Report

2019 Water Quality Monitoring Data

For the

Flambeau (Upper) Hydroelectric Project

FERC Project #2640

Flambeau Hydro, LLC

North Fork of the Flambeau River, Price County, Wisconsin

Respectfully Submitted by:

Angie Stine



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Summary Flambeau (Upper) Hydroelectric Project - FERC #2640

2019 marked the sixteenth year of water quality sampling under FERC approved "Water Quality Monitoring Plan Per License Article 406 for the Flambeau (Upper) Hydroelectric Project – FERC Project # 2640 – Flambeau Hydro, LLC. Monitoring was conducted on April 23, July 24, and August 14, 2019. This document contains all of the associated records for the 2019 monitoring along with summary figures and tables in four appendices: (1) Appendix A (Figures 1-4), (2) Appendix B (Tables 1-3), (3) Appendix C (sampling logs by date), and (4) Appendix D (laboratory reports and chains of custody).

A map of the Flambeau (Upper) Hydroelectric Project is shown in Figure 1 indicating the water quality sampling location.

Monitoring results for 2019 are shown in Table 1. No unusual Temperature (Figure 2) or Dissolved Oxygen (Figure 3) readings were observed. The Secchi depths are shown in Figure 4.

In general, the weather (temperature and rainfall) during 2019 monitoring season appeared slightly warmer in May, June, and July, & August, with lower than normal precipitation in January, March, April, June, July and August, and normal to high precipitation in the months of October, December, February, May, and September (Table 2).

Ice-Out occurred between Agenda and Nine Mile Landing on the North Fork of the Flambeau River sometime during the week beginning April 14, 2019. The Ice-Out sampling event occurred on April 23, 2019. River flow, based on the Flambeau (Upper) Hydroelectric Project records was approximately 4447 cubic feet per second. Sampling occurred between 8:10 a.m. and 8:33 a.m. Samples were taken without incident. No unusual D.O. or temperature readings were observed. Samples for laboratory analysis were delivered to White Water Associates, Inc. laboratory in Amasa, MI on April 24, 2019. White Water Associates, Inc. issued a laboratory report on May 21, 2019. No unusual levels of Chlorophyll *a*, True Color, or Total Phosphorus were noted in the laboratory reports.

River flow, based on Flambeau (Upper) Hydroelectric Project records, was approximately 760 cubic feet per second during the July 24, 2019 sampling event. Sampling occurred between 7:48 a.m. and 7:53 a.m. Samples were taken without incident. No unusual Temperature or D.O. readings were observed. Samples for laboratory analysis were delivered to White Water Associates, Inc. laboratory in Amasa, MI on July 24, 2019. White Water Associates, Inc. issued a laboratory report on August 27, 2019. No unusual levels of Chlorophyll *a*, True Color, or Total Phosphorus were noted in the laboratory reports.

River flow, based on Flambeau (Upper) Hydroelectric Project records, was approximately 671 cubic feet per second during the August 14, 2019 sampling event. Sampling occurred between 7:40 a.m. and 7:55 a.m. Samples were taken without incident. No unusual D.O. or Temperature readings were observed. Samples for laboratory analysis were delivered to White Water Associates, Inc. laboratory in Amasa, MI on August 15, 2019. White Water Associates, Inc. issued a laboratory report on September 13, 2019. No unusual levels of Chlorophyll *a*, True Color, or Total Phosphorus were noted in the laboratory reports.

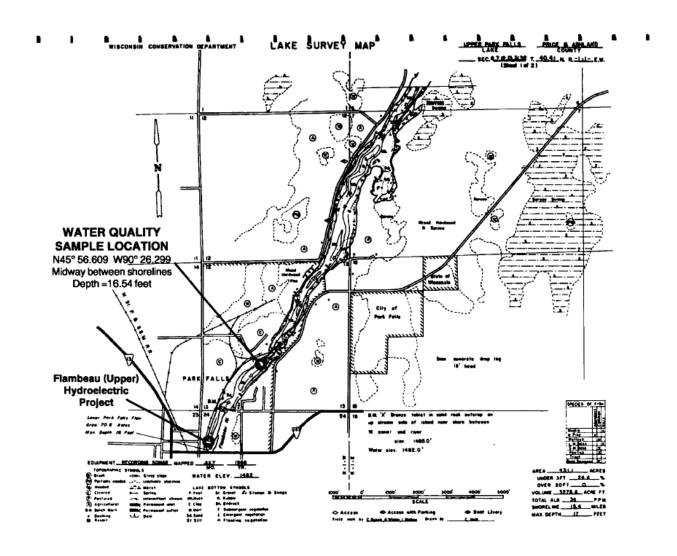
A summary of a comparison between the 2012 thru 2019 (Table 3) sampling results are as follows:

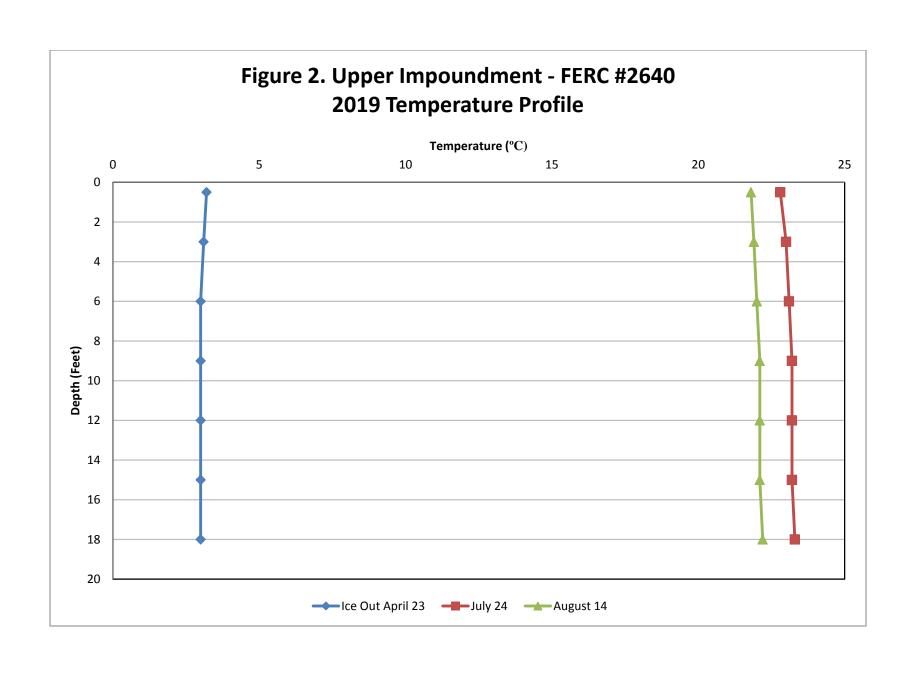
- 1. Water Clarity Secchi decreased Ice Out and August and increased in July
- 2. Chlorophyll a Increased Ice Out, July and August
- 3. Color Decreased Ice Out, July and August
- 4. Total Phosphorus Increased Ice Out, and decreased July and August
- 5. Overall, D.O. Increased Ice Out, July and August
- 6. Water Temperatures Decreased Ice Out, July and August

