

**Ecological evaluation of the defunct Cooks Run Fish Hatchery
and its influence on the stream
(Iron County, Michigan)**

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Chapter 1. Introduction

Rivers could be considered as the circulatory system of the environment. For centuries, humans have affected rivers by restraining or modifying flow, channelizing, damming, confining to man-made channels, transporting and diluting waste materials, and more. All these uses have an impact on the health of the river and its inhabitants. In the proposed project, we focus on the Cooks Run Fish Hatchery built in the mid-1930s by the Civilian Conservation Corps (CCC) on the stream known as Cooks Run in Iron County, Michigan. The original construction included redirecting and channelizing parts of Cooks Run using weirs and screens (Younk, 2013). While always referred to locally as the “Cooks Run Fish Hatchery”, the facility apparently was never a hatchery but rather a fish rearing facility. It was used only to rear trout that were hatched at other facilities. During its active operation, the fish rearing facility influenced the Cooks Run ecosystem (including water chemistry, hydrodynamics, and fish and macroinvertebrate habitat). A catastrophic high-water event in the 1980s mobilized significant organic material from rearing ponds and into the stream. The resulting biological oxygen demand was thought by some to be the cause of a downstream fish kill event. The historic Cooks Run Fish Hatchery has gone nearly two decades without regular use. According to news reports, the Cooks Run Fish Hatchery was briefly managed in 2013 for Iron County (Mansfield, 2021). Downstream of the rearing facility, Cooks Run flows about 5 miles before joining the South Branch of the Paint River. Both streams are high quality trout streams with the natural capacity to produce and maintain a sustainable recreational fishery. A legitimate question can be asked: “Are there any ongoing detrimental impacts of the defunct fish rearing facility on the Cooks Run?” Decommissioning of the fish facility remnants and restoration of the stream reach should be considered if impacts are present, ongoing, and significant. This project investigates the question of impact of the Cooks Run Fish Hatchery by doing an ecological evaluation of the site. Besides this introductory chapter, this report is organized in six chapters. The study area is described in Chapter 2. Chapter 3 states the methods of the ecological evaluation. Chapter 4 presents the results. Chapter 5 discusses the results and provides recommendations. Three appendices complete this document. Appendix 1 contains literature cited, Appendix 2 contains laboratory results, and Appendix 3 contains the Procedure 51 habitat assessment photos.



Chapter 2. Study area

The Cooks Run Fish Hatchery facility (Iron County, Michigan) is on the Cooks Run and located 13.5 miles west of the City of Iron River (Figure 1). The Cooks Run is a tributary of the South Branch of the Paint River. The Paint River is an important tributary of the Menominee River. Although the proposed project specifically addresses gathering information for future restoration of a relatively small stream reach, the potential benefits from a restoration extend downstream for miles in the Cook's Run system and beyond to the Paint River system in terms of reducing temperatures in summer months and reducing sediment and nutrient sources to downstream reaches. Cold stream temperatures are crucial to trout streams. Cool stream temperature allows trout to thrive and better compete against warm water fishes such as smallmouth bass. Warmer average air temperatures push water temperatures upward and intensify a potential problem for cold water fish species.

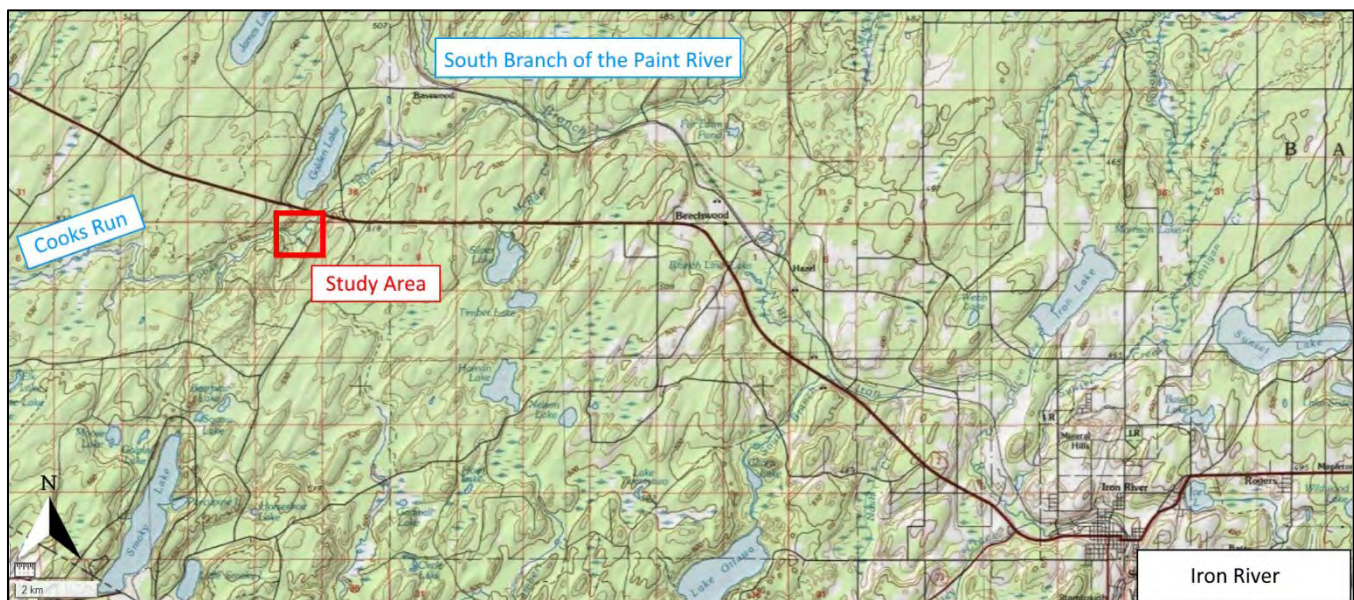


Figure 1. Topographic map of the study area and the surroundings.

Figure 2 presents a detailed map of the Cooks Run study area and shows several important features. The Cooks Run channel in Figure 2 is shown in dark blue. This is likely the original path of the Cooks Run in the vicinity of the Cooks Run Hatchery. Photo 1 is an image of the Cooks Run channel. An unnamed tributary (Photo 2 and shown in medium blue on Figure 2) enters the Cooks Run channel from the southwest. The diversion ditch was constructed as part of the Cooks Run Hatchery facility. This feature is shown in light blue on Figure 2. During hatchery operation, this ditch presumably provided a means of diverting water during high flow events thus bypassing the Cooks Run channel and the fish rearing runs. Today the diversion ditch is a permanent stream with distinct bed and banks (Photo 3). The historic map on which Figure 2 is based labels a channel lying south of the diversion ditch as "branch." There was no evidence of this channel in the vicinity of the western junction of the Cooks Run channel and the diversion ditch. Somewhat south of that junction, running water was observed flowing from the Cooks



Run channel and underneath the old road (trail) flowing east into the 10-acre swamp that lies south of the diversion ditch. This observation was made during a high-water period and noticeable flow was not always present at this site. There was no bed and bank observed at this crossing point of the trail. Aerial photos show standing water in the 10-acre wetland that may be part of the branch. No obvious confluence of the branch and the Cooks Run channel was present at the downstream end (east end) of the channel in the vicinity of the mapped confluence (Figure 2). Further north along the old road (trail), a small notch in trail allowed some water to drain to the Cooks Run channel although there was not permanent flow. The 10-acre swamp is an important habitat feature for wildlife. Frogs, turtles and wetland-associated birds were present. Figure 2 shows the location of 14 historic dam remnants (light red rectangles) that were part of the water control infrastructure delimiting the fish rearing runs of the Cooks Run facility. At present, these remnants consist of concrete abutments, but no wood structure (Photo 4).



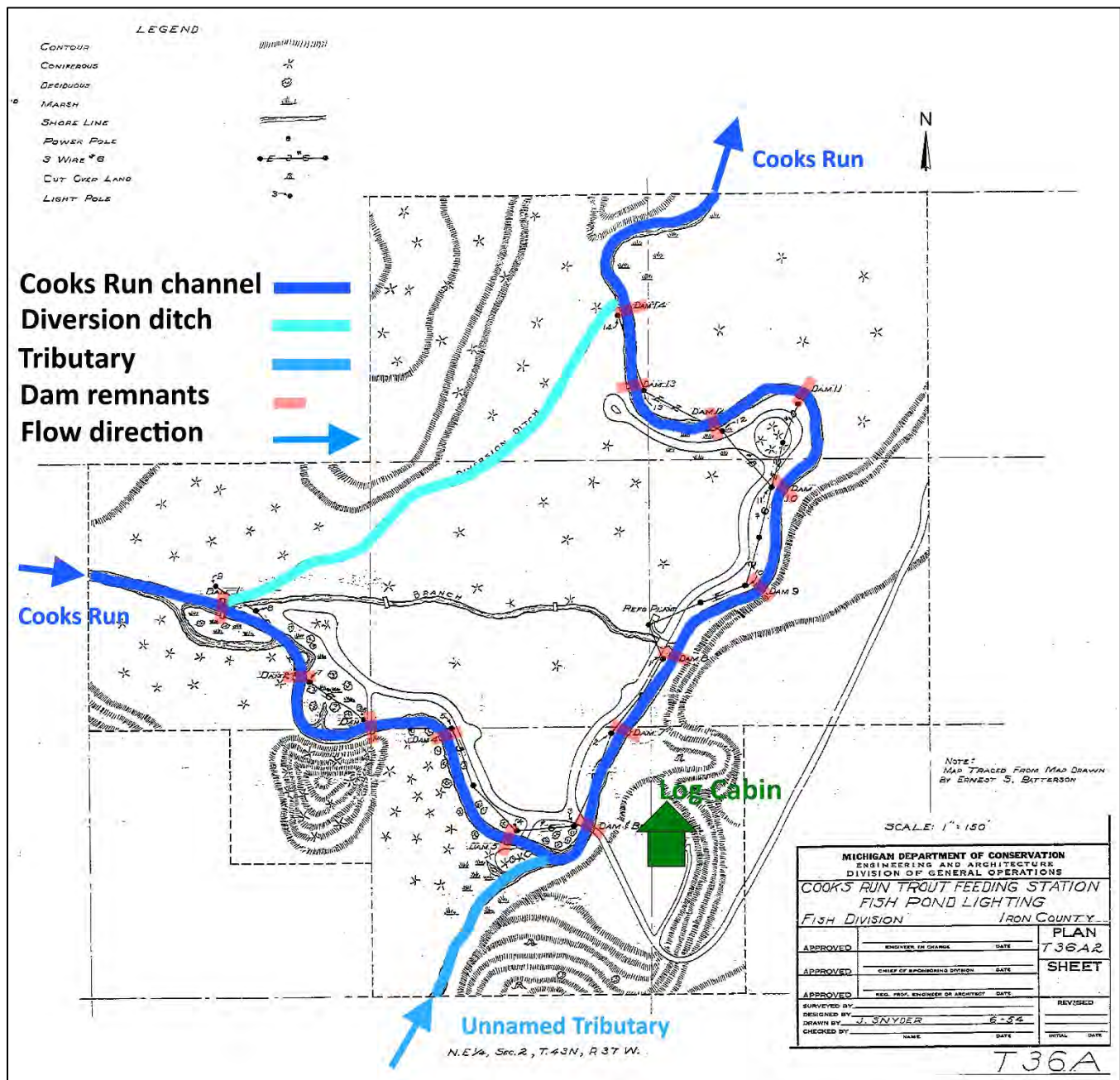


Figure 2. Detailed map of the Cooks Run study area.





Photo 1. Looking upstream of CR07.



Photo 2. Looking downstream of CR02.





Photo 3. Looking upstream of CR04.



Photo 4. Concrete abutments of a remnant dam.



Chapter 3. Methods of the ecological evaluation

Figure 2 is a detailed map of the Cooks Run study area and shows important features such as the natural river bed, constructed diversion ditch, fourteen remnant manmade dams, and an unnamed tributary. The ecological evaluation of this area of the Cooks Run included several stream characteristics including temperature and dissolved oxygen, stream discharge, water and sediment chemistry, stream habitat and the macroinvertebrate community. Both the USDA Forest Service and the Michigan Department of Natural Resources were contacted and report that historic fish community data for the study area is dated.

Section 1. Temperature and dissolved oxygen monitoring

Table 1 and Figure 3 present the seven temperature and three dissolved oxygen (DO) data loggers monitoring locations within the study area. These sites can be sorted into three categories:

Upstream of the fish facility – one on the Cooks Run (CRO1) and one on the unnamed tributary (CRO2);

Downstream of the fish facility – one site on the Cooks Run (CRO3); and

Within the complex associated with the fish facility – four sites (CRO4, CRO5, CRO6, and CRO7).

