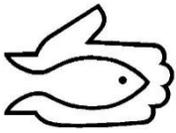


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analyzed in accordance to SVSFE water sampling protocol; 2m above bottom, mid-depth, and 2 meters below surface. Late summer dissolved oxygen and temperature was documented at every meter depth of each of the two respective deep basins. As per protocol, weather, turbidity, and water colour was documented at each water station as well. Benthic samples were taken at each water sampling station, as well in two random littoral areas to determine benthic prevalence in more likely habitats. Ten vegetation transects were mapped where technicians would mark the beginning and end of both emergent and submergent vegetation using a Garmin echoMap 50s sonar. The average depth where submergent vegetation ceased was 2.78m. A accurate vegetation prevalence map for Legacy Lake using GIS is still pending. A satellite image, including scale and sample sites can be viewed on page 7, and the water testing results can be viewed on page 8 & 9.



Fine mesh trap net



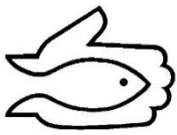
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Discussion/Recommendation: At current, it appears that Legacy Lake is a good candidate lake for stocking game fish species for recreational angling. The two deep basins are not very large, so conducting late winter dissolved oxygen readings would be recommended before investing in a stocking/management plan. The lake is full of forage, has an impressive degree of fish cover in terms of woody debris, aquatic vegetation and rock. The lake would without a doubt grow an aggressive predatory species throughout the open water season.

The area has four popular small trout fisheries; Vini Lake (rainbow trout, lake trout, arctic char), Snail Lake (arctic char), Nick Lake (rainbow trout), and Gass Lake (rainbow trout & tiger trout). It would be beneficial to introduce either brook trout or brown trout to the area to facilitate a more opportunity for trout anglers, brown trout possibly being the more suitable of the two. If winter oxygen results come up positive ($>4\text{mg/L}$), the recommended candidate species should be discussed amongst branch staff and SVSFE directors using the data collected from this assessment and suitability index literature.

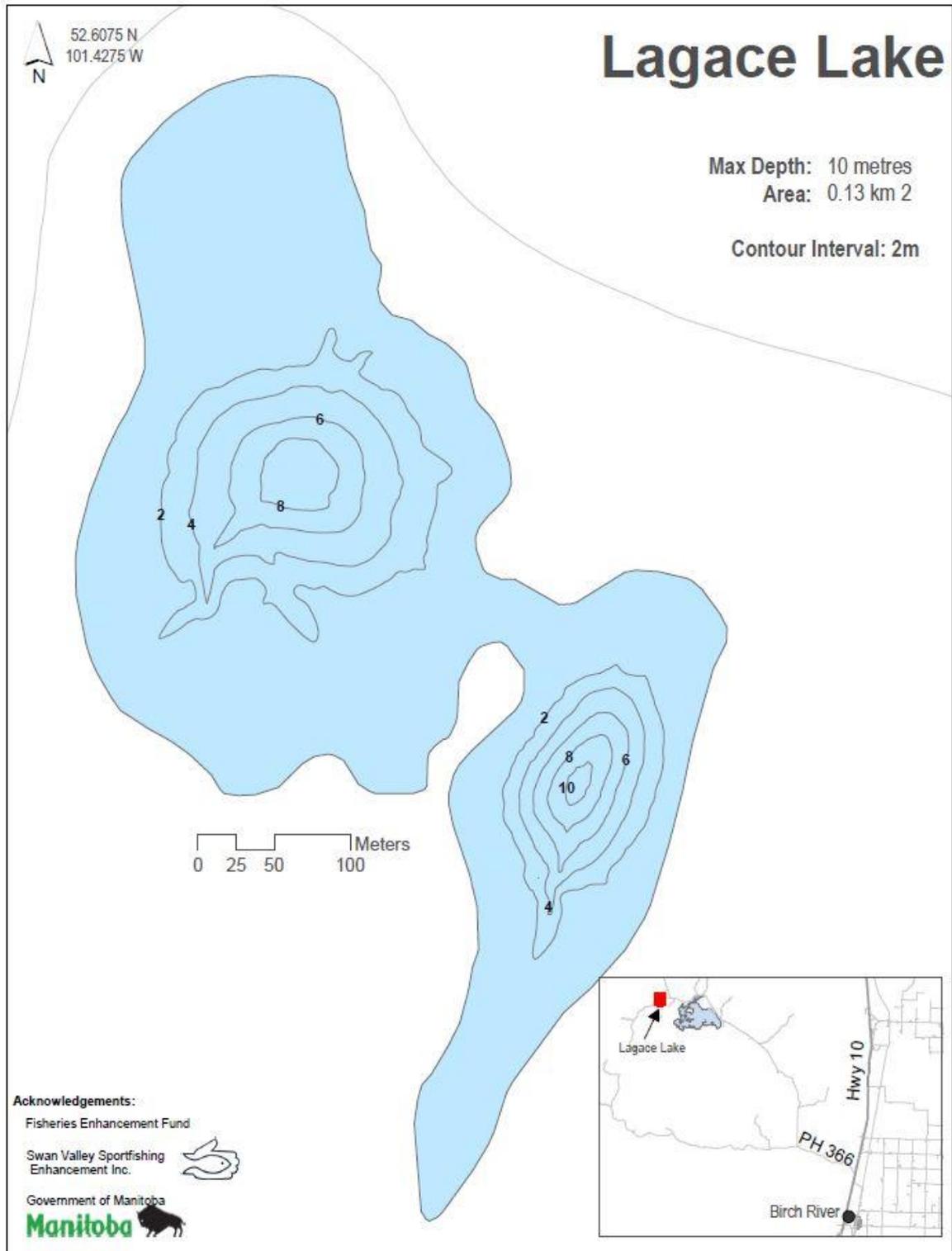
If oxygen appears to be an issue, stocking of a species like walleye who can tolerate lower oxygen levels may be an option. Natural recruitment is unlikely, however is also unknown. There is presence of rocky shoals that could potentially facilitate successful recruitment but the lake is very small to facilitate a walleye population, which could lead to high pressure. It is advised to review this option in more detail.