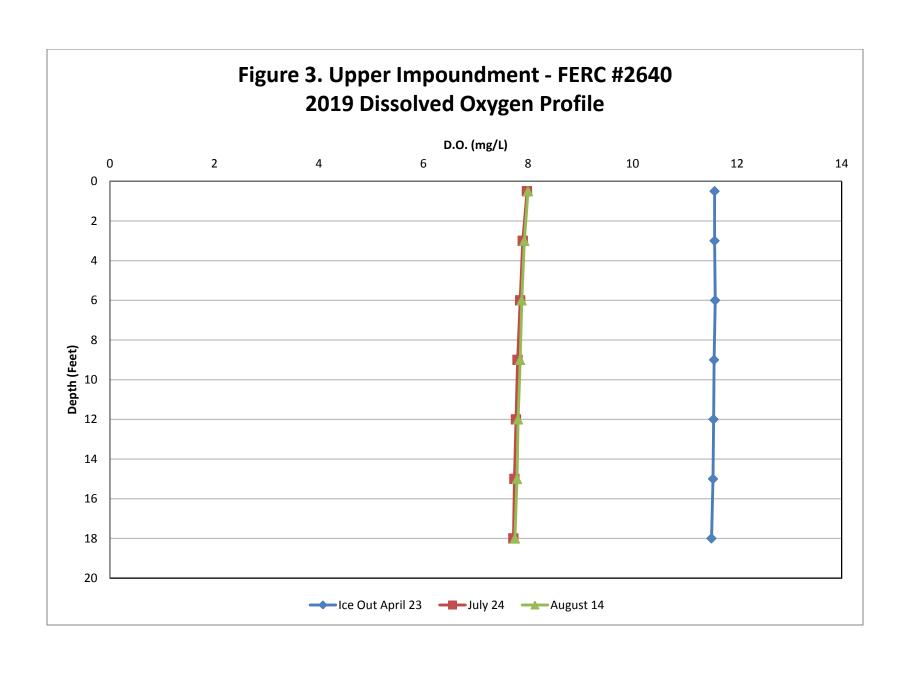
The next scheduled Water Quality Monitoring at the Flambeau (Upper) Hydroelectric Project is set to take place in 2020 beginning with the Ice-Out sampling event.

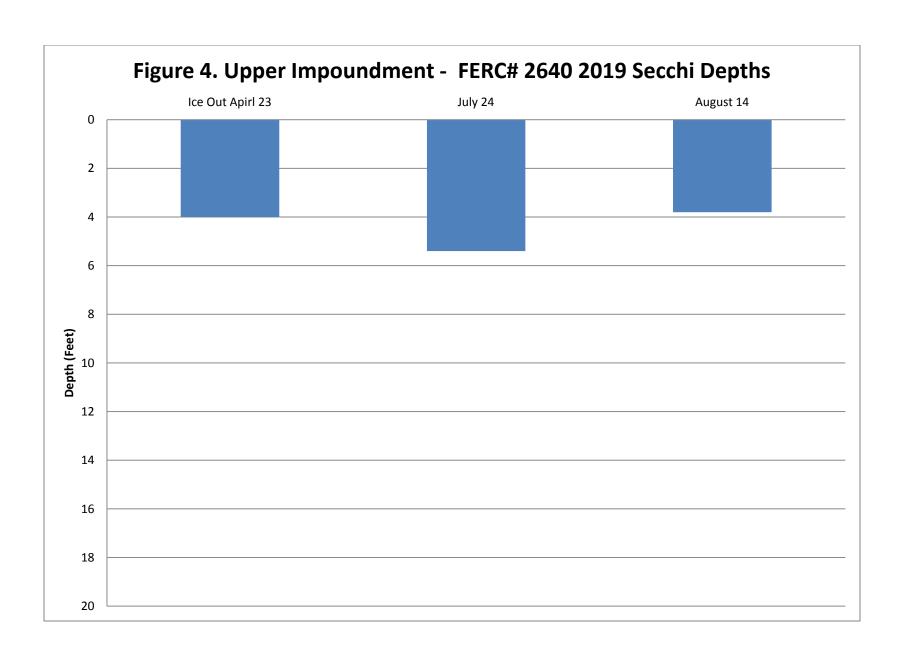
Appendix A – Flambeau (Upper) Hydroelectric Project Figures

Figure 1. Flambeau (Upper) Hydroelectric Project Map









Appendix B – Flambeau (Upper) Hydroelectric Project Tables

Table 1. Flambeau (Upper) Hydroelectric Project – FERC Project # 2640: 2019 Water Quality Sampling Data

	Ice Out April 23, 2019				July 24, 20	019	August 14, 2019			
Project Flow (c.f.s)		4447			760			671		
Dissolved Oxygen	Time	D.O. (mg/L)	Water Temp.	Time	D.O. (mg/L)	Water Temp.	Time	D.O. (mg/L)	Water Temp.	
0.5 feet below surface	8:28:0	11.57	3.2	7:49:50	7.98	22.8	7:42:43	8.00	21.8	
3 feet below surface	8:29:15	11.57	3.1	7:50:27	7.90	23.0	7:43:17	7.93	21.9	
6 feet below surface	8:30:13	11.58	3.0	7:50:58	7.85	23.1	7:43:50	7.88	22.0	
9 feet below surface	8:30:46	11.56	3.0	7:51:29	7.80	23.2	7:44:47	7.85	22.1	
12 feet below surface	8:31:09	11.55	3.0	7:52:05	7.77	23.2	7:45:20	7.81	22.1	
15 feet below surface	8:31:59	11.54	3.0	7:52:33	7.74	23.2	7:45:55	7.79	22.1	
18 feet below surface	8:32:47	11.51	3.0	7:53:19	7.72	23.2	7:46:56	7.75	22.2	
0.5 meter above bottom	8:33:01	11.51	3.1	7:53:52	7.70	23.3	7:47:35	7.74	22.2	
Secchi Disk	Time	Depth (ft)		Time	Depth (ft)		Time	Depth (ft)		
Feet below surface	8:25	4		7:58	5.4		7:45	3.8		
			1			T				
Chlorophyll a	Time	μg/L	_	Time	μg/L		Time	μg/L		
3 feet below surface	8:23	2.9		7:52	5.9		7:45	18		
Color (True)	Time	C.P.U. Units	LOD	Time	C.P.U. Units	LOD	Time	C.P.U. Units	LOD	
3 feet below surface	8:23	40	5*	7:52	25	5*	7:45	30	5*	
		Γ -			Т -			1 .		
Total Phosphorus	Time	mg/L	LOD	Time	mg/L	LOD	Time	mg/L	LOD	
3 feet below surface	8:23	0.028	0.008*	7:52	0.017	0.008*	7:45	0.018	0.008*	
3 feet above bottom	8:15	0.026	0.008*	7:56	0.016	0.008*	7:55	0.017	0.008*	
* Considered Method Det	ection Limit	N/A = Not A	Applicable ND =	No Detection	n					