Table 1. Data logger locations GPS coordinates

Location name	latitude	longitude
CR01	46.157175	-88.896463
CR02	46.154950	-88.893468
CR03	46.159605	-88.891991
CR04	46.158801	-88.892552
CR05	46.155382	-88.893495
CR06	46.155676	-88.892588
CR07	46.158808	-88.892135



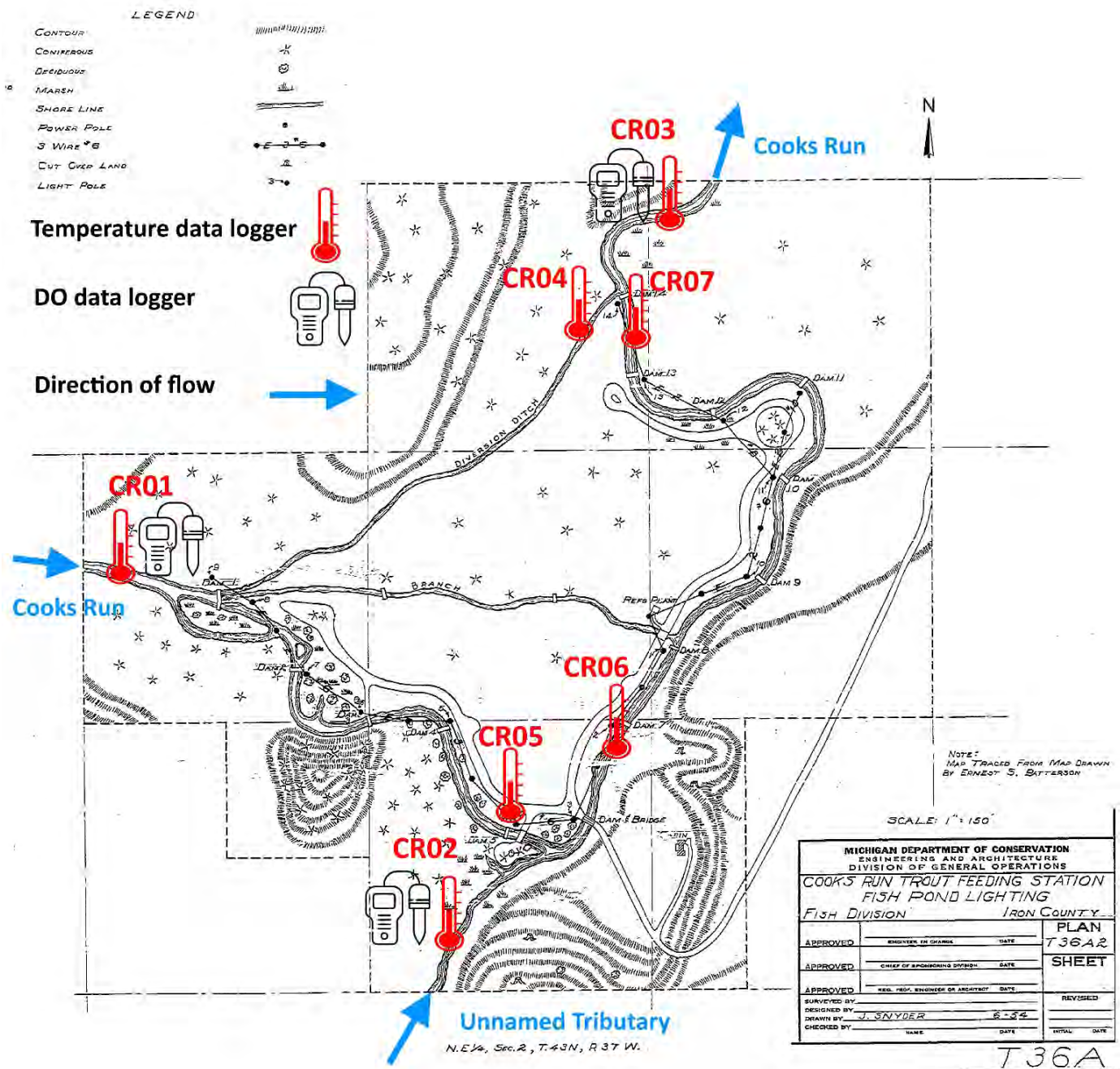


Figure 3. Temperature and dissolved oxygen data logger locations in the Cooks Run study area.

The temperature and DO data loggers were set to record every 15min from May through November 2024. The data loggers were downloaded every couple of weeks. During the biweekly visit, temperature and dissolved oxygen were measured with a portable HACH® HQ1130 Meter and pH and conductivity were measured with a portable Myron L Company Ultrameter II.



Section 2. Hydrology measurement

During the biweekly visits to download data loggers, stream discharge (in cubic feet per second) was measured at each location. The “float method” was used to determine stream discharge by establishing a transect perpendicular to stream flow extending from bank to bank. The stream width (length of the transect) was recorded. At each of five equally distributed points along the transect, depth and velocity were recorded. Velocity was determined by timing a neutrally buoyant object floating a known stream distance.

Section 3. Water and sediment chemistry

Samples for water and sediment chemistry were collected and analyzed in August 2024. The water sample locations were CR01, CR02, CR03, CR04, and CR07. The sediment sample was taken at CR07 (Figure 3). Water chemistry parameters included total phosphorus, total suspended solids, nitrite/nitrate, Total Kjeldahl Nitrogen, pH, conductivity, calcium, potassium, and alkalinity. Sediment chemistry parameters included total organic carbon, total phosphorus, nitrite/nitrate, Total Kjeldahl Nitrogen, potassium, calcium, lead, cadmium, and arsenic.

Section 4. Stream habitat

Stream habitat was formally measured using the Department of Environment, Great Lakes and Energy (EGLE) Procedure 51 ([Procedure 51 - Qualitative Biological and Habitat Survey Protocols for Wadeable Streams and Rivers](#)). In addition to the P-51 habitat measures, stream habitat was also described by conducting an inventory of beaver dams within the study area. Structure description and GPS location of every beaver dam (active and not active) was recorded and photos were taken of each beaver dam.

The stream habitat was assessed at six of the seven data logger locations (CR01, CR02, CR04, CR05, CR6, and CR07). The data logger locations CR03 was not wadable and therefore not suitable to use the Procedure 51. A new site was chosen as a substitute for CR03 just downstream of the junction of diversion ditch and the Cooks Run main branch (GPS coordinates 46.159355, -88.892293).

Section 5. Macroinvertebrate community assessment

The macroinvertebrate community was assessed at the stream habitat assessment locations by using EGLE procedure P-51. The resulting aquatic macroinvertebrate samples were preserved for later identification and analysis. Macroinvertebrates were identified to family and counted. These data were analyzed according to the standard P-51 protocol.



Chapter 4. Results

Section 1. Temperature and dissolved oxygen monitoring results

Part 1. Dissolved oxygen monitoring results

The monitoring data collected at all sampling sites throughout the 2024 field season demonstrated suitable dissolved oxygen concentration for a coldwater stream (Figure 4). Elevated values of DO at CR01 in the fall likely was influenced by the partial removal of a large beaver dam directly upstream of the data logger. This resulted in turbulence and increased oxygenation. This higher DO likely increased the DO at CR03 during this period. DO grab samples collected periodically through the 2024 field season verified the continuous monitoring data and demonstrated good DO at all sites (Table 2).

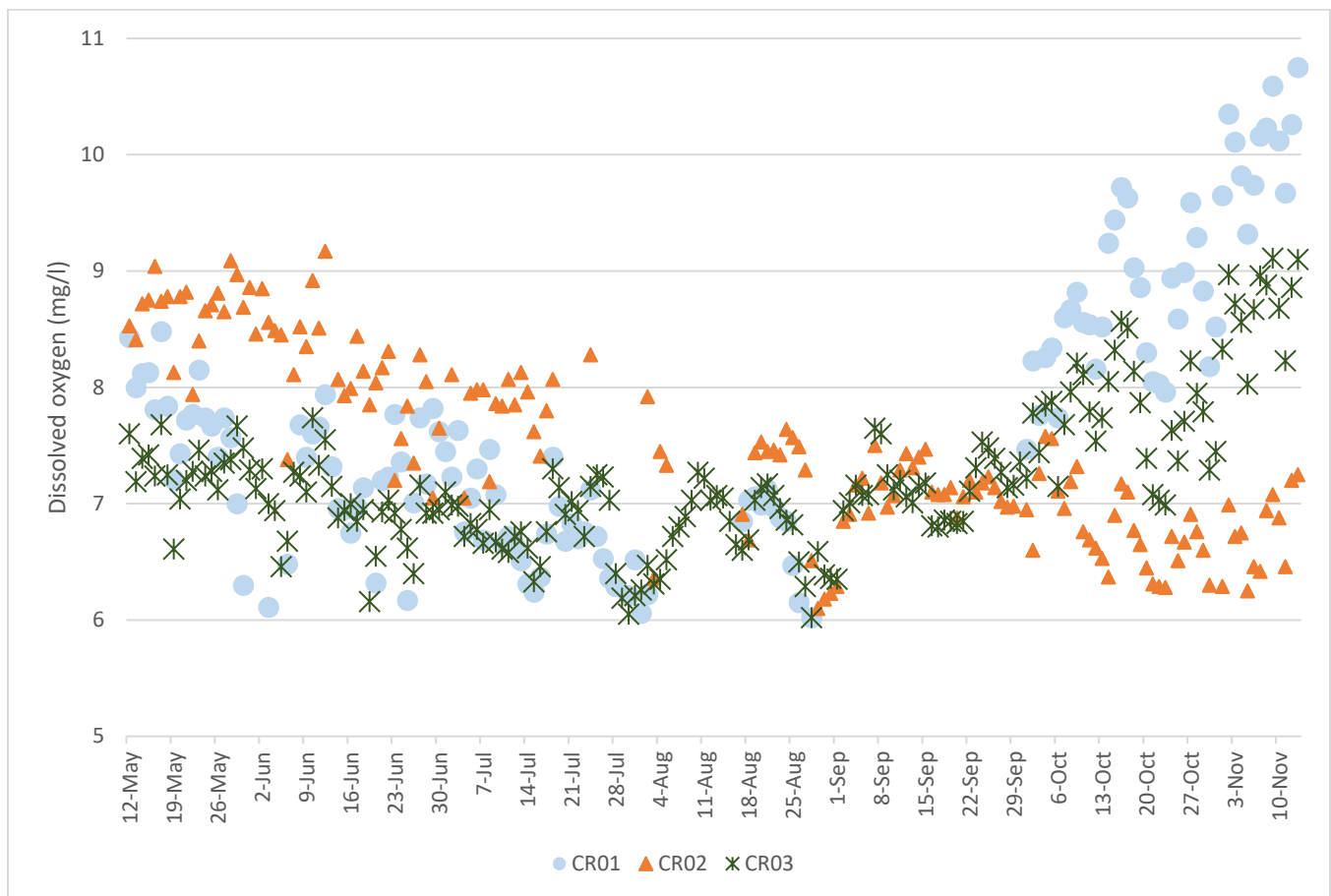


Figure 4. Mean dissolved oxygen measured by the data loggers at CR01, CR02, and CR03.



Table 2. Dissolved oxygen measured with the portable meter at CR01-CR07.

Date	CRO1	CRO2	CRO3	CRO4	CRO5	CRO6	CRO7
5/10/2024	9.64	7.79	9.78	9.85	9.48	9.47	9.92
5/17/2024	10.04	8.82	10.25	9.7	9.4	10.57	11.56
6/7/2024	8.88	7.27	9.64	8.96	8.45	8.31	9.78
6/25/2024	7.37	6.63	8.63	8	7.24	7.72	8.97
7/5/2024	8.13	8.77	9.99	8.04	7.64	8.36	9.73
8/16/2024	7.01	6.58	7.93	7.8	7.4	7.98	8
9/30/2024	8.33	7.73	8.91	8.62	8.56	8.99	8.93
11/14/2024	11.22	8.21	9.96	10.81	10.13	9.63	10.11

Part 2. Temperature monitoring results

Temperature monitoring results are presented in Figure 5. The most upstream location on the Cooks Run (CR01) consistently had the highest temperatures in spring and summer of 2024. In fall, all sites had very similar temperatures. The unnamed tributary (CR02) was consistently the coolest water and this contributed to cooler water in Cooks Run at downstream sites CR06, CR07, and CR03. CR04 (diversion ditch) and CR05 (Cooks Run channel) water temperatures are both lower than CR01 indicating possible ground water influence and greater canopy cover over the stream.

Figures 6 and 7 illustrates the daily temperature variation (difference between daily high and low temperature values) at each of the seven sampling sites. Sites CR04 and CR05 showed the smallest daily variations possibly because these sites had the most canopy cover. Sites CR06 and CR07 showed the largest daily variations. Each of these sites is in an area with greater stream width, lesser depth, darker substrate, and less canopy cover. Site CR03 showed a reduced variation in daily temperature which likely reflects the mixing of the Cooks Run channel and the diversion ditch.