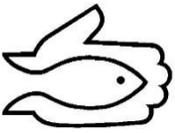
In summary, the lake is very aesthetic with great access - a short "carry in" boat launching area. This along with the high prevalence of forage and deep basins suggests that it would be a great candidate for creating a fishery for the average angler.



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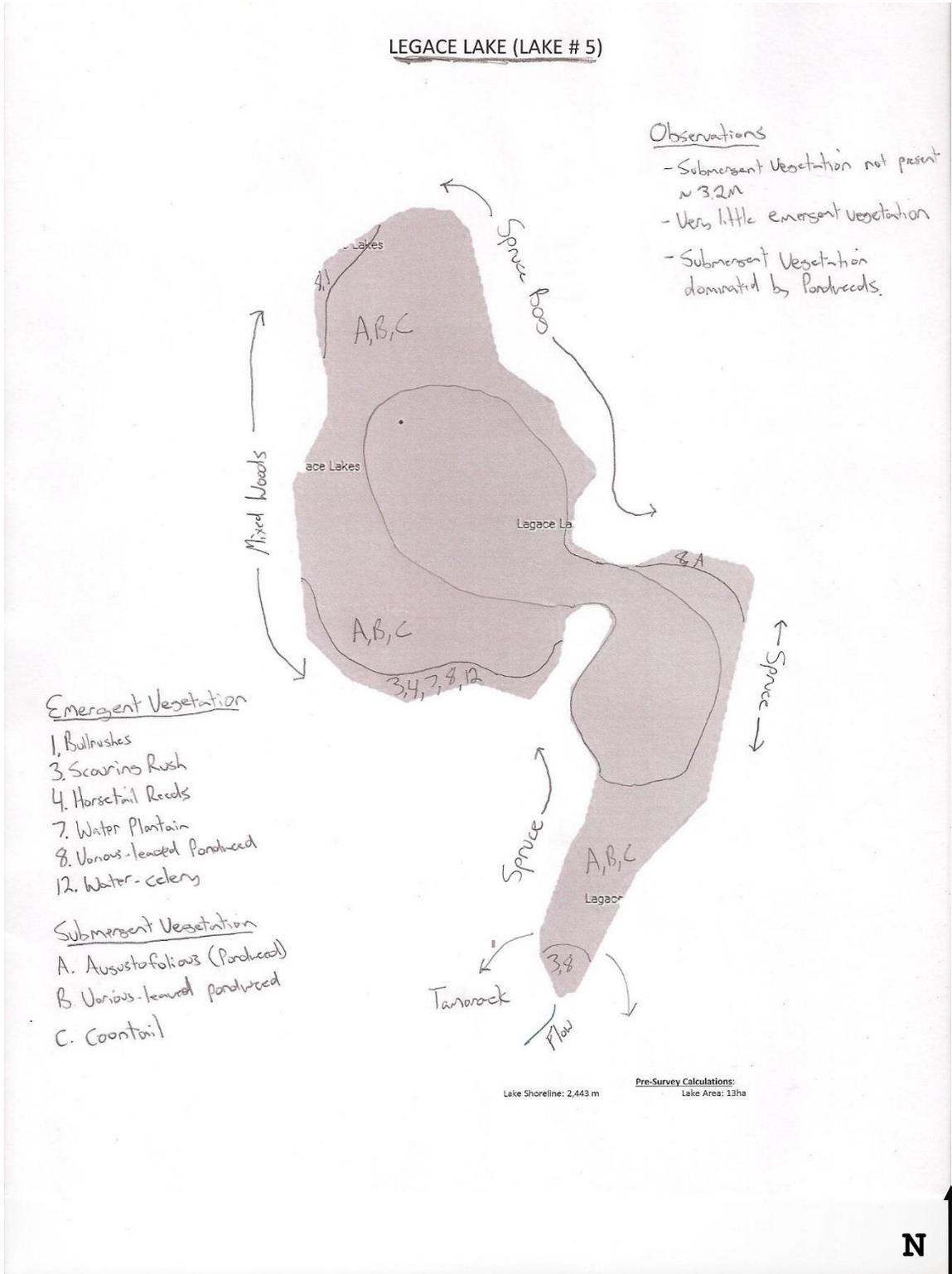
Bathymetric Map (2015)