Table 2. 2018/19 Water Year Monthly Temperature and Precipitation for Park Falls, Wisconsin

				Departure	Heating	Normal				
Month	Highest	Lowest	Average	From	Degree	Degree	Total	Total	Normal	% of Normal
	Temp.	Temp.	Temp.	Normal	Days	Days	Precip.	Snowfall	Precip.	Precipitation
October - 18	66	26	41.0	-2.2	738	678	4.67	1.5	2.85	72
November - 18	44	-7	23.2	-5.6	1247	1088	1.67	12.2	2.09	75
December - 18	44	-9	21.6	6.8	1338	1556	1.77	19.8	1.21	78
January – 19	40	-31	7.6	-2.6	1772	1699	0.80	10.4	0.96	70
February – 19	31	-19	10.6	-4.5	1515	1399	1.88	36.4	0.81	73
March – 19	58	-19	24.9	-1.0	1237	1210	1.19	6.7	1.49	64
April – 19	74	16	40.2	0.06	737	762	2.19	6.5	2.43	65
May – 19	82	28	49.3	-2.1	478	426	3.87	13.3	3.23	65
June – 19	87	40	61.7	1.6	126	179	4.10	0.00	4.23	64
July – 19	89	49	71.1	5.3	4	63	2.63	0.00	3.85	66
August – 19	87	46	66.1	1.8	44	86	2.51	0.00	3.70	66
September - 19	83	37	59.6	4.0	172	298	5.76	0.00	4.11	74

Source: NOAA/Duluth, MN

	Table 3. Flar	nbeau	(Upper) P	roject Sam	pling Compari	son Table 201	2 Thru C	urrent	Year	
Year	Month	Secchi Depth	Chlorophyll a	Color (True)	Total Phosphorus	Total Phosphorus	Low D.O.	High D.O.	Low Water Temp.	High Water Temp.
		Feet	μg/L	C.P.U. Units	Below Surface mg/L	Above Bottom mg/L	mg/L	mg/L	°C	°C
2012	April	3.50	1.00	100.00	0.027	*	12.01	11.71	8.50	8.90
2013	May	*	*	*	*	*	*	*	*	*
2014	June	3.20	1.90	130.00	0.024	*	7.09	7.37	17.60	17.80
2015	April	3.60	2.90	130.00	0.026	*	9.80	10.04	9.20	9.60
2016	March	3.50	ND	30.00	0.020	0.010	11.88	12.13	2.50	2.60
2017	April	4.90	4.00	30.00	0.018	0.029	10.92	11.08	6.10	6.70
2018	May	4.70	0.69	50.00	0.022	0.022	8.79	8.95	13.1	13.2
2019	April	4.00	2.90	40.00	0.028	0.029	11.51	12.13	3.00	3.20
Minimum	March/April/May/June	3.20	0.69	30.00	0.018	0.010	7.09	7.37	2.50	2.60
Maximum	March/April/May/June	4.90	4.00	130.00	0.028	0.029	12.01	12.13	17.60	17.80
Average	March/April/May/June	3.91	2.23	72.86	0.024	0.022	10.29	10.41	8.57	8.86
2012	July	3.50	5.90	70.00	0.036	*	6.56	6.91	24.30	24.80
2013	July	3.10	1.60	150.00	0.026	*	6.35	6.41	24.00	24.20
2014	July	3.50	3.20	100.00	0.035	*	7.19	7.35	21.00	21.30
2015	July	3.90	3.50	80.00	0.017	*	6.91	7.10	20.30	20.70
2016	July	3.70	6.30	40.00	0.022	0.019	7.29	7.49	22.50	22.70
2017	July	5.40	3.10	35.00	0.023	0.019	7.02	7.23	24.40	25.20
2018	July	3.60	4.90	40.00	0.030	0.026	6.77	6.95	22.90	23.30
2019	July	5.40	5.90	25.00	0.017	0.016	7.70	7.98	22.80	23.30
Minimum	July	3.10	1.60	25.00	0.017	0.016	6.35	6.41	20.30	20.70
Maximum	July	5.40	6.30	150.00	0.036	0.026	7.70	7.98	24.30	24.80
Average	July	4.01	4.30	67.50	0.026	0.020	6.97	7.18	25.53	22.80
2012	August	2.70	12.00	70.00	0.037	*	7.61	8.08	22.70	22.86
2013	August	3.30	6.00	130.00	0.066	*	7.45	7.69	19.50	19.70
2014	August	3.10	5.60	100.00	0.024	*	6.88	7.12	21.00	21.60
2015	August	3.50	16.00	70.00	0.029	*	7.40	7.79	20.70	21.70
2016	August	4.70	8.50	35.00	0.022	0.022	6.52	7.31	23.70	23.80
2017	August	4.60	4.90	35.00	0.018	0.015	7.33	7.53	19.80	19.90
2018	August	4.70	7.30	50.00	0.023	0.024	6.98	7.25	21.80	22.40
2019	August	3.80	18.00	30.00	0.018	0.017	7.74	8.00	21.80	22.20
Minimum	August	2.70	4.90	30.00	0.018	0.015	6.52	7.12	19.50	19.70
Maximum	August	4.70	18.00	130.00	0.066	0.024	7.74	8.08	23.70	23.80
Average	August	3.80	9.79	65.00	0.030	0.020	7.24	7.60	21.38	21.78

^{*}no sample taken

Appendix C - Flambeau (Upper) Impoundment Project Sampling Logs

IMPOUNDMENT SAMPLING LOG
Water Quality Study Location Thom Flamb,
Hydroelectric Project – FERC # 2640
Date: 4-23-19
Pre-Sampling Data:
HWL 1486,51 TWL 1467,6 CFS 4447
Sample Location: 145 66 1609
Performed by:
Time: $\frac{8.10}{1.10}$ Barometer: $\frac{30.14}{1.10}$
Air Temp: 38 °C Wind Speed: NWW 6 mp H Sky Conditions: Clear
Sky Conditions: Cuar
Precipitation within Last 24 Hours:
D.O. Meter Calibration:
Instrument Model Used: HQ40D
Were the batteries changed? ☐ Yes ☒️ No
If yes, when were they changed:
Battery Status:% Charge
Calibration Method: Factory
Sampling Depth Profile: Measured depth to bottom of impoundment: / 7 Feet
bottom of impoundment: / # Feet
Secchi Depth (± 0.1)
Time 4:25 Feet

Comments:

	Chloroph	yll a	
(3 feet below	surface h	orizor	ntal sampler)
Lab Sample I.D.	. #:		
Time 8: 23	Quantity	(ml)	Filtered
	1000		In Lab
Preservative		MgC	03