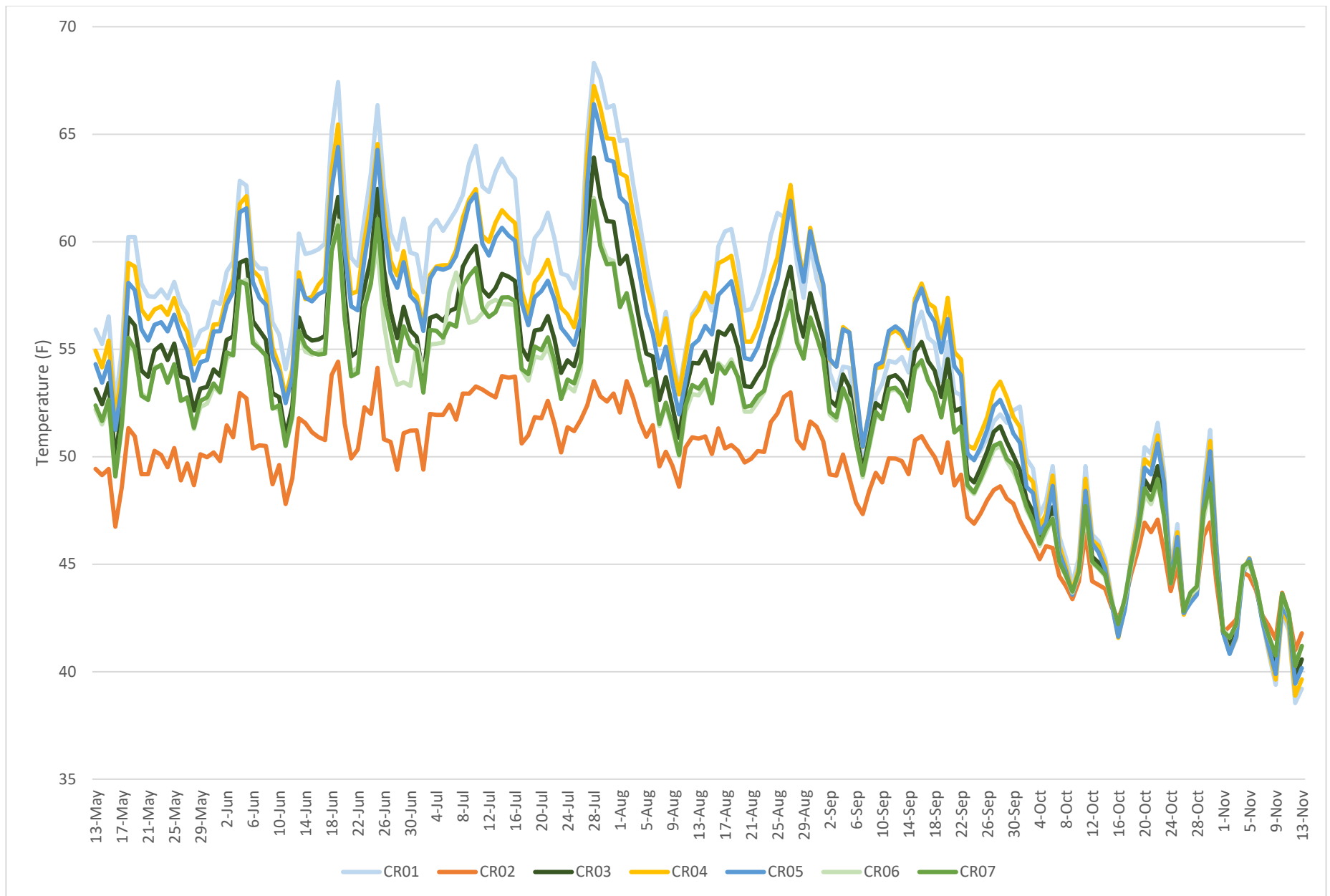


Figure 5. Mean temperature measured by the data loggers at CR01-CR07.





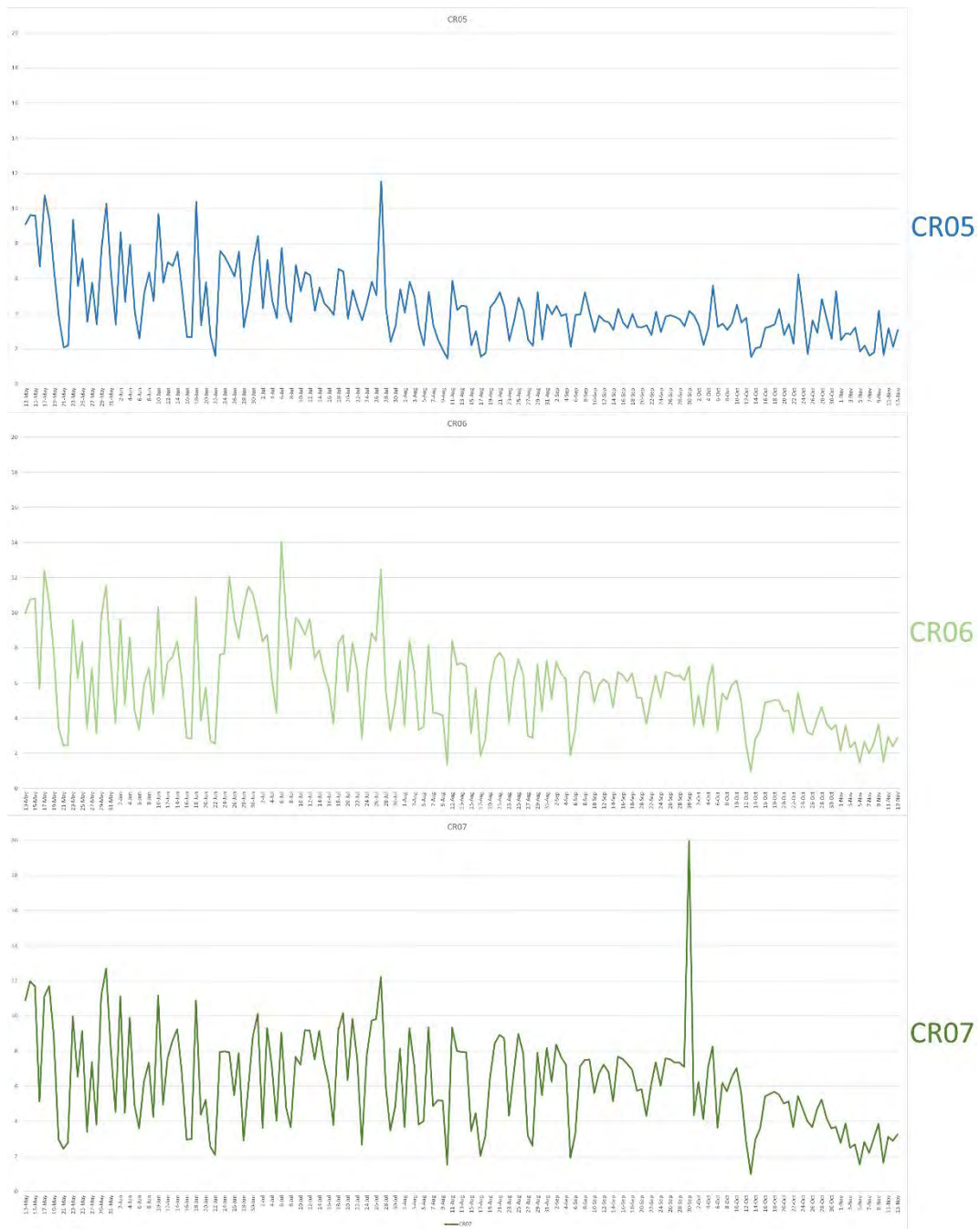


Figure 7. Daily temperature variation (F) for the data loggers at CR05-CR07.



Part 3. pH and conductivity monitoring

The 2024 pH and conductivity measurements collected in the study area are presented in Tables 3 and 4, respectively. The pH is near neutral at all sampling sites and times. Conductivity is indicative of moderate amounts of dissolved substances is similar at all sampling sites and times.

Table 3. pH measured at CRO1-CRO7.

Date	CRO1	CRO2	CRO3	CRO4	CRO5	CRO6	CRO7
5/10/2024	7.2	6.52	7.19	7.22	7.22	7.4	7.23
5/17/2024	7.49	7.18	7.53	7.54	7.34	7.94	7.96
6/7/2024	7.28	6.91	7.18	7.19	6.62	6.84	6.94
6/25/2024	NA	NA	NA	NA	NA	NA	NA
7/5/2024	7.52	7.25	7.82	7.41	7.32	7.58	7.8
8/16/2024	7.36	7.09	7.46	7.41	7.34	7.56	7.47
9/30/2024	7.59	6.95	7.53	7.56	7.54	7.92	7.64
11/14/2024	7.6	7.69	7.72	7.57	7.5	7.78	7.72

Table 4. Conductivity (µmho/cm) measured at CRO1-CRO7.

Date	CRO1	CRO2	CRO3	CRO4	CRO5	CRO6	CRO7
5/10/2024	96.79	150.4	122.4	102.6	103.2	138.7	128.8
5/17/2024	106	150.6	126.4	112.2	110.8	127.8	135.9
6/7/2024	108.9		126.9	113.2	114.5	127.2	131.6
6/25/2024	NA	NA	NA	NA	NA	NA	NA
7/5/2024	114.3	154.9	143.6	124.8	118.7	137.3	139.8
8/16/2024	131.4	156.2	146.8	135.7	133.2	149.2	151.4
9/30/2024	144	158.4	155.4	146.8	142.9	150.5	159.5
11/14/2024	122.9	150.7	141.8	127.7	127.1	145.9	148.2



Section 2. Hydrology measurement results

Part 1. Discharge measurements

The discharges measured in 2024 are graphed in Figure 8. The downstream most site (CR03) was not conducive to measuring discharge. Discharge at CR03 was measured on only one date (June 14, 2024) and calculated as 27.20cfs. The unnamed tributary discharge (CR02) showed the least variability over the season. Relative positions of the discharge amount between sites are generally consistent. Sampling site CR07 always had the highest discharge value. It is noteworthy that CR07 has a consistently higher discharge than the nearby upstream CR06, in spite of the fact that no obvious contribution of surface water occurs between these two sites. It is likely that the source of this additional water is infiltration through the 10-acre wetland.



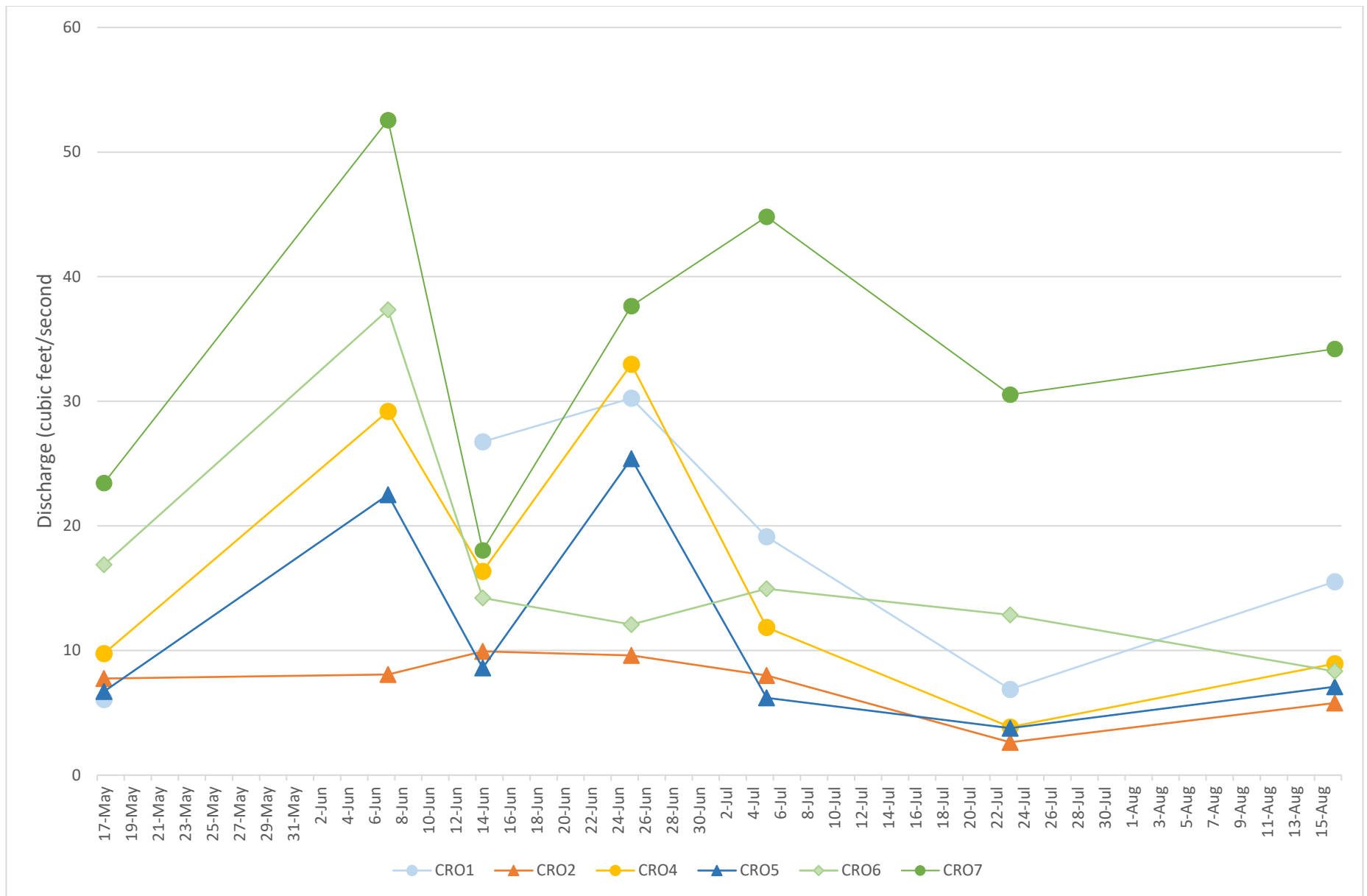


Figure 8. Discharge (cubic feet/second) measured at CR01-CR07.



Part 2. Beaver dam inventory

There were 13 beaver dams documented in the study area (Figure 9). One was located in the diversion ditch and two were in the unnamed tributary. Table 5 reports the location coordinates and physical description for each dam. Figure 10 defines and illustrates the physical measurements. Photos 5 through 17 show each of the beaver dams.