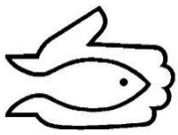




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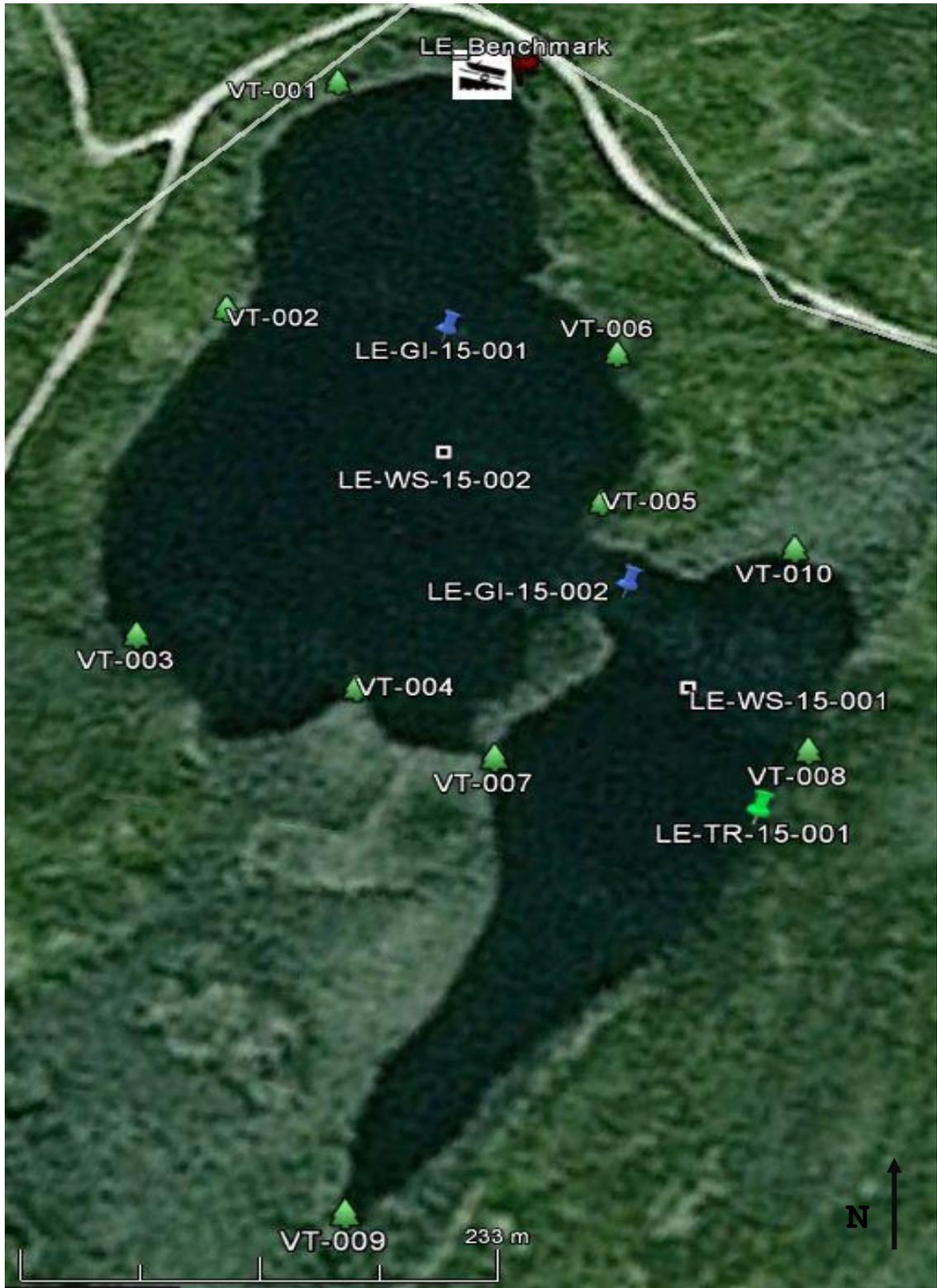
Habitat Map (sketch)