True Color	_
(3 feet below surface horizontal sampler)	
Lab Sample I.D. # :	
Time: 8,23	

	Phosphorus ace horizontal sampler)
Lab Sample I.D. #:	vee nonzentar sampler
Time 8,23	Preservative
	H₂SO ₄

Total	Phosphorus
(3 feet above bot	tom horizontal sampler)
Lab Sample I.D. #:	
Time(8:15	Preservative
	H ₂ SO ₄

D.	O. and Te	mperature	Profile
Depth	Time	D.O.	Temperature
(Feet)		(mg/L)	° C
0.5			
below	8.28	11:00	2 1
surface		11.57	3, 2
· 3	8.29,18	11:57	3./
6	8.30113	11:58	3,0
9	8130,44	11156	3.0
12	8.31:09	11.55	3,0
15	8.31,59	11:54	3.0
18/7	8.37:47	11:51	3,0
21			
24			
0.5 above	8.33.01	11:51	3.1
bottom	0,220	וכייו	31/

*If D.O. is below 5.0 mg/L notify agency and measure D.O. at 1.0 foot intervals if <5.0 mg/L.



IMPOUNDMENT	SAMPLING	LOC

Water Quality Study Location Upper Flumbean

Hydroelectric Project – FERC # 2640

Date: 2724–)4

Pre-Sampling Data:

HWL 1480.62 TWL 1467.5 CFS 760

Sample Location: 45° 56.604 w90 26.499

Performed by:
Angle Stine Ryan War nove
Time: 748 Barometer: 30114

Air Temp: GK Wind Speed: L Omph

Sky Conditions: Class

Precipitation within Last 24 Hours: 30.14

D.O. Meter Calibration:

Instrument Model Used: HQ40D

Were the batteries changed? ☐ Yes No

Calibration Method: Factory

Sampling Depth Profile: Measured depth to bottom of impoundment: Feet

Secchi Depth (± 0.1)
Time 7:56 5,4 Feet

Comments:

	Chloroph	ıyll a				
(3 feet below	ı surface h	orizo	ntal sampler)			
Lab Sample I.D. #:						
Time 7:52	Quantity	(ml)	Filtered			
	1000		In Lab			
Preservative		MgC	O ₃			

True Color	
(3 feet below surface horizontal sampler)	
Lab Sample I.D. #:	
Time: 7:52	

	Phosphorus
(3 feet below surfa	ace horizontal sampler)
Lab Sample I.D. #:	
Time 7.52	Preservative
,	H ₂ SO ₄

Total	Phosphorus
(3 feet above bot	tom horizontal sampler)
Lab Sample I.D. #:	
Time 7.56	Preservative
	H ₂ SO ₄

D.	D.O. and Temperature Profile								
Depth	Time	D.O.	Temperature						
(Feet)		(mg/L)	° C						
0.5	45	.,							
below	2.49.50	7.98	228						
surface		7,10	/~X~0						
3	250.22	7.90	23,0						
6	7:50.58	7.85	23.1						
9	7:51.29	7.80	23.2						
12	7.52:65	277	23.2						
15	752.33	7,74	23.2						
1817	75319	2.22	23 3						
21		1 1 1 2 2							
24									
0.5 above	2.12.62	7 20	73 2						
bottom	1,5),24	1110							

*If D.O. is below 5.0 mg/L notify agency and measure D.O. at 1.0 foot intervals if <5.0 mg/L.



IMPOUNDMENT SAMPLING LOG
Water Quality Study Location W fes Lanbeur
Hydroelectric Project – FERC # 2640
Date: 8-14-2019
Pre-Sampling Data:
HWL 1486.56 TWL 1467.5 CFS 671
Sample Location: 145° 56, 609 690° 24.249
Performed by: The Finna
Time: $\frac{3000}{100}$ Barometer: $\frac{3000}{100}$
Air Temp: 54 ° Wind Speed: NE 4mp 17
Sky Conditions:
Precipitation within Last 24 Hours:
D.O. Meter Calibration:
Instrument Model Used: HQ40D
Were the batteries changed? ☐ Yes 坑 No
If yes, when were they changed:
Battery Status:% Charge
Calibration Method: Factory
Sampling Depth Profile: Measured depth to bottom of impoundment: Feet
Secchi Depth (± 0.1)
Time + 7 Feet

Comments:

	Chloroph	yll a				
(3 feet belov	w surface h	orizor	ntal sampler)			
Lab Sample I.D	.#:					
Time 2:45	Quantity	Quantity (ml) Filtered				
	1000		in Lab			
Preservative		MgC	O ₃			

True Color	
(3 feet below surface horizontal sa	ampler)
Lab Sample I.D. # :	
Time: 7.45	

Total	Phosphorus
(3 feet below sur	face horizontal sampler)
Lab Sample I.D. #:	
Time 7.45	Preservative
	H ₂ SO ₄

Total	Phosphorus
(3 feet above bot	tom horizontal sampler)
Lab Sample I.D. #:	
Time 7:55	Preservative
	H ₂ SO ₄

D.	O. and Te	mperature	Profile
Depth	Time	D.O.	Temperature
(Feet)		(mg/L)	° C
0.5		^/	
below	7,42.43	8.00	21.8
surface		٠	ļ
3	7.43117	7,93	219
6	7.43.50	7.88	22.0
9	7,44,47	7.85	221
12	7:45.20	7.81	221
15	7.45:55	7 79	22./
18/Ç	7.5/6.5%	2.25	22,2
21		7	
24			
0.5 above	1 41.	1,74	22,2
bottom	7 / 1.33	777	12/2

*If D.O. is below 5.0 mg/L notify agency and measure D.O. at 1.0 foot intervals if <5.0 mg/L.



Appendix D – Flambeau (Upper) Hydroelectric Project Lab Reports and Chains of Custody



Client: RWE		WWA Job #: 82125				
Project:	Monitoring					
Date Received:	4/24/2019	Date Reported:	5/21/2019			
Sample Number	Client Sample ID	Date Sampled	Sample Matrix			
82125-001	Upper Flambeau Surface	04/23/19	Water			
82125-002	Upper Flambeau Bottom	04/23/19	Water			
82125-003	Lower Flambeau Surface	04/23/19	Water			
82125-004	Lower Flambeau Bottom	04/23/19	Water			
82125-005	Pixley Surface	04/23/19	Water			
82125-006	Pixley Bottom	04/23/19	Water			
82125-007	Crowley Surface	04/23/19	Water			
82125-008	Crowley Bottom	04/23/19	Water			

Client: RWE WWA Job #: 82125

Comments (if any):

Key to Laboratory Flags:

- *: RPD exceeds limits.
- B: The analyte-was found in the associated blank as well as in the sample.
- J: The quantitation is an estimated value because the result is less than the sample quantitation limit but greater than the detection limit.
- M: A matrix effect was present.
- Q: Batch QC data associated with the analysis does not meet the stated objectives
- H: Indicates analytical holding time exceedance.
- U: The analyte was analyzed for, but not detected.
- P: A manual peak selection or manual integration was performed to correct an erroneous software selection.