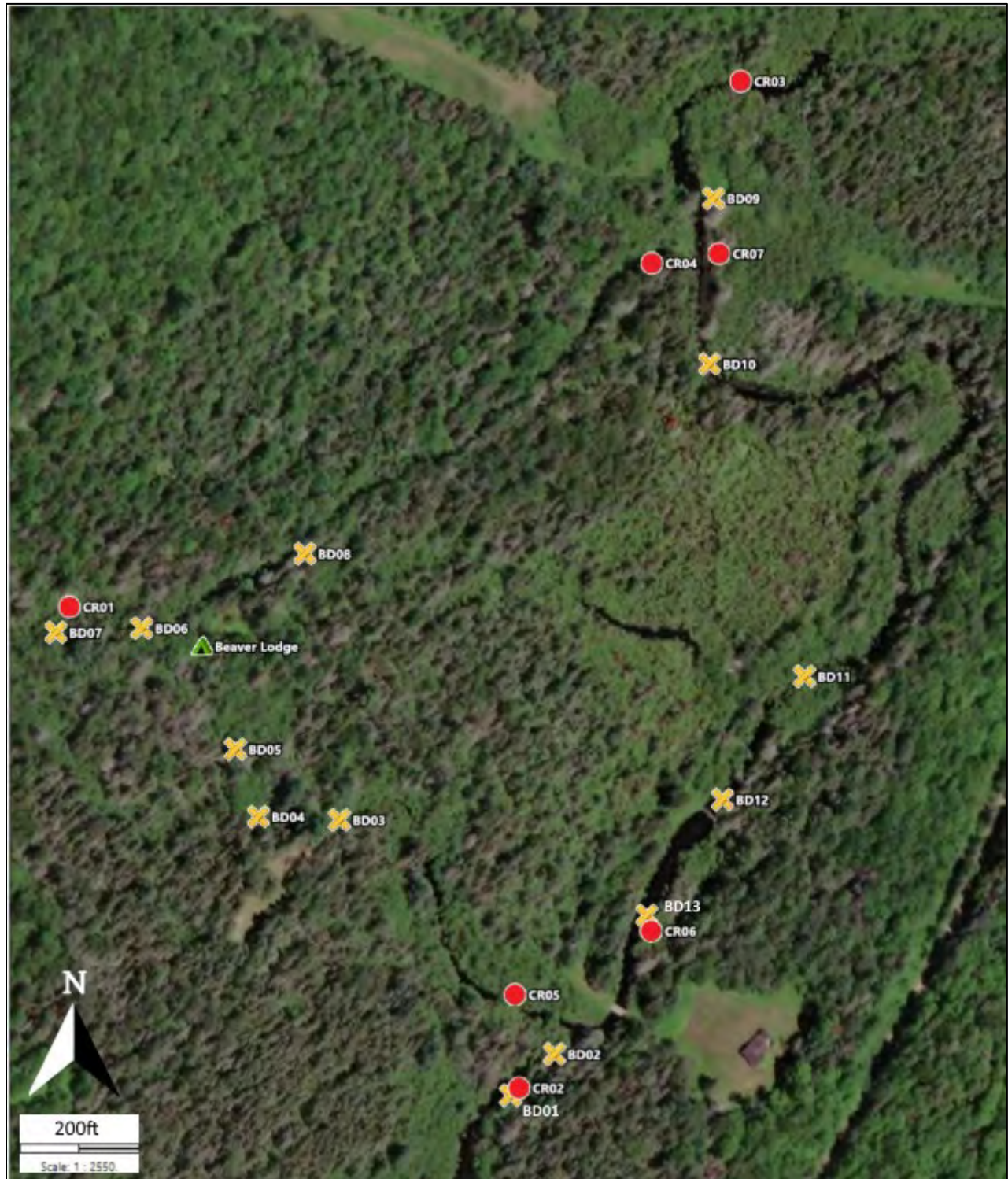


Figure 9. Beaver hut, dams, and data logger locations in the study area.



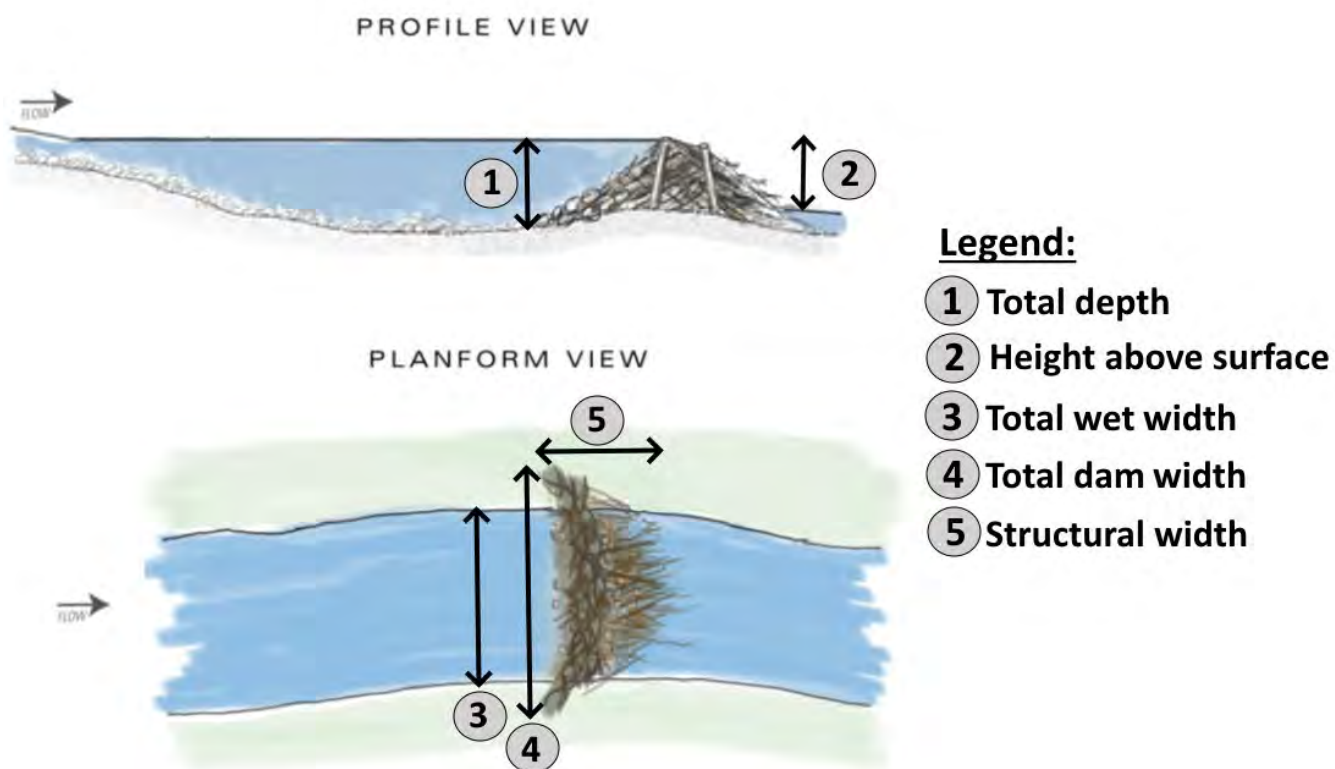


Figure 10. Description of the physical dam parameters

Table 5. Beaver dam physical parameters measurements and GPS coordinates.

Beaver dam #	latitude	longitude	1- Total depth (ft)	2- At center height above surface (ft)	3- Total wet width (ft)	4- Total dam width (ft)	5- Structural width (ft)	Active Yes/No
BD01	46.154915	-88.893527	2.1	1.4	25.0	43.0	17.0	Yes
BD02	46.155106	-88.893234	1.1	1.0	14.4	14.0	6.0	Yes
BD03	46.156189	-88.894667	1.9	1.3	25.9	27.0	2.2	Yes
BD04	46.156204	-88.895208	2.9	2.6	82.0	33.4	7.0	Yes
BD05	46.156516	-88.89536	2.3	1.0	47.0	38.3	8.0	Yes
BD06	46.157076	-88.895983	2.0	1.6	38.0	35.5	4.0	Yes
BD07	46.157056	-88.896556	2.6	1.7	143.0	143.0	11.0	Yes
BD08	46.15742	-88.894898	2.6	2.2	30.0	28.5	6.0	Yes
BD09	46.159063	-88.892173	1.2	0.6	29.3	26.8	12.0	No
BD10	46.158297	-88.892201	1.1	0.5	34.6	36.5		No
BD11	46.156853	-88.891568						No
BD12	46.156283	-88.892114	1.5	1.0	41.8	37.6		No
BD13	46.155748	-88.892619						No





Photo 5. Beaver dam BD01.



Photo 6. Beaver dam BD02.





Photo 7. Beaver dam BD03



Photo 8. Beaver dam BD04.





Photo 9. Beaver dam BD05



Photo 10. Beaver dam BD06.





Photo 11. Beaver dam BD07.



Photo 12. Beaver dam BD08.



Photo 13. Beaver dam BD09.



Photo 14. Beaver dam BD10.





Photo 15. Beaver dam BD11.



Photo 16. Beaver dam BD12.





Photo 17. Beaver dam BD13.



Section 3. Water and sediment results

Part 1. Water quality results

Water quality results for the Cooks Run study area are included in Appendix 2. There was no difference in water quality between the five sites where water samples were taken (01, 02, 03, 04, 07). All results showed good water quality (low nutrients and low alkalinity). Concentrations of the metals calcium and potassium were low in water samples.

Part 2. Sediment results

The results can be found in the Appendix 2. The nutrients (Total Phosphorus, Nitrate/Nitrite) are low except for Total Organic Nitrogen (TKN) with a concentration of 403mg/kg. The Total Organic Carbon (TOC) is very high with a concentration of 204,000mg/kg. These two high concentrations could result from remnants of the defunct fish hatchery activities, however might also result from natural causes such as beaver activities and organic material decomposition. Studies on effect of beaver dams on organic carbon and nutrients conducted in Lithuania, Europe evaluated the mean TKN in stream sediments varied from 1,250mg/kg to 5,450mg/kg and the mean TOC varied from 19,000mg/kg to 38,000mg/kg (Čiuldienė et al. 2020).

Heavy metal concentrations values in the Cooks Run sediments samples were below the background levels in Michigan. The mineral concentrations (Calcium, Potassium) were similar with the concentration found in the general area.



Section 4. Stream habitat

All of the sampling sites were considered riffle/run. The highest score was measured at CR04 located at the downstream extent of the diversion ditch (Table 6). This site could be characterized as “excellent” habitat. Scores at the other six sampling sites can be characterized as “good” habitat. Photos of each of the sampling sites are provided in Appendix 3. Table 7 provides data on substrate at each of the sampling sites as well as an assessment of suitability for trout spawning using two ratings (good and marginal). Aquatic vegetation was present in the study area including two non-native invasive species (Curly-leaf pondweed, *Potamogeton crispus*, and aquatic forget-me-not, *Myosotis scorpioides*).

Table 6. Habitat assessment score for CR01-CR07.

Location	CR01	CR02	CR03	CR04	CR05	CR06	CR07
1. Epifaunal Substrate/Available Cover	8	10	8	18	5	10	10
2. Embeddedness	3	5	5	19	5	9	8
3. Velocity/Depth Regime	3	4	3	20	3	3	3
4. Sediment Deposition	2	8	18	19	4	4	7
5. Channel Flow Status	9	9	10	9	9	10	9
6. Channel Flow Status-Flashiness	9	9	10	10	9	10	9
7. Channel Alteration	18	18	13	19	18	14	16
8. Frequency of Riffles (or bends)	5	13	3	19	3	3	3
9. Bank Stability LB.	9	9	10	10	9	9	8
9. Bank Stability RB.	9	9	10	10	9	9	8
10. Vegetative Protection LB.	10	9	8	10	9	10	8
10. Vegetative Protection RB.	10	9	8	10	9	10	8
11. Riparian LB.	10	10	10	10	10	10	10
11. Riparian RB.	10	10	10	10	10	10	10
Total Score	115	132	126	193	112	121	117
Metric Habitat Characterization	Good	Good	Good	Excellent	Good	Good	Good



Table 7. Substrate composition for CR01-CR07.

Substrate	CR01	CR02	CR03	CR04	CR05	CR06	CR07
Bedrock							
Boulder							
Cobble				75%			
Gravel	2%		5%	20%		5%	10%
Sand	3%	20%	60%	5%	5%	45%	20%
Silt	95%	80%	35%		95%	50%	70%
Clay							
Detritus	10%-40%	10%-40%	<10%	10%-40%	10%-40%	10%-40%	40%-75%
Muck	>75%	>75%	40%-75%	<10%	>75%	40%-75%	40%-75%
Macrophyte percent cover	0%	10%	75%	15%	0%	40%	50%
Fish spawning habitat	Marginal	Marginal	Marginal	Good	Marginal	Marginal	Marginal

Section 5. Macroinvertebrate community

Macroinvertebrate community data is illustrated in Figure 11, 12, and 13. Figure 11 presents relative sensitivity to pollution. In this dataset, the tolerance values are oriented toward detection of organic pollution (Hilsenhoff, 1987). The primary strategy or mechanism for obtaining food resources are presented in Figure 12. Finally, Figure 13 shows the primary mechanism a particular species utilizes for maintaining position and moving in the aquatic environment (Merritt et al., 1996).

Site CR02 values reflect high tolerance toward organic pollution). Water quality and direct observation, however, show the water quality at this site to be high. It is likely that the more tolerant assemblage of macroinvertebrates at CR02 reflects a headwater, low nutrient and coldwater stream. Site CR04 reflects an assemblage of aquatic invertebrates typical of pristine environments. The diversion ditch (CR04) invertebrate community reflects high diversity and organisms suited to higher stream velocity and coarser more heterogeneous substrate. The unnamed tributary (CR02) shows lower diversity (perhaps because of lower temperatures). Lower stream velocity allowed a higher number of the swimmer habit group at CR02. Cooks Run channel sites 05, 06, 07, and 03 were similar to one another with high number of shredders (indicating higher coarse particulate organic material at these sites).