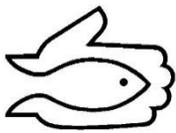




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Sample Sites Map





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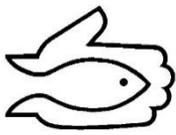
Water Chemistry Results:

Water Station #1					
Project Site Code:		LE-WS-15-001			
Date:		August-11-15			
UTM:	334803 5831589	Depth	2m	5m	8m
Time of Day:	10:30	TDS (ppm):	75	79	96
Cloud Cover:	1/8	CON (µs):	150	158	193
Air Temp (°C):	25°C	pH:	8.9	8.38	8.3
Sample Depth (m):	10m	Water Temp (°C)	19.3°C	18.1°C	16.4°C
Water Surface:	Calm	Alkalinity (mg/L):	80	80	80
Water Color:	Yellow/Brown	Nitrates (ppm):	0	0	0
Secchi (m):	1.1m	Nitrites (ppm):	0	0	0
Morpheodaphic Index (MEI):	TBD	Phosphate (ppm):	22.5	22.5	15

Water Station #1		
DO/Temp Profile		
Depth (m)	DO	TEMP°C
Surface	8.54	19.9
1	8.34	19.1
2	8.45	16.4
3	7.3	15.9
4	5.04	15.1
5	1.1	10.4
6	1.2	7.8
7	1.26	6.4
8	1.26	6
9	1.26	5.9
10	1.23	5.8
11		
12		
13		
14		

Benthic Sample - Water Station # 1			
Benthic Substrate:	MU	Benthic Organisms:	Unidentified exuviae, chironomids
Vegetation:	Pondweed	Comments:	Seperated brown/black muck, decaying vegetation, very little life.

Benthic Sample - Littoral Site # 1 (334706 5831536)			
Benthic Substrate:	SI, MU, GR	Benthic Organisms:	freshwater shrimp, water-mites
Vegetation:	Scouring Rush, Pondweed	Comments:	low counts



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Water Chemistry Results:

Water Station #2					
Project Site Code:		LE-WS-15-002			
Date:		August-11-15			
UTM:	334631 5831717	Depth	2m	4.5m	8m
Time of Day:	11:42	TDS (ppm):	75	75	100
Cloud Cover:	1/8	CON (µs):	150	151	207
Air Temp (°C):	26°C	pH:	9.08	8.49	8.24
Sample Depth (m):	9.7m	Water Temp (°C)	20°C	18.5°C	16.9°C
Water Surface:	Rippled	Alkalinity (mg/L):	80	80	80
Water Color:	Yellow/ Brown	Nitrates (ppm):	0	0	0
Secchi (m):	1.15	Nitrites (ppm):	0	0	0
Morpheodaphic Index (MEI):	TBD	Phosphate (ppm):	25	20	15

DO/Temp Profile		
Depth (m)	DO	TEMP°C
Surface	9.14	20.8
1	9.61	19.4
2	9.34	16.7
3	7.93	16.1
4	6.95	15.8
5	5.38	15.4
6	1.25	10.4
7	1.32	8.2
8	1.31	7.7
9	1.28	7.7
10		
11		
12		
13		
14		

Benthic Sample - Water Station # 2			
Benthic Substrate:	MU	Benthic Organisms:	chronomid exuvia
Vegetation:	Woody Debris, Chara	Comments:	substrate solid brown MU, Much different from WS-001

Benthic Sample - Littoral Site # 2 (334747 5831617)			
Benthic Substrate:	SA, GR	Benthic Organisms:	freshwater shrimp, clams, snails, chironomids, horsetail
Vegetation:	NA	Comments:	Low counts