ND = Not Detected, MDL = Method Detection Limit, MQL = Method Quantitation Limit ppm = mg/L (liquid) or mg/kg (solid), ppb = ug/L (liquid) or ug/kg (solid)
For coliform, Negative = No coliform bacteria detected, Positive = Coliform bacteria detected

Sample Types:

S = Solids, DW = Drinking water, D = Dissolved, T = Total, TC = TCLP extract, SP = SPLP extract

All samples were received intact and properly preserved unless otherwise noted. The results reported relate only to the samples tested. This report shall not be reproduced, except in full, without the written approval of this laboratory. The Chain of Custody is attached.

This report satisfies the requirements of your project but has not been prepared to comply with NELAP reporting requirements.

I certify that the data contained in this Final Report has been generated and reviewed in accordance with approved methods and White Water Associates Standard Operating Procedures. Exceptions, if any, are discussed in the accompanying sample narrative. Release of this Final Report is authorized by White Water Associates management, as is verified by the following signature.

Approved By:

WI DNR Lab Certification Number: 999971280

MI DEQ Certification Number: 9306 DoD-ELAP Accreditation Number: 65802

ISO/IEC 17025:2005 Accredited



Client: RWE

WWA Job #: 82125

Project:

Monitoring

Date Received: 4/24/2019			Date Rep	orted: 5/21/2019					
Sample Results									
Sample No. / ID / Description / N	Aatrix Result	Flags	Units	Date/Time	Method	MDL	MQL	Analyst	
82125-001 / Upper Flambeau Su	ırface / Wate	r							
General Chemistry Parameter	rs								
Chlorophyll a	2.9		mg/m3	4/25/2019 13:30	10200H	NA	NA	CA	
Color	40		CU	4/24/2019 11:05	2120B	5	5	AH	
Total Phosphorus LL (t)	0.028	J	mg/L	5/15/2019 12:29	365.4	0.008	0.050	NK	
82125-002 / Upper Flambeau Bo	ottom / Water	r							
General Chemistry Paramete	rs								
Total Phosphorus LL (t)	0.026	J	mg/L	5/15/2019 12:31	365.4	0.008	0.050	NK	
82125-003 / Lower Flambeau St	urface/ Wate	er							
General Chemistry Paramete	rs								
Chlorophyll a	4.5		mg/m3	4/25/2019 13:30	10200H	NA	NA	CA	
Color	55		CU	4/24/2019 11:05	2120B	5	5	AH	
Total Phosphorus LL (t)	0.036	J	mg/L	5/15/2019 12:32	365.4	0.008	0.050	NK	
82125-004 / Lower Flambeau B	ottom / Wate	r							
General Chemistry Paramete	rs								
Total Phosphorus LL (t)	0.039	J	mg/L	5/15/2019 12:32	365.4	0.008	0.050	NK	
82125-005 / Pixley Surface / W	ater								
General Chemistry Paramete	ers								
Chlorophyll a	2.5		mg/m3	4/25/2019 13:30	10200H	NA	NA	CA	
Color	45		CU	4/24/2019 11:05	2120B	5	5	AH	
Total Phosphorus LL (t)	0.036	J	mg/L	5/15/2019 12:33	365.4	0.008	0.050	NK	



Client: RWE

WWA Job #: 82125

Project:

Monitoring

Date Received:

4/24/2019

Date Reported:

5/21/2019

	Sa	ample	Results					
Sample No. / ID / Description / Ma	atrix Result	Flags	Units	Date/Time	Method	MDL	MQL	Analyst
82125-006 / Pixley Bottom / Water	er							
General Chemistry Parameters								
Total Phosphorus LL (t)	0.048	J	mg/L	5/15/2019 12:33	365.4	0.008	0.050	NK
82125-007 / Crowley Surface / W	^v ater				•			
General Chemistry Parameters	!							
Chlorophyll a	2.7		mg/m3	4/25/2019 13:30	10200H	NA	NA	CA
Color	45		CU	4/24/2019 11:05	2120B	5	5	AH
Total Phosphorus LL (t)	0.038	J	mg/L	5/15/2019 12:34	365.4	0.008	0.050	NK
82125-008 / Crowley Bottom / W	ater							
General Chemistry Parameters Total Phosphorus LL (t)	0.036	J	ma/I	5/15/2019 12:35	365.4	0.008	0.050	NK
Total I nosphorus LL (t)	0.050	J	mg/L	3/13/2019 12.33	505.4	0.000	0.050	1 /17



Proje	ct No.:	82125	Date logged in.: 4/24/2019	Login person's initials: ER
Clien	t:	RWE		Number of coolers: 1
Proje	ct name:	Monitoring		Courier/shipper: WWA
V	1. Custod	y seals/origina	al packing tape were intact (if	applicable).
✓	2. Sample	s are in good	condition, i.e. not broken or le	aking.
✓.	3. Sample	s were receive	ed within holding times.	
✓	4. Sample	es were receive	ed on ice (ice in direct contact	with the samples).
	5. Temper	rature of the s	amples was between 0-6°C. To	e mp.: -1
			tween 0-6°C that are received o not require client notificatio	v
V	6. Sample	es matched the	Chain of Custody (COC).	
✓	7. Proper	containers we	ere used.	
~	8. Sample	es were collect	ed in White Water lab contain	ers.
~	9. There i	s adequate sa	mple volume for requested an	alyses and QC.
	10. For w	ater VOC san	aples, headspace is less than th	e size of a pea.
✓	_		ved to the proper pH. Sample Container Section.	bottles and preservation are
V	12. The C	OC is signed.	(either Sampler or Relinquish	ed by)
		ampling (SS) i log-in form.	s required. Bottles created are	e noted in sample containers
V	14. For D	issolved Anal	ysis (when applicable), sample	s were filtered in the lab.
	15. For so	oil VOCs, met	hanol preserved samples were	received.
	16. For S	oil VOCs, sam	ples were preserved with met	hanol in the lab.
	17. Client	t contact is ne	cessary. Provide documentation	on below.

CLIENT RESPONSE

COMMENTS/CORRECTIVE ACTION

Note: If hold time, volume, and received on ice or temperature criteria are not met when required by the method, results may not be able to be used for regulatory purposes. Check with your reporting agency for more information.