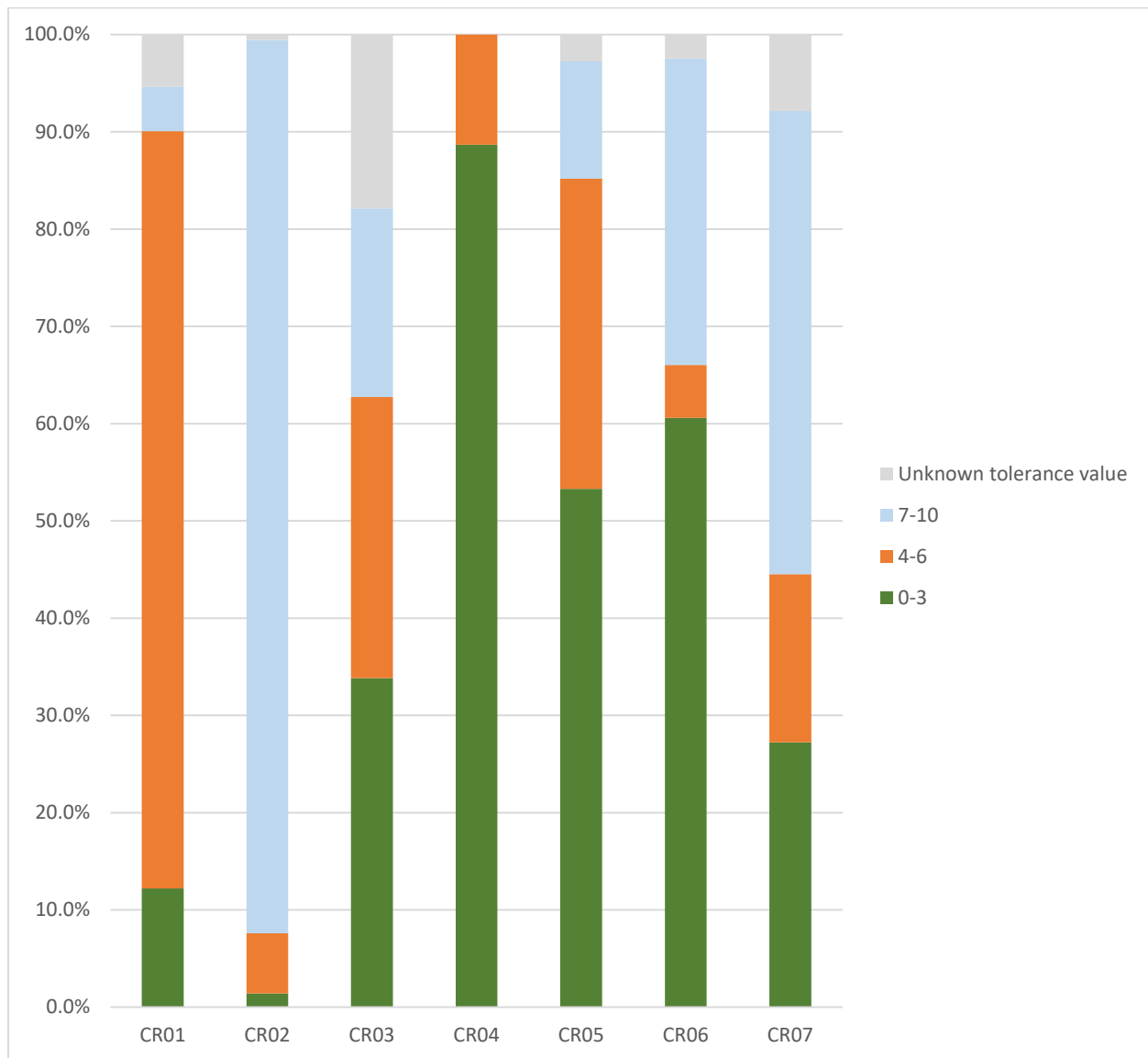


Figure 11. Tolerance values range in the macroinvertebrate community at CR01-CR07.

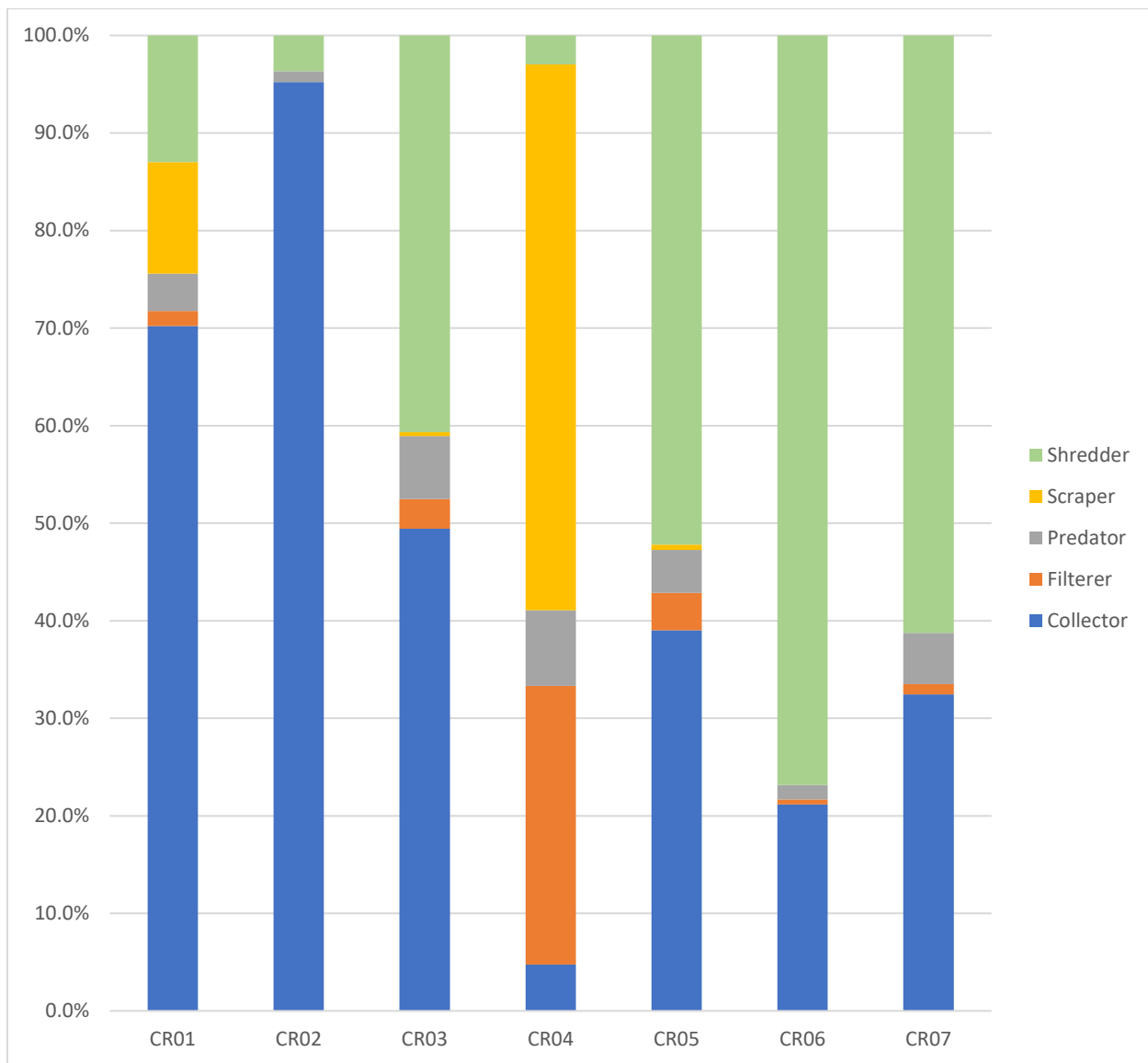


Figure 12. Functional feeding group in the macroinvertebrate community at CR01-CR07.

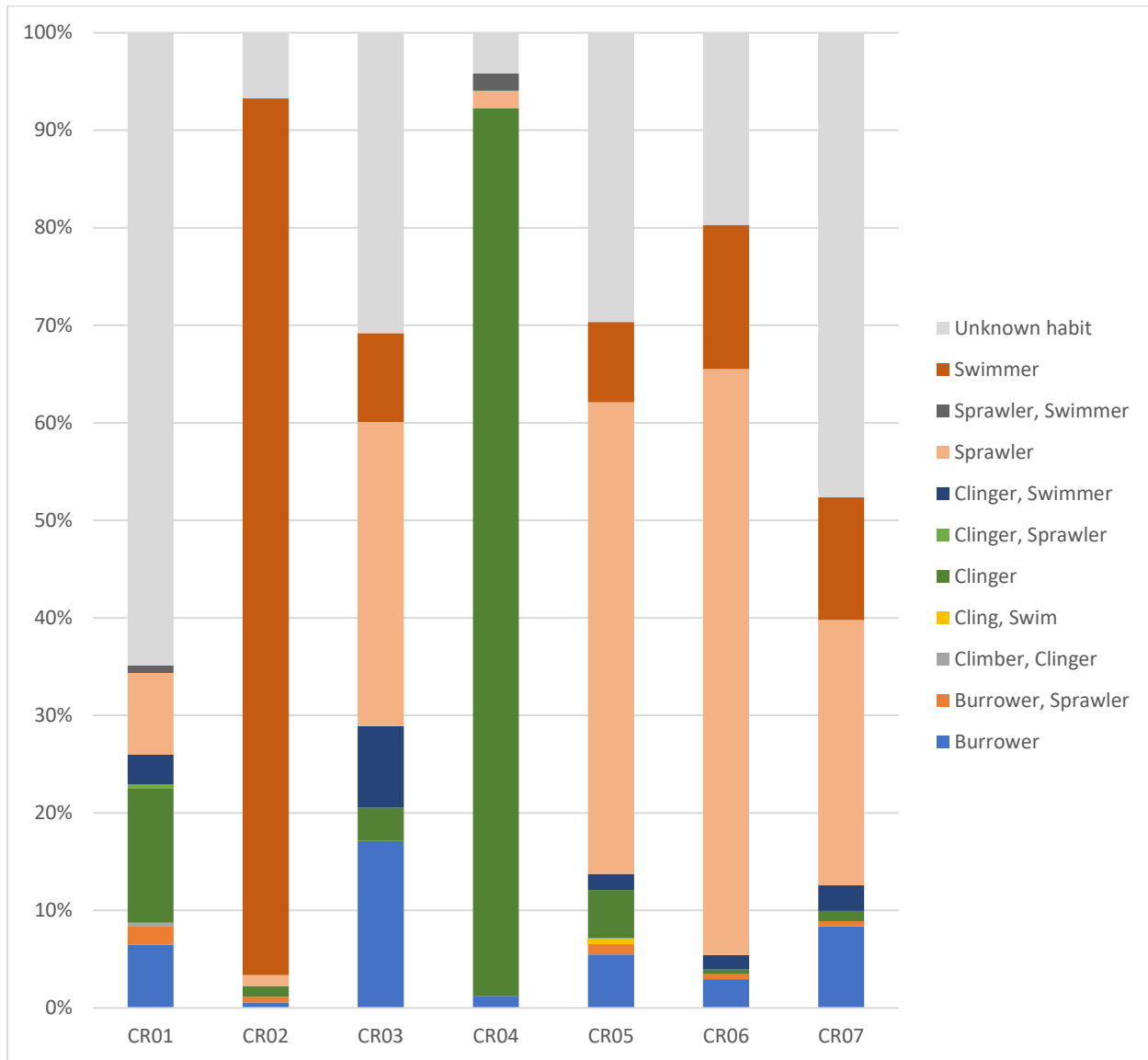


Figure 13. Habit group in the macroinvertebrate community at CR01-CR07.

Chapter 5. Discussion and recommendations

The findings from this study support the contention that the Cooks Run in the vicinity of the study area is a high quality and productive coldwater stream. Spawning brook trout were observed in several locations in late fall of 2024. Sculpin (also a coldwater fish) were observed during the macroinvertebrate survey. Sculpin juveniles were observed in the diversion ditch indicating successful reproduction occurs. Temperature, dissolved oxygen and water quality data reflect very good coldwater stream habitat. The historic fish data for this area is dated and we recommend that new fish survey work be conducted in the near future.

The 10-acre wetland is likely an important source of water to the downstream reaches of the Cooks Run channel. It is important to note that there is no apparent difference in water temperature between CR06 and CR07 indicating that the wetland area is not contributing warm water. The macroinvertebrate assemblages of CR06 and CR07 are also very similar. The 10-acre wetland is also a rich wildlife area that provides functions and values to both the terrestrial and the aquatic ecosystems in the study area and beyond. This area should be protected from any disturbance.

The concrete abutments that remain from the historic dam structures are neutral to the Cooks Run channel from an ecological standpoint. They should be left as is. The surrounding substrate is stable and would be disrupted if they were to be removed. They act as hard structure that concentrates current and helps clear silt and organic material from some areas. They provide cover for fishes and substrate for macroinvertebrates. Some of the abutments may be suitable as the substructure for future foot bridges to enhance public access. Some abutments may be suitable as the substructure for installing casting platforms for anglers.

The diversion ditch provides the best habitat conditions for coldwater water stream organisms within the study area. Its high gradient serves to oxygenate the water. Its coarse heterogenous substrate serves as excellent macroinvertebrate habitat and fish spawning area. The diversion ditch should remain a permanent feature of this site.

The unnamed tributary is a very important source of cold, highly oxygenated water for the Cooks Run channel. It also acts as a cool water refuge during periods of extreme heat.

Aquatic macrophytes are present where sediment and organic material exists in the Cooks Run channel. Even though some of these plants are non-native (e.g., Curlyleaf pondweed), all serve to stabilize the sediment and provide habitat for macroinvertebrates and fishes. The sediment analysis indicates that the chemical composition of the sediment presents no risk to downstream areas.

The existing old roadways in the study area form the basis for an excellent walking trail system for better public access and enjoyment of the area. Along the south bank of the diversion ditch, there is a little used trail that follows the high ground ridge that was apparently formed from the material excavated during the creation of the ditch. This trail could be easily improved as an access to observe and enjoy the picturesque diversion ditch. If this area becomes part of an interpretive trail in the future, it would be



good to select an alternate name for the diversion ditch that is commensurate with its high-quality habitat and aesthetic attributes.