VGWI4 PS/19 Version 160504

WHITE WATER

CHAIN-OF-CUSTODY RECORD Job # (WWA office use): 82 [25]

EMAIL ADDRESS

CLIENT NAME / BILL TO

Jnless otherwise noted, drinking instructions provided by client or water report copies are sent to Packing: Ice REMARKS (Note any special conditions of receipt noted by Instructions to White Water WWA lab staff. Also note any MDEQ and Health Dept. Send my report by: residual chlorine.) Web: white-water-associates.com Phone: (906) 822-7889, Fax -7977 ASSOCIATES, INC. JPS□ FedEx□ USPS□ Client□ Other ANALYSIS TYPE REQUESTED (Attach list if neeeded) Comments/Sample temp. on receipt: 429 River Lane, P.O. Box 27 Amasa, Michigan 49903 Time: Time: でよりか ndicate if more than one page of COC \mathcal{C} records used Date: Date: CONTAINERS / PRESERVATIVES Va Thio upon arrival and indicate total number of Check off preservatives for each bottle bottles. WWA database contains bottle HOsN\oAnZ HOBN PINK-CUSTOMER R CONTRACT / PO / PROJECT NAME / WSSN# HCI Moniton PAGE / КОИН H2SO4 anoM Received by: COUNTY OF LOCATION Other: Received by: SAMPLE MATRIX lio2 CANARY - W/ SAMPLES Sed. TELEPHONE × snoenb∀ Time: Time: Drinking water 50.50 15 H 3 04.91 54 PC 304 16323 4.23.19 4-13-4-1680 TIME 380 Date: Date: dΙΖ Apper Flambeau Swace 4-23-11 DATE _ STATE 7 ب دنس، SAMPLER NAME (print first/last name) Upper Flambean Bo Hom must Flambean Surface LOWER Flamber Bolton Shir Containers for each sample may SAMPLE ID AND LOCATION be combined on one line. Monthly Sist bace months to thom ixley Surface Bothom Relinquished by: Relinquished by: SAMPLERS VX Km ADDRESS CITY 4 N

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WHITE - RETURN W/ REPORT



Client: RWE			WWA Job #: 84252
Project:	Monitoring		
Date Received:	7/25/2019	Date Reported:	8/27/2019
Sample Number	Client Sample ID	Date Sampled	Sample Matrix
84252-001	Upper Flambeau Surface	07/24/19	Water
84252-002	Upper Flambeau Bottom	07/24/19	Water
84252-003	Lower Flambeau Surface	07/24/19	Water
84252-004	Lower Flambeau Bottom	07/24/19	Water
84252-005	Pixley Surface	07/24/19	Water
84252-006	Pixley Bottom	07/24/19	Water
84252-007	Crowley Surface	07/24/19	Water
84252-008	Crowley Bottom	07/24/19	Water

Client: RWE

WWA Job #: 84252

Comments (if any):

Key to Laboratory Flags:

- *: RPD/RSD exceeds limits.
- B: The analyte was found in the associated blank as well as in the sample.
- J: The quantitation is an estimated value because the result is less than the sample quantitation limit but greater than the detection limit.
- M: A matrix effect was present.
- Q: Batch QC data associated with the analysis does not meet the stated objectives
- H: Indicates analytical holding time exceedance.
- P: A manual peak selection or manual integration was performed to correct an erroneous software selection.
- N: For reporting results that are non-target analytes, when requested by client for Mass Spec reporting.
- T: Tentatively Identified Compound.

ND = Not Detected, MDL = Method Detection Limit, MQL = Method Quantitation Limit ppm = mg/L (liquid) or mg/kg (solid), ppb = ug/L (liquid) or ug/kg (solid)

For coliform, Negative = No coliform bacteria detected, Positive = Coliform bacteria detected

Sample Types:

S = Solids, DW = Drinking water, D = Dissolved, T = Total, TC = TCLP extract, SP = SPLP extract

All samples were received intact and properly preserved unless otherwise noted. The results reported relate only to the samples tested. This report shall not be reproduced, except in full, without the written approval of this laboratory. The Chain of Custody is attached.

This report satisfies the requirements of your project but has not been prepared to comply with NELAP reporting requirements.

I certify that the data contained in this Final Report has been generated and reviewed in accordance with approved methods and White Water Associates Standard Operating Procedures. Exceptions, if any, are discussed in the accompanying sample narrative. Release of this Final Report is authorized by White Water Associates management, as is verified by the following signature.

Approved By:

WI DNR Lab Certification Number: 999971280

MI EGLE Certification Number: 9306 DoD-ELAP Accreditation Number: 65802

ISO/IEC 17025:2005 Accredited



Client: RWE

WWA Job #: 84252

Project:

Monitoring

Date Received:

7/25/2019

Date Reported:

8/27/2019

Date Received: 7/25/2019			Date Repo	orted: 8/27/2019				
		Sample	Results					
Sample No. / ID / Description	/ Matrix Resu	lt Flags	Units	Date/Time	Method	MDL	MQL	Analyst
84252-001 / Upper Flambeau	Surface / Wa	ter						
General Chemistry Parame	eters							
Chlorophyll a	5.9		mg/m3	7/25/2019 15:20	10200H	NA	NA	CA
Color	25		CU	7/25/2019 13:00	2120B	5	5	GG
Total Phosphorus LL (t)	0.017	J	mg/L	8/20/2019 12:40	365.4	0.008	0.050	NK
84252-002 / Upper Flambeau	Bottom / Was	er						
General Chemistry Parame	eters							
Total Phosphorus LL (t)	0.016	J	mg/L	8/20/2019 12:49	365.4	0.008	0.050	NK
84252-003 / Lower Flambeau	Surface/ Wa	ter						
General Chemistry Parame	eters							
Chlorophyll a	3.9		mg/m3	7/25/2019 15:20	10200H	NA	NA	CA
Color	20		CU	7/25/2019 13:00	2120B	5	5	GG
Total Phosphorus LL (t)	0.030	J	mg/L	8/20/2019 12:50	365.4	0.008	0.050	NK
84252-004 / Lower Flambeau	Bottom / Wa	ter						
General Chemistry Parame	eters							
Total Phosphorus LL (t)	0.026	J	mg/L	8/20/2019 12:50	365.4	0.008	0.050	NK
84252-005 / Pixley Surface /	Water							
General Chemistry Parame	eters							
Chlorophyll a	12		mg/m3	7/25/2019 15:20	10200H	NA	NA	CA
Color	25		CU	7/25/2019 13:00	2120B	5	5	GG
Total Phosphorus LL (t)	0.041	J	mg/L	8/20/2019 12:51	365.4	0.008	0.050	NK



Client: RWE

WWA Job #: 84252

Project:

Monitoring

Date Received:	7/25/2019			Date Rep	orted: 8/27/2019				
		Sa	mple	Results					
Sample No. / ID / De	escription / Mat	rix Result	Flags	Units	Date/Time	Method	MDL	MQL.	Analyst
84252-006 / Pixley I	Bottom / Water								
General Chemistr	y Parameters								
Total Phosphorus LI	L (t)	0.034	J	mg/L	8/20/2019 12:52	365.4	0.008	0.050	NK
84252-007 / Crowle	y Surface / Wa	ter				•			
General Chemistr	ry Parameters								
Chlorophyll a		15		mg/m3 _.	7/25/2019 15:20	10200H	NA	NA	CA
Color		25		CU	7/25/2019 13:00	2120B	5	5	GG
Total Phosphorus LI	_ (t)	0.032	J	mg/L	8/20/2019 12:54	365.4	0.008	0.050	NK
84252-008 / Crowle	y Bottom / Wa	ter							
General Chemistr	ry Parameters								
Total Phosphorus LI	_ (t)	0.040	J	mg/L	8/20/2019 12:54	365.4	0.008	0.050	NK

Login Checklist



Proj	ject No.:	84252	Date logged in.: 7/25/2019	Login person's initia	ls: ER
Clie	ent:	RWE		Number of coolers:	1
Pro	ject name:	Monitoring		Courier/shipper:	WWA
✓	1. Custody	seals/origin	al packing tape were intact (if ap	pplicable).	
✓	2. Samples	are in good	condition, i.e. not broken or leal	king.	
✓	3. Samples	were receiv	ed within holding times.	NOTE	CS on #4:
V	4. Samples	were receiv	ed on ice (in direct contact with	the samples).	
✓	5. Temper	ature of the	samples was between 0-6°C. Ten	np.: 0	
		•	etween 0-6°C that are received a lo not require client notification.	v	lay
✓	6. Samples	matched th	e Chain of Custody (COC).		
~	7. Proper o	containers w	ere used.		
✓	8. Samples	were collec	ted in White Water lab containe	rs.	
~	9. There is	adequate sa	mple volume for requested anal	yses and QC.	
	10. For wa	iter VOC sai	mples, headspace is less than the	size of a pea.	
V			rved to the proper pH. Sample be Container Section.	ottles and preservation a	re
✓	12. The CO	OC is signed	. (either Sampler or Relinquishe	d by)	
		mpling (SS) log-in form.	is required. Bottles created are	noted in sample containe	ers
~	14. For Di	ssolved Ana	lysis (when applicable), samples	were filtered in the lab.	
	15. For soi	il VOCs, me	thanol preserved samples were r	eceived.	
	16. For So	il VOCs, sar	nples were preserved with meth:	anol in the lab.	
	17. Client	contact is ne	ecessary. Provide documentation	below.	
C	OMMENT	S/CORREC	TIVE ACTION		

CLIENT RESPONSE

Note: If hold time, volume, and received on ice or temperature criteria are not met when required by the method, results may not be able to be used for regulatory purposes. Check with your reporting agency for more information.

Jay 1/20/19 Version

160504

Job # (WWA office use): g + 25

CHAIN-OF-CUSTODY RECORD

Unless otherwise noted, drinking instructions provided by client or water report copies are sent to **REMARKS** (Note any special Packing: Ice Cooler Instructions to White Water conditions of receipt noted by WWA lab staff. Also note any MDEQ and Health Dept. Send my report by: residual chlorine.) Web: white-water-associates.com mai Phone: (906) 822-7889, Fax -7977 UPS \square FedEx \square USPS \square Client \square Other $\overline{\mathbb{W}}\overline{\mathbb{W}}\overline{\mathbb{R}}$ ASSOCIATES, INC. WHITE WATER ANALYSIS TYPE REQUESTED (Attach list if neeeded) Comments/Sample temp. on receipt: 429 River Lane, P.O. Box 27 Amasa, Michigan 49903 Time: (35) Time: × 6W Date: 7-75-Indicate if more than one page of COC Crecords used Date: 9 CONTAINERS / PRESERVATIVES OidT BN upon arrival and indicate total number of Check off preservatives for each bottle bottles. WWA database contains bottle HOsN\oAnZ NaOH CONTRACT / PO / PROJECT NAME / WSSN# ᆼ HCI preservation details. Monitoring PAGE / HNO3 H2SO4 None Other: COUNTY OF LOCATION Received bys Received by: SAMPLE MATRIX lioS EMAIL ADDRESS Sed, TELEPHONE Time: 17130 snoenb∀ Time: Drinking water 80:11 7:56 12:30 19:34 13:10 50: 11 Upper Flambeau Swave May 1152 1/24/19 3:14 TIME Dațe: ZIP DATE STATE SAMPLER NAME (print first/last name) Uppar Flambeau Bo Hom ouver Hambean Surface Cowar Flambery Bothon Containers for each sample may SAMPLE ID AND LOCATION be combined on one line. rowley Sur Face Aronder Bothom Bottom ixley Surface SAMPLER'S SIGNATURE CLIENT NAME / BILL TO 122 Relinquished by: Kelinquished by: P. XIC. ADDRES CITY N

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PAK-CUSTOMER

CANARY - W/ SAMPLES

WHITE - RETURN W/ REPORT



Client: RWE			WWA Job #: 84707
Project:	Monitoring		
Date Received:	8/15/2019	Date Reported:	9/13/2019
Sample Number	Client Sample ID	Date Sampled	Sample Matrix
84707-001	Upper Flambeau Surface	08/14/19	Water
84707-002	Upper Flambeau Bottom	08/14/19	Water
84707-003	Lower Flambeau Surface	08/14/19	Water
84707-004	Lower Flambeau Bottom	08/14/19	Water
84707-005	Pixley Surface	08/14/19	Water
84707-006	Pixley Bottom	08/14/19	Water
84707-007	Crowley Surface	08/14/19	Water
84707-008	Crowley Bottom	08/14/19	Water

Client: RWE

WWA Job #: 84707

Comments (if any):

Key to Laboratory Flags:

- *: RPD/RSD exceeds limits.
- B: The analyte was found in the associated blank as well as in the sample.
- J: The quantitation is an estimated value because the result is less than the sample quantitation limit but greater than the detection limit.
- M: A matrix effect was present.
- Q: Batch QC data associated with the analysis does not meet the stated objectives
- H: Indicates analytical holding time exceedance.
- P: A manual peak selection or manual integration was performed to correct an erroneous software selection.
- N. For reporting results that are non-target analytes, when requested by client for Mass Spec reporting.
- T: Tentatively Identified Compound.

ND = Not Detected, MDL = Method Detection Limit, MQL = Method Quantitation Limit ppm = mg/L (liquid) or mg/kg (solid), ppb = ug/L (liquid) or ug/kg (solid)

For coliform, Negative = No coliform bacteria detected, Positive = Coliform bacteria detected

Sample Types:

S = Solids, DW = Drinking water, D = Dissolved, T = Total, TC = TCLP extract, SP = SPLP extract

All samples were received intact and properly preserved unless otherwise noted. The results reported relate only to the samples tested. This report shall not be reproduced, except in full, without the written approval of this laboratory. The Chain of Custody is attached.

This report satisfies the requirements of your project but has not been prepared to comply with NELAP reporting requirements.

I certify that the data contained in this Final Report has been generated and reviewed in accordance with approved methods and White Water Associates Standard Operating Procedures. Exceptions, if any, are discussed in the accompanying sample narrative. Release of this Final Report is authorized by White Water Associates management, as is verified by the following signature.