The study area currently has a complex forested riparian area that is critical to the health of the Cooks Run. It provides shade from the sun and contributes woody structure and crucial organic material to the stream. This should be protected from disturbance. Beavers are an integral and natural component of the Cooks Run ecosystem including the riparian forest. The data collected in this study did not show evidence of thermal impact from beaver dams.

In conclusion, from an ecological standpoint no restoration efforts are required for the study area. The 10-acre wetland complex and broad riparian forest should be protected from forest harvest and other invasive activities. Improvements of the existing trail system would greatly enhance human access and recreation of the site.

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Appendix 1. Literature cited



Čiuldienė, D., Vigras, E., Belova, O., Aleinikovas, M. and Armolaitis, K. (2020), *The effect of beaver dams on organic carbon, nutrients and methyl mercury distribution in impounded waterbodies*. Wildlife Biology, 2020: 1-8 wlb.00678. <https://doi.org/10.1111/wlb.00678>

Department of Environment, Great Lakes and Energy (EGLE) *Procedure 51* ([Procedure 51 - Qualitative Biological and Habitat Survey Protocols for Wadeable Streams and Rivers](#)).

Hilsenhoff, W.L. 1987. *An improved biotic index of organic stream pollution*. The Great Lakes Entomologist, 20(1):7.

Mansfield, Dennis. October, 14, 2021. Iron County renews effort on Cooks Run. *Iron Mountain Daily News*.

Merritt, R. and K. Cummins. 1996. *Aquatic Insects of North American*. Third Edition. Kendall/Hunt Publishing Co., Dubuque Iowa.

Younk, Nikki. July, 27, 2013. Historic fish hatchery re-opens. *Iron Mountain Daily News*.



Appendix 2. Laboratory results





429 River Lane • PO Box 27 Amasa, MI 49903 • (906) 822-7889

Client: Gabbard, Carole

WWA Job #: 111796

Project: MEF-Cooks Run

Date Received: 8/1/2024

Date Reported: 9/5/2024

Sample Number	Client Sample ID	Date/Time Sampled	Sample Matrix
111796-001	CR01	8/1/2024 9:27	Water
111796-002	CR02	8/1/2024 9:50	Water
111796-003	CR04	8/1/2024 10:16	Water
111796-004	CR07	8/1/2024 10:21	Water
111796-005	CR03	8/1/2024 10:10	Water
111796-006	CR07-Sed	8/1/2024 10:21	Sediment

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.

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 MI EGLE 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 and DoD QSM V5.4 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.

Approved By:

Electronically signed by
Jen Toivonen

WI DNR Lab Certification Number: 999971280

MI EGLE Certification Number: 9306

DoD-ELAP QSM V5.4 Accreditation Number:

65802 by PJLA for Environmental Testing

ISO/IEC 17025:2017 Accredited PJLA 65802



429 River Lane • PO Box 27 Amasa, MI 49903 • (906) 822-7889

Client: Gabbard, Carole

WWA Job #: 111796

Project: MEF-Cooks Run

Date Received: 8/1/2024

Date Reported: 9/5/2024

Sample Results

Sample No. / ID / Description / Matrix	Result	Flags	Units	Date/Time	Method	Dilution	MDL	MLQ	Analyst
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111796-001 / CR01 / Water

General Chemistry Parameters

Alkalinity (t) as CaCO ₃	60		mg/L	8/6/2024 15:58	310.2	1	9.1	30	NK
Conductivity Lab	130		umho/cm	8/5/2024 11:03	2510B	1	1	1	TP
Nitrate/Nitrite-N	ND		mg/L	8/7/2024 16:44	4500-NO ₃ - F	1	0.13	0.40	NK
pH Lab	7.3		pH Units	8/1/2024 12:14	4500H+ B	1	0.10	0.10	EA
Total Kjeldahl Nitrogen (t)	0.22	J	mg/L-N	8/2/2024 12:20	351.2	1	0.14	0.50	NK
Total Phosphorus LL (t)	0.082	M	mg/L	8/12/2024 17:29	365.4	1	0.008	0.050	NK
Total Suspended Solids	6		mg/L	8/5/2024 15:35	2540D	1	1	1	TP

Trace Metals - Total

Calcium (t)	15		mg/L	8/8/2024 16:52	200.7	1	0.08	0.20	NS
Potassium (t)	ND		mg/L	8/8/2024 16:52	200.7	1	0.52	1.2	NS

111796-002 / CR02 / Water

General Chemistry Parameters

Alkalinity (t) as CaCO ₃	79		mg/L	8/6/2024 15:59	310.2	1	9.1	30	NK
Conductivity Lab	160		umho/cm	8/5/2024 11:03	2510B	1	1	1	TP
Nitrate/Nitrite-N	0.27	J	mg/L	8/7/2024 16:45	4500-NO ₃ - F	1	0.13	0.40	NK
pH Lab	7.5		pH Units	8/1/2024 12:14	4500H+ B	1	0.10	0.10	EA
Total Kjeldahl Nitrogen (t)	ND		mg/L-N	8/2/2024 12:23	351.2	1	0.14	0.50	NK
Total Phosphorus LL (t)	0.015	J	mg/L	8/12/2024 17:32	365.4	1	0.008	0.050	NK
Total Suspended Solids	ND		mg/L	8/5/2024 15:40	2540D	1	1	1	TP

Trace Metals - Total

Calcium (t)	18		mg/L	8/8/2024 16:56	200.7	1	0.08	0.20	NS
Potassium (t)	0.68	J	mg/L	8/8/2024 16:56	200.7	1	0.52	1.2	NS



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Client: Gabbard, Carole

WWA Job #: 111796

Project: MEF-Cooks Run

Date Received: 8/1/2024

Date Reported: 9/5/2024

Sample Results

Sample No. / ID / Description / Matrix	Result	Flags	Units	Date/Time	Method	Dilution	MDL	MQL	Analyst
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111796-003 / CR04 / Water

General Chemistry Parameters

Alkalinity (t) as CaCO ₃	66		mg/L	8/6/2024 16:00	310.2	1	9.1	30	NK
Conductivity Lab	130		umho/cm	8/5/2024 11:03	2510B	1	1	1	TP
Nitrate/Nitrite-N	ND		mg/L	8/7/2024 16:46	4500-NO ₃ - F	1	0.13	0.40	NK
pH Lab	7.4		pH Units	8/1/2024 12:14	4500H+ B	1	0.10	0.10	EA
Total Kjeldahl Nitrogen (t)	0.16	J	mg/L-N	8/2/2024 12:27	351.2	1	0.14	0.50	NK
Total Phosphorus LL (t)	0.028	J	mg/L	8/12/2024 17:33	365.4	1	0.008	0.050	NK
Total Suspended Solids	6		mg/L	8/5/2024 15:45	2540D	1	1	1	TP

Trace Metals - Total

Calcium (t)	15		mg/L	8/8/2024 17:00	200.7	1	0.08	0.20	NS
Potassium (t)	0.53	J	mg/L	8/8/2024 17:00	200.7	1	0.52	1.2	NS

111796-004 / CR07 / Water

General Chemistry Parameters

Alkalinity (t) as CaCO ₃	77		mg/L	8/6/2024 16:00	310.2	1	9.1	30	NK
Conductivity Lab	150		umho/cm	8/5/2024 11:03	2510B	1	1	1	TP
Nitrate/Nitrite-N	ND		mg/L	8/7/2024 16:50	4500-NO ₃ - F	1	0.13	0.40	NK
pH Lab	7.5		pH Units	8/1/2024 12:14	4500H+ B	1	0.10	0.10	EA
Total Kjeldahl Nitrogen (t)	ND		mg/L-N	8/2/2024 12:27	351.2	1	0.14	0.50	NK
Total Phosphorus LL (t)	0.019	J	mg/L	8/12/2024 17:34	365.4	1	0.008	0.050	NK
Total Suspended Solids	ND		mg/L	8/5/2024 15:50	2540D	1	1	1	TP

Trace Metals - Total

Calcium (t)	15		mg/L	8/8/2024 17:11	200.7	1	0.08	0.20	NS
Potassium (t)	0.54	J	mg/L	8/8/2024 17:11	200.7	1	0.52	1.2	NS



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Client: Gabbard, Carole

WWA Job #: 111796

Project: MEF-Cooks Run

Date Received: 8/1/2024

Date Reported: 9/5/2024

Sample Results

Sample No. / ID / Description / Matrix	Result	Flags	Units	Date/Time	Method	Dilution	MDL	MQL	Analyst
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111796-005 / CR03 / Water

General Chemistry Parameters

Alkalinity (t) as CaCO ₃	78		mg/L	8/6/2024 16:01	310.2	1	9.1	30	NK
Conductivity Lab	150		umho/cm	8/5/2024 11:03	2510B	1	1	1	TP
Nitrate/Nitrite-N	ND		mg/L	8/7/2024 16:54	4500-NO ₃ - F	1	0.13	0.40	NK
pH Lab	7.6		pH Units	8/1/2024 12:14	4500H+ B	1	0.10	0.10	EA
Total Kjeldahl Nitrogen (t)	ND		mg/L-N	8/2/2024 12:29	351.2	1	0.14	0.50	NK
Total Phosphorus LL (t)	0.020	J	mg/L	8/12/2024 17:34	365.4	1	0.008	0.050	NK
Total Suspended Solids	9		mg/L	8/5/2024 15:55	2540D	1	1	1	TP

Trace Metals - Total

Calcium (t)	14		mg/L	8/8/2024 17:15	200.7	1	0.08	0.20	NS
Potassium (t)	ND		mg/L	8/8/2024 17:15	200.7	1	0.52	1.2	NS

111796-006 / CR07-Sed / Sediment

General Chemistry Parameters

Moisture	See Attached	%		EPA Moisture	1				EFB
Nitrate/Nitrite-N (s)	See Attached	mg/kg		353.2	1				EFB
Total Kjeldahl Nitrogen (s)	See Attached	mg/kg		351.2	1				EFB
Total Organic Carbon (t)	See Attached	mg/L		Lloyd Kahn	1				EFB
Total Phosphorus (s)	See Attached	mg/kg		4500 P E	1				EFB

Trace Metals in Solids

Arsenic (s)	See Attached	mg/kg		6010C	1				EFB
Cadmium (s)	See Attached	mg/kg		6010C	1				EFB
Calcium (s)	See Attached	mg/kg		6010C	1				EFB
Lead (s)	See Attached	mg/kg		6010C	1				EFB
Potassium (s)	See Attached	mg/kg		6010C	1				EFB



429 River Lane • PO Box 27 Amasa, MI 49903 • (906) 822-7889

LOGIN CHECKLIST

Client: Gabbard, Carole
Project: MEF-Cooks Run
Date Received: 8/1/2024

WWA Job #: 111796
Date Reported: 9/5/2024

Date logged in.: 8/1/2024 **Number of coolers:** 1
Login person's initials: JJ **Courier/shipper:** Client

- ☒ 01) The COC is signed. (either Sampler or Relinquished by)
- ☒ 02) Custody seals/original packing tape were intact (if applicable).
- ☒ 03) Samples are in good condition, i.e. not broken or leaking.
- ☒ 04) Samples matched the Chain of Custody (COC).
- ☒ 05) Samples were received within holding times.
- ☒ 06) Samples were received on ice (in direct contact with the samples).
- ☐ 07) Temperature of the samples was between 0-6°C.
- ☒ 09) Proper containers were used.
- ☒ 10) Samples were collected in White Water lab containers.
- ☒ 11) There is adequate sample volume for requested analyses and QC.
- ☐ 12) Samples are preserved to the proper pH. Sample bottles and preservation are noted in LIMS Sample Container Section.
- ☐ 13) Sub-sampling (SS) is required. Bottles created are noted in sample containers section of log-in form.
- ☐ 14) For Dissolved Analysis (when applicable), samples were filtered in the lab.
- ☐ 15) For water VOC samples, headspace is less than the size of a pea.
- ☐ 16) For soil VOCs, methanol preserved samples were received.
- ☐ 17) For Soil VOCs, samples were preserved with methanol in the lab.
- ☐ 18) Client contact is necessary. Provide documentation below.

Comments:

08) Temp.:

16.1

16

Observed

Corrected

COMMENTS/CORRECTIVE ACTION

CLIENT RESPONSE

Note: Samples not between 0-6°C that are received at the laboratory on the day of sample collections do not require client notification.

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.

CHAIN-OF-CUSTODY RECORD

[illegible]

ANALYTICAL REPORT

PREPARED FOR

Attn: Jen Toivonen
White Water Associates
429 River Lane
PO BOX 27
Amasa, Michigan 49903

Generated 9/3/2024 1:01:15 PM

JOB DESCRIPTION

White Water Associates - 111796

JOB NUMBER

480-222482-1

Eurofins Buffalo

Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing Northeast, LLC Project Manager.

Authorization



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Definitions/Glossary

Client: White Water Associates
Project/Site: White Water Associates - 111796

Job ID: 480-222482-1

Qualifiers

Metals

Qualifier	Qualifier Description
^+	Continuing Calibration Verification (CCV) is outside acceptance limits, high biased.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

General Chemistry

Qualifier	Qualifier Description
*+	LCS and/or LCSD is outside acceptance limits, high biased.
H	Sample was prepped or analyzed beyond the specified holding time. This does not meet regulatory requirements.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Case Narrative

Client: White Water Associates
Project: White Water Associates - 111796

Job ID: 480-222482-1

Job ID: 480-222482-1

Eurofins Buffalo

Job Narrative 480-222482-1

Analytical test results meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page unless otherwise noted under the individual analysis. Data qualifiers and/or narrative comments are included to explain any exceptions, if applicable.

- Matrix QC may not be reported if insufficient sample is provided or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD may be performed, unless otherwise specified in the method.
- Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

Receipt

The samples were received on 8/12/2024 1:11 PM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 15.8°C.

Receipt Exceptions

The following samples were received at the laboratory outside the required temperature criteria: 111796-006 (480-222482-1), 111827-001 (480-222482-2), 111825-002 (480-222482-3), 111828-001 (480-222482-4) and 111786-001 (480-222482-5). This does not meet regulatory requirements.

Metals

Method 6010C: The low level continuing calibration verification (CCVL) associated with batch 480-722016 recovered above the upper control limit for Lead. The samples associated with this CCVL were 10x for the affected analytes; therefore, the data have been reported.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

General Chemistry

Method Lloyd_Kahn_Mod: Please note that the reporting limit for Lloyd Kahn TOC analysis is a nominal value and does not reflect adjustments in sample mass processed on an individual basis

111796-006 (480-222482-1), (180-178483-B-6), (180-178483-B-6 MS) and (180-178483-B-6 MSD)

Method Lloyd_Kahn_Mod: Reanalysis of the following samples were performed outside of the analytical holding time due to instrument error : 111796-006 (480-222482-1), (180-178483-B-6), (180-178483-B-6 MS) and (180-178483-B-6 MSD).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

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Detection Summary

Client: White Water Associates
Project/Site: White Water Associates - 111796

Job ID: 480-222482-1

Client Sample ID: 111796-006

Lab Sample ID: 480-222482-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Cadmium	0.58	J	1.4	0.49	mg/Kg	1	✳		6010C	Total/NA
Calcium	9070		347	188	mg/Kg	1	✳		6010C	Total/NA
Lead	9.1	^+	6.9	3.2	mg/Kg	1	✳		6010C	Total/NA
Potassium	416		208	168	mg/Kg	1	✳		6010C	Total/NA
Total Kjeldahl Nitrogen	403		67.6	29.4	mg/Kg	1	✳		351.2	Total/NA
Total Organic Carbon	204000	H	6760	6560	mg/Kg	1	✳		EPA-Lloyd Kahn	Total/NA
Phosphorus	2.2	J	4.3	1.7	mg/Kg	2	✳		SM 4500 P E	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Buffalo

Client Sample Results

Client: White Water Associates
Project/Site: White Water Associates - 111796

Job ID: 480-222482-1

Client Sample ID: 111796-006

Lab Sample ID: 480-222482-1

Date Collected: 08/01/24 10:21

Matrix: Solid

Date Received: 08/12/24 13:11

Percent Solids: 14.8

Method: SW846 6010C - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<6.1		13.9	6.1	mg/Kg	☼	08/13/24 13:33	08/14/24 15:29	1
Cadmium	0.58	J	1.4	0.49	mg/Kg	☼	08/13/24 13:33	08/14/24 15:29	1
Calcium	9070		347	188	mg/Kg	☼	08/13/24 13:33	08/14/24 15:29	1
Lead	9.1	^+	6.9	3.2	mg/Kg	☼	08/13/24 13:33	08/15/24 16:20	1
Potassium	416		208	168	mg/Kg	☼	08/13/24 13:33	08/14/24 15:29	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Kjeldahl Nitrogen (EPA 351.2)	403		67.6	29.4	mg/Kg	☼	08/16/24 16:41	08/20/24 12:20	1
Total Organic Carbon (EPA-Lloyd Kahn)	204000	H	6760	6560	mg/Kg	☼		08/30/24 18:11	1
Percent Moisture (EPA Moisture)	85.2		0.1	0.1	%			08/16/24 15:18	1
Phosphorus (SM 4500 P E)	2.2	J	4.3	1.7	mg/Kg	☼	08/14/24 18:00	08/14/24 18:56	2

General Chemistry - Soluble

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate Nitrite as N (EPA 353.2)	<1.5		3.7	1.5	mg/Kg	☼		08/26/24 20:56	1

QC Sample Results

Client: White Water Associates
Project/Site: White Water Associates - 111796

Job ID: 480-222482-1

Method: 6010C - Metals (ICP)

Lab Sample ID: MB 480-721580/1-A
Matrix: Solid
Analysis Batch: 721848

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 721580

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.87		2.0	0.87	mg/Kg		08/13/24 13:33	08/14/24 15:01	1
Cadmium	<0.070		0.20	0.070	mg/Kg		08/13/24 13:33	08/14/24 15:01	1
Calcium	<26.8		49.7	26.8	mg/Kg		08/13/24 13:33	08/14/24 15:01	1
Potassium	<24.1		29.8	24.1	mg/Kg		08/13/24 13:33	08/14/24 15:01	1

Lab Sample ID: MB 480-721580/1-A
Matrix: Solid
Analysis Batch: 721988

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 721580

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	<0.46		0.99	0.46	mg/Kg		08/13/24 13:33	08/15/24 13:24	1

Lab Sample ID: LCSSRM 480-721580/2-A
Matrix: Solid
Analysis Batch: 721848

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 721580

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec Limits
Arsenic	180	152.4		mg/Kg		84.7	70.0 - 130.0
Cadmium	199	169.4		mg/Kg		85.1	74.9 - 125.1
Calcium	5760	5006		mg/Kg		86.9	73.6 - 126.4
Potassium	2100	1954		mg/Kg		93.0	70.0 - 130.0

Lab Sample ID: LCSSRM 480-721580/2-A
Matrix: Solid
Analysis Batch: 721988

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 721580

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec Limits
Lead	261	242.4		mg/Kg		92.9	78.2 - 121.1

Method: 351.2 - Nitrogen, Total Kjeldahl

Lab Sample ID: MB 480-722186/1-A
Matrix: Solid
Analysis Batch: 722520

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 722186

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Kjeldahl Nitrogen	<0.087		0.20	0.087	mg/Kg		08/16/24 16:41	08/20/24 12:19	1

Lab Sample ID: LCS 480-722186/2-A
Matrix: Solid
Analysis Batch: 722520

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 722186

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Kjeldahl Nitrogen	2.50	2.33		mg/Kg		93	90 - 110

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QC Sample Results

Client: White Water Associates
Project/Site: White Water Associates - 111796

Job ID: 480-222482-1

Method: 353.2 - Nitrogen, Nitrate-Nitrite

Lab Sample ID: MB 480-723221/17
Matrix: Solid
Analysis Batch: 723221

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate Nitrite as N	<0.020		0.050	0.020	mg/Kg			08/26/24 21:00	1

Lab Sample ID: MB 480-723221/7
Matrix: Solid
Analysis Batch: 723221

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate Nitrite as N	<0.020		0.050	0.020	mg/Kg			08/26/24 20:45	1

Lab Sample ID: LCS 480-723221/18
Matrix: Solid
Analysis Batch: 723221

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Nitrate Nitrite as N	1.50	1.53		mg/Kg		102	90 - 110

Lab Sample ID: LCS 480-723221/8
Matrix: Solid
Analysis Batch: 723221

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Nitrate Nitrite as N	1.50	1.52		mg/Kg		101	90 - 110

Lab Sample ID: MB 480-723135/1-A
Matrix: Solid
Analysis Batch: 723221

Client Sample ID: Method Blank
Prep Type: Soluble

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate Nitrite as N	<0.21		0.52	0.21	mg/Kg			08/26/24 20:53	1

Method: EPA-Lloyd Kahn - Organic Carbon, Total (TOC)

Lab Sample ID: MB 180-478143/4
Matrix: Solid
Analysis Batch: 478143

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Organic Carbon	<971		1000	971	mg/Kg			08/30/24 08:16	1

Lab Sample ID: LCS 180-478143/5
Matrix: Solid
Analysis Batch: 478143

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Organic Carbon	40000	40820		mg/Kg		102	75 - 125

QC Sample Results

Client: White Water Associates
Project/Site: White Water Associates - 111796

Job ID: 480-222482-1

Method: SM 4500 P E - Phosphorus

Lab Sample ID: MB 480-721870/1-A
Matrix: Solid
Analysis Batch: 721871

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 721870

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phosphorus	<0.14		0.34	0.14	mg/Kg		08/14/24 18:00	08/14/24 18:56	1

Lab Sample ID: LCSSRM 480-721870/2-A
Matrix: Solid
Analysis Batch: 721871

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 721870

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec Limits
Phosphorus	2040	1932		mg/Kg		94.7	47.5 - 133.8
Phosphorus as PO4	6230	5925	*+	mg/Kg		95.2	15.6 - 43.9

QC Association Summary

Client: White Water Associates
Project/Site: White Water Associates - 111796

Job ID: 480-222482-1

Metals

Prep Batch: 721580

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-222482-1	111796-006	Total/NA	Solid	3050B	
MB 480-721580/1-A	Method Blank	Total/NA	Solid	3050B	
LCSSRM 480-721580/2-A	Lab Control Sample	Total/NA	Solid	3050B	

Analysis Batch: 721848

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-222482-1	111796-006	Total/NA	Solid	6010C	721580
MB 480-721580/1-A	Method Blank	Total/NA	Solid	6010C	721580
LCSSRM 480-721580/2-A	Lab Control Sample	Total/NA	Solid	6010C	721580

Analysis Batch: 721988

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 480-721580/1-A	Method Blank	Total/NA	Solid	6010C	721580
LCSSRM 480-721580/2-A	Lab Control Sample	Total/NA	Solid	6010C	721580

Analysis Batch: 722016

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-222482-1	111796-006	Total/NA	Solid	6010C	721580

General Chemistry

Analysis Batch: 478143

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-222482-1	111796-006	Total/NA	Solid	EPA-Lloyd Kahn	
MB 180-478143/4	Method Blank	Total/NA	Solid	EPA-Lloyd Kahn	
LCS 180-478143/5	Lab Control Sample	Total/NA	Solid	EPA-Lloyd Kahn	

Prep Batch: 721870

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-222482-1	111796-006	Total/NA	Solid	SM 4500 P B	
MB 480-721870/1-A	Method Blank	Total/NA	Solid	SM 4500 P B	
LCSSRM 480-721870/2-A	Lab Control Sample	Total/NA	Solid	SM 4500 P B	

Analysis Batch: 721871

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-222482-1	111796-006	Total/NA	Solid	SM 4500 P E	721870
MB 480-721870/1-A	Method Blank	Total/NA	Solid	SM 4500 P E	721870
LCSSRM 480-721870/2-A	Lab Control Sample	Total/NA	Solid	SM 4500 P E	721870

Analysis Batch: 722157

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-222482-1	111796-006	Total/NA	Solid	Moisture	

Prep Batch: 722186

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-222482-1	111796-006	Total/NA	Solid	351.2	
MB 480-722186/1-A	Method Blank	Total/NA	Solid	351.2	
LCS 480-722186/2-A	Lab Control Sample	Total/NA	Solid	351.2	

QC Association Summary

Client: White Water Associates
Project/Site: White Water Associates - 111796

Job ID: 480-222482-1

General Chemistry

Analysis Batch: 722520

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-222482-1	111796-006	Total/NA	Solid	351.2	722186
MB 480-722186/1-A	Method Blank	Total/NA	Solid	351.2	722186
LCS 480-722186/2-A	Lab Control Sample	Total/NA	Solid	351.2	722186

Leach Batch: 723135

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-222482-1	111796-006	Soluble	Solid	DI Leach	
MB 480-723135/1-A	Method Blank	Soluble	Solid	DI Leach	

Analysis Batch: 723221

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
480-222482-1	111796-006	Soluble	Solid	353.2	723135
MB 480-723135/1-A	Method Blank	Soluble	Solid	353.2	723135
MB 480-723221/17	Method Blank	Total/NA	Solid	353.2	
MB 480-723221/7	Method Blank	Total/NA	Solid	353.2	
LCS 480-723221/18	Lab Control Sample	Total/NA	Solid	353.2	
LCS 480-723221/8	Lab Control Sample	Total/NA	Solid	353.2	

Lab Chronicle

Client: White Water Associates
Project/Site: White Water Associates - 111796

Job ID: 480-222482-1

Client Sample ID: 111796-006

Date Collected: 08/01/24 10:21

Date Received: 08/12/24 13:11

Lab Sample ID: 480-222482-1

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	Moisture		1	722157	AF	EET BUF	08/16/24 15:18

Client Sample ID: 111796-006

Date Collected: 08/01/24 10:21

Date Received: 08/12/24 13:11

Lab Sample ID: 480-222482-1

Matrix: Solid

Percent Solids: 14.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	3050B			721580	ET	EET BUF	08/13/24 13:33
Total/NA	Analysis	6010C		1	722016	NZG	EET BUF	08/15/24 16:20
Total/NA	Prep	3050B			721580	ET	EET BUF	08/13/24 13:33
Total/NA	Analysis	6010C		1	721848	NZG	EET BUF	08/14/24 15:29
Total/NA	Prep	351.2			722186	GW	EET BUF	08/16/24 16:41
Total/NA	Analysis	351.2		1	722520	IMZ	EET BUF	08/20/24 12:20
Soluble	Leach	DI Leach			723135	KB	EET BUF	08/26/24 15:50
Soluble	Analysis	353.2		1	723221	KB	EET BUF	08/26/24 20:56
Total/NA	Analysis	EPA-Lloyd Kahn		1	478143	SMW	EET PIT	08/30/24 18:11
Total/NA	Prep	SM 4500 P B			721870	GW	EET BUF	08/14/24 18:00
Total/NA	Analysis	SM 4500 P E		2	721871	GW	EET BUF	08/14/24 18:56

Laboratory References:

EET BUF = Eurofins Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

EET PIT = Eurofins Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

Accreditation/Certification Summary

Client: White Water Associates
Project/Site: White Water Associates - 111796

Job ID: 480-222482-1

Laboratory: Eurofins Buffalo

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Michigan	State	9937	03-31-25
The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.			
Analysis Method	Prep Method	Matrix	Analyte
351.2	351.2	Solid	Total Kjeldahl Nitrogen
353.2		Solid	Nitrate Nitrite as N
6010C	3050B	Solid	Arsenic
6010C	3050B	Solid	Cadmium
6010C	3050B	Solid	Calcium
6010C	3050B	Solid	Lead
6010C	3050B	Solid	Potassium
Moisture		Solid	Percent Moisture
SM 4500 P E	SM 4500 P B	Solid	Phosphorus