Approved By:

WI DNR Lab Certification Number: 999971280

MI EGLE Certification Number: 9306 DoD-ELAP Accreditation Number: 65802

ISO/IEC 17025:2005 Accredited



Client: RWE

WWA Job #: 84707

Project:

Monitoring

Date Received:

8/15/2019

Date Reported:

9/13/2019

Date Received: 8/15/2019			Date Repo	orted: 9/13/2019				
	Sa	ample	Results					···
Sample No. / ID / Description / Mar	trix Result	Flags	Units	Date/Time	Method	MDL	MQL.	Analyst
84707-001 / Upper Flambeau Surf	ace / Wate	r						
General Chemistry Parameters		\						
Chlorophyll a	18		mg/m3	8/22/2019 15:10	10200H	NA	NA	AH
Color	30		CU	8/15/2019 13:45	2120B	5	5	AH
Total Phosphorus LL (t)	0.018	J	mg/L	8/20/2019 13:26	365.4	0.008	0.050	NK
84707-002 / Upper Flambeau Botte	om / Water							
General Chemistry Parameters								
Total Phosphorus LL (t)	0.017	J .	mg/L	8/20/2019 13:28	365.4	0.008	0.050	NK
84707-003 / Lower Flambeau Surf	ace / Wate	r						
General Chemistry Parameters								
Chlorophyll a	6.9		mg/m3	8/22/2019 15:10	10200H	NA	NA	AH
Color	35		CU	8/15/2019 13:45	2120B	5	5	AH
Total Phosphorus LL (t)	0.031	J	mg/L	8/20/2019 13:28	365.4	0.008	0.050	NK
84707-004 / Lower Flambeau Bott	om / Wate	r						
General Chemistry Parameters								
Total Phosphorus LL (t)	0.027	J	mg/L	8/20/2019 13:29	365.4	0.008	0.050	NK
84707-005 / Pixley Surface / Water	er							
General Chemistry Parameters								
Chlorophyll a	7.4		mg/m3	8/22/2019 15:10	10200H	NA	NA	AH
Color	40		CU	8/15/2019 13:45	2120B	5	5	AH
Total Phosphorus LL (t)	0.025	J	mg/L	8/20/2019 13:29	365.4	0.008	0.050	NK



Client: RWE

WWA Job #: 84707

Project:

Monitoring

Date Received:

8/15/2019

Date Reported:

9/13/2019

Date Received: 8/15/2019		÷	Date Repo	orted: 9/13/2019				
	Sa	mple	Results					
Sample No. / ID / Description	/ Matrix Result	Flags	Units	Date/Time	Method	MDL	MQL	Analyst
84707-006 / Pixley Bottom / V	Vater							
General Chemistry Parame	ters							
Total Phosphorus LL (t)	0.025	J	mg/L	8/20/2019 13:30	365.4	0.008	0.050	NK
84707-007 / Crowley Surface	/ Water							
General Chemistry Parame	eters							
Chlorophyll a	11		mg/m3	8/22/2019 15:10	10200H	NA	NA	AH
Color	30		CU	8/15/2019 13:45	2120B	5	5	AH
Total Phosphorus LL (t)	0.028	J	mg/L	8/20/2019 13:30	365.4	0.008	0.050	NK
84707-008 / Crowley Bottom	/ Water							
General Chemistry Parame	eters							
Total Phosphorus LL (t)	0.025	J	mg/L	8/20/2019 13:32	365.4	0.008	0.050	NK

Login Checklist



Pro	ject No.:	84707	Date logged in.: 8/15/2019	Login person's initials: ER
Clie	ent:	RWE		Number of coolers: 1
Pro	ject name:	Monitoring		Courier/shipper: WWA
✓	1. Custody	seals/original	packing tape were intact (if app	licable).
✓	2. Samples	are in good co	ondition, i.e. not broken or leaki	ng.
	3. Samples	were received	within holding times.	NOTES on #4:
✓	4. Samples	were received	on ice (in direct contact with th	e samples).
V	5. Tempera	ature of the sa	mples was between 0-6°C. Temp	o.: 1
		-	veen 0-6°C that are received at t not require client notification.	he laboratory on the day
Y	6. Samples	matched the	Chain of Custody (COC).	
✓	7. Proper o	ontainers wer	e used.	
✓	8. Samples	were collected	l in White Water lab containers	
✓	9. There is	adequate sam	ple volume for requested analys	es and QC.
	10. For wa	ter VOC samp	oles, headspace is less than the si	ze of a pea.
✓	_		ed to the proper pH. Sample bott Container Section.	tles and preservation are
✓	12. The CO	OC is signed. (either Sampler or Relinquished	by)
		mpling (SS) is og-in form.	required. Bottles created are no	ted in sample containers
V	14. For Dis	ssolved Analys	is (when applicable), samples w	ere filtered in the lab.
	15. For soi	l VOCs, metha	anol preserved samples were rec	eeived.
	16. For Soi	il VOCs, samp	les were preserved with methan	ol in the lab.
	17. Client	contact is nece	ssary. Provide documentation b	elow.

COMMENTS/CORRECTIVE ACTION

#3. 190815 8:50ER color received past hold time

CLIENT RESPONSE

Note: If hold time, volume, and received on ice or temperature criteria are not met when required by the method, results may not be able to be used for regulatory purposes. Check with your reporting agency for more information.

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CITY	STATE /	ZIP	CONTRACT / PO / PROJECT NAME / WSSN#	ACT / I	70 / PF	SOJEC	NAM	E/WS	#NS			ব	NALY	SIS TY	PE RI	GUES	TED (ttach lis	ANALYSIS TYPE REQUESTED (Attach list if neeeded)	(pa)	
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SAMPLER NAME (print first/last name)	je)		COUNTY OF LOCATION	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	OCATI		PAGE			Indic	Indicate if more than	e than	<u> </u>							· •	email
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S. St.	\(p bot	upon arrival and indi bottles. WWA datab preservation details.	l and in /A data n details	dicate to base co	upon arrival and indicate total number of bottles. WWA database contains bottle preservation details.	oer of	entaine	$\frac{\gamma}{u_1}$	5						Unless otherwise noted, drinking	ted, drinking
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SAMPLE ID AND LOCATION	L F	Ļ							/	HOB		qun	/- 77	70	5/2					REMARKS (Note any special instructions provided by client or	any special
be combined on one line.	Д П	u N	Orinking 	ydneor	lios	Jther: _	12804	FONH	IOI	HOsu M\oAn2	oidT sV	V IstoT	10	7	2 '`\					conditions of receipt noted by WWA lab staff. Also note any	pt noted by to note any
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Upper Flambeau Surface 8-144 715	シディア	Š	×				<u> </u>					7	<u></u>	X Z				_			
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5 Pixley Surface	Alle Alle	13.18				<u> </u>						٠,	<u>/</u>	××							
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