Laboratory: Eurofins Pittsburgh

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Arkansas DEQ	State	19-033-0	06-28-25
California	State	2891	04-30-24 *
Connecticut	State	PH-0688	09-30-24
Florida	NELAP	E871008	06-30-25
Georgia	State	PA 02-00416	04-30-25
Illinois	NELAP	004375	07-31-25
Kansas	NELAP	E-10350	01-31-25
Kentucky (UST)	State	162013	04-30-25
Kentucky (WW)	State	KY98043	12-31-24
Louisiana	NELAP	04041	06-30-22 *
Louisiana (All)	NELAP	04041	06-30-25
Maine	State	PA00164	03-06-26
Minnesota	NELAP	042-999-482	12-31-24
New Hampshire	NELAP	2030	04-04-25
New Jersey	NELAP	PA005	06-30-25
New York	NELAP	11182	04-01-25
North Carolina (WW/SW)	State	434	12-31-24
North Dakota	State	R-227	04-30-24 *
Oregon	NELAP	PA-2151	02-06-25
Pennsylvania	NELAP	02-00416	04-30-25
Rhode Island	State	LAO00362	01-01-25
South Carolina	State	89014	04-30-25
Texas	NELAP	T104704528	03-31-25
US Fish & Wildlife	US Federal Programs	058448	04-30-25
USDA	US Federal Programs	P330-16-00211	04-11-26
Utah	NELAP	PA001462024-14	05-31-25
Virginia	NELAP	10043	07-14-24 *
West Virginia DEP	State	142	01-31-25
Wisconsin	State	998027800	08-31-25

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Eurofins Buffalo

Method Summary

Client: White Water Associates
Project/Site: White Water Associates - 111796

Job ID: 480-222482-1

Method	Method Description	Protocol	Laboratory
6010C	Metals (ICP)	SW846	EET BUF
351.2	Nitrogen, Total Kjeldahl	EPA	EET BUF
353.2	Nitrogen, Nitrate-Nitrite	EPA	EET BUF
EPA-Lloyd Kahn	Organic Carbon, Total (TOC)	EPA	EET PIT
Moisture	Percent Moisture	EPA	EET BUF
SM 4500 P E	Phosphorus	SM	EET BUF
3050B	Preparation, Metals	SW846	EET BUF
351.2	Nitrogen, Total Kjeldahl	EPA	EET BUF
DI Leach	Deionized Water Leaching Procedure	ASTM	EET BUF
SM 4500 P B	Phosphorous, Total and Ortho	SM	EET BUF

Protocol References:

ASTM = ASTM International

EPA = US Environmental Protection Agency

SM = "Standard Methods For The Examination Of Water And Wastewater"

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EET BUF = Eurofins Buffalo, 10 Hazelwood Drive, Amherst, NY 14228-2298, TEL (716)691-2600

EET PIT = Eurofins Pittsburgh, 301 Alpha Drive, RIDC Park, Pittsburgh, PA 15238, TEL (412)963-7058

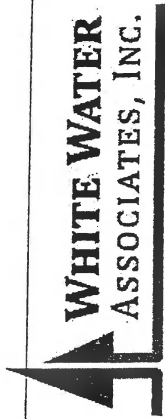
Sample Summary

Client: White Water Associates
Project/Site: White Water Associates - 111796

Job ID: 480-222482-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
480-222482-1	111796-006	Solid	08/01/24 10:21	08/12/24 13:11

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14



429 River Lane (906) 822-7889
Amasa, MI 49903 White-Water-Associates.com

240805 - Buffalo

Chain-of-Custody

Company Eurofins - Buffalo
Contact John Beninati
Email John.Beninati@et.eurofins.com

Address 10 Hazelwood Dr
Amherst, NY 14228-2223

Date Shipped 08/02/2024
Due Date

Site Contact: Jen Toivonen, jen.toivonen@white-water-associates.com

Sample No.	State	Test	Matrix	Preservation	Type*	Sampler	Containers	Notes
111796-006	MI	Arsenic (s)	Sediment	Cool, 4 °C		WWA	1	Sampled: 08/01/2024 10:21
111796-006	MI	Cadmium (s)	Sediment	Cool, 4 °C		WWA	1	Sampled: 08/01/2024 10:21
111796-006	MI	Calcium (s)	Sediment	Cool, 4 °C		WWA	1	Sampled: 08/01/2024 10:21
111796-006	MI	Lead (s)	Sediment	Cool, 4 °C		WWA	1	Sampled: 08/01/2024 10:21
111796-006	MI	Potassium (s)	Sediment	Cool, 4 °C		WWA	1	Sampled: 08/01/2024 10:21
111796-006	MI	Nitrate/Nitrite-N (s)	Sediment	Cool, 4 °C		WWA	1	Sampled: 08/01/2024 10:21
111796-006	MI	Total Kjeldahl Nitrogen (s)	Sediment	Cool, 4 °C		WWA	1	Sampled: 08/01/2024 10:21
111796-006	MI	Total Organic Carbon (s)	Sediment	Cool, 4 °C		WWA	1	Sampled: 08/01/2024 10:21
111796-006	MI	Total Phosphorus (s)	Sediment	Cool, 4 °C		WWA	1	Sampled: 08/01/2024 10:21
111796-006	MI	Total Solids	Sediment	Cool, 4 °C		WWA	1	Sampled: 08/01/2024 10:21

Special Instructions/QC Requirements & Comments

Custody Seals Intact:		Custody Seal No:		Cooler Temp (°C):	Therm ID No.:
Yes	No			Observed 13.8	Corrected
Relinquished by:		Company:	Date/Time	Received by:	Company:
Relinquished by:		Company:	Date/Time	Received by:	Company:
		WWT	8/2/24 1400		TA 817124
					1630

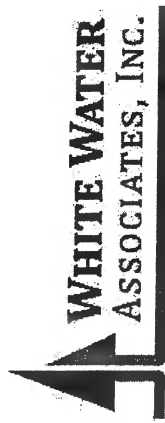


480-222482 Chain of Custody

8/2/2024 13:00

*Sample Type: C = Composite and G = Grab

Page 1 of 1



429 River Lane (906) 822-7889
Amasa, MI 49903 White-Water-Associates.com

240805- Buffalo

Company Eurofins - Buffalo
Contact John Beninati
Email John.Beninati@et.eurofins.com

Chain of Custody

Address 10 Hazelwood Dr
Amherst, NY 14228-2223

Date Shipped 08/05/2024
Due Date

Site Contact: Jen Toivonen, jen.toivonen@white-water-associates.com

Sample No.	State	Test	Matrix	Preservation	Type*	Sampler	Containers	Notes
111827-001	MI	Nitrate/Nitrite-N (s)	Biota	Cool, 4 °C		WWA	1	Sampled: 08/01/2024 12:00
Sample No.	State	Test	Matrix	Preservation	Type*	Sampler	Containers	Notes
111825-002	MI	Metals Solid	Soil	Cool, 4 °C		WWA	1	Sampled: 07/31/2024 09:00 Metals (s): As, Cd, Cr, Cu, Pb, Ni, Se
Sample No.	State	Test	Matrix	Preservation	Type*	Sampler	Containers	Notes
111827-001	MI	Ammonia-N (s)	Biota	Cool, 4 °C		WWA	1	Sampled: 08/01/2024 12:00
111827-001	MI	Metals Solid	Biota	Cool, 4 °C		WWA	1	Sampled: 08/01/2024 12:00 Metals (s): Al, Sb, As, Ba, Be, B, Cd, Ca, Cr, Co, Cu, Fe, Pb, Li, Mg, Mn, Hg, Mo, Ni, K, Se, Na, Sr, Th, V, Zn, U
111827-001	MI	Sulfate (s)	Biota	Cool, 4 °C		WWA	1	Sampled: 08/01/2024 12:00
111827-001	MI	Sulfur (s)	Biota	Cool, 4 °C		WWA	1	Sampled: 08/01/2024 12:00
111827-001	MI	Total Kjeldahl Nitrogen (s)	Biota	Cool, 4 °C		WWA	1	Sampled: 08/01/2024 12:00
111827-001	MI	Total Phosphorus (s)	Biota	Cool, 4 °C		WWA	1	Sampled: 08/01/2024 12:00
Sample No.	State	Test	Matrix	Preservation	Type*	Sampler	Containers	Notes
111828-001	MI	Oil & Grease	Water	Cool, 4 °C		WWA	1	Sampled: 08/01/2024 08:00
111828-001	MI	Total Cyanide(w)	Water	Cool, 4 °C		WWA	1	Sampled: 08/01/2024 08:00

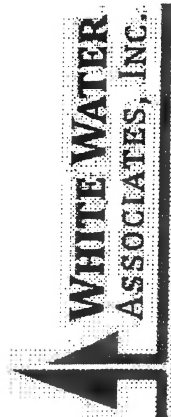
Special Instructions/QC Requirements & Comments

Custody Seals Intact: Yes _____ No _____	Custody Seal No:	Cooler Temp (°C): Observed _____ Corrected _____	Therm ID No.:
Relinquished by:	Company:	Received by:	Company:
Relinquished by:	Company:	Received by:	Company:

8/5/2024 14:34

*Sample Type: C = Composite and G = Grab

Page 1 of 1



429 River Lane (906) 822-7889
Amasa, MI 49903 White-Water-Associates.com

240805- Buffalo

Company Eurofins - Buffalo
Contact John Beninati
Email John.Beninati@et.eurofins.com

Chain of Custody

Address 10 Hazelwood Dr
Amherst, NY 14228-2223

Date Shipped 08/05/2024
Due Date

Site Contact: Jen Toivonen, jen.toivonen@white-water-associates.com

Sample No.	State	Test	Matrix	Preservation	Type*	Sampler	Containers	Notes
111786-001	MI	Mercury (t)	Water	HNO ₃ , pH < 2		WWA	1	Sampled: 07/31/2024 15:30

Special Instructions/QC Requirements & Comments

Custody Seals Intact: Yes _____ No _____		Custody Seal No:		Cooler Temp (°C): Observed _____ Corrected _____		Therm ID No.:	
Relinquished by:		Company:		Date/Time		Company:	
Relinquished by:		Company: WWA		Date/Time: 8/5/24 1400		Company: TA 8171241030	

8/5/2024 13:45

*Sample Type: C = Composite and G = Grab

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Eurofins Buffalo
10 Hazelwood Drive
Amherst, NY 14228-2298
Phone: 716 691 2600 Fax: 716 691 7001



Client Information (Sub Contract Lab)		Sampler	Lab PM	Camera Tracking No(s)	COC No:			
Client Contact		Phone	E-Mail	State of Origin	Page			
Shipping/Receiving		John Beninati@et.eurofinsus.com			Page 1 of 1			
Company		Accreditations Required (See note)			Job #			
Address		State - MI - RadChem Recognition; State - Michigan; Sta ...			Preservation Codes:			
301 Alpha Drive, RIDC Park,		Due Date Requested:			Analysis Requested			
City: Pittsburgh		8/26/2024						
State, Zip		TAT Requested (days):						
PA, 15238		PO #:						
Phone		WO #:						
412-963-7058(Tel) 412-963-2468(Fax)		Project #			Total Number of containers			
Email		48003095						
Project Name		SSOW#						
White Water Associates - 111796		Sample Date						
Site:		8/1/24						
Sample Identification - Client ID (Lab ID)		Sample Time	Sample Type	Matrix	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	Lloyd_Kahn_Mod/Lloyd Kahn-	Special Instructions/Note:
111796-006 (480-222482-1)	10.21 Eastern	G	Solid	BT-Tissue, Analp	X	X	X	1
Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing Northeast, LLC places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/test/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing Northeast, LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Environment Testing Northeast, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins Environment Testing Northeast, LLC								
Possible Hazard Identification								
Unconfirmed								
Deliverable Requested: I, II, III, IV, Other (specify)								
Primary Deliverable Rank: 2								
Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)								
Return To Client ☐ Disposal By Lab ☐ Archive For ☐ Months								
Special Instructions/QC Requirements								
Empty Kit Relinquished by:								
Relinquished by: 								
Relinquished by:								
Relinquished by:								
Custody Seal No.:								
Custody Seal Intact: A Yes A No								
Cooler Temperature(s) °C and Other Remarks								

Login Sample Receipt Checklist

Client: White Water Associates

Job Number: 480-222482-1

Login Number: 222482

List Number: 1

Creator: Kolb, Chris M

List Source: Eurofins Buffalo

Question	Answer	Comment
Radioactivity either was not measured or, if measured, is at or below background	True	
The cooler's custody seal, if present, is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	False	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time (Excluding tests with immediate HTs)..	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	N/A	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Sampling Company provided.	True	wwa
Samples received within 48 hours of sampling.	False	
Samples requiring field filtration have been filtered in the field.	True	
Chlorine Residual checked.	N/A	

Appendix 3. Procedure 51 habitat assessment photos





Photo 18. CR01 looking upstream.



Photo 19. CR01 site looking downstream.





Photo 20. CR02 site looking upstream.



Photo 21. CR02 site looking downstream.





Photo 22. CR03 substitute site looking upstream.



Photo 23. CR03 substitute site looking downstream.





Photo 24. CR04 site looking upstream.



Photo 25. CR04 site looking downstream.





Photo 26. CR05 site looking upstream.



Photo 27. CR05 site looking downstream.





Photo 28. CR06 site looking upstream.



Photo 29. CR06 site looking downstream.





Photo 30. CR07 site looking upstream.



Photo 31. CR07 site looking downstream.

