GREEN LAKE WATER POWER CO.

UPDATED STUDY REPORT
FOR THE GREEN LAKE HYDROELECTRIC PROJECT
(FERC NO. 7189)

Prepared by:

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GREEN LAKE HYDROELECTRIC PROJECT
FERC NO. 7189
UPDATED STUDY REPORT

1.0 OVERVIEW

Green Lake Water Power Co. (GLWP) hereby files this Updated Study Report (USR) with the Federal Energy Regulatory Commission (FERC) as part of the relicensing of the Green Lake Project.

The Licensee is using FERC's Integrated Licensing Process (ILP) as established in regulations issued by FERC July 23, 2003 (Final Rule, Order No. 2002) and found at Title 18 CFR, Part 5. The current license expires on March 31, 2024.

1.1 Process and Schedule Overview

Consistent with requirements under 18 CFR § 5.15, and in accordance with the Green Lake Project Process Plan and Schedule, within 15 days following the filing of this Updated Study Report (USR) (i.e., by February 24, 2022) GLWP will hold an online meeting with relicensing participants and FERC staff to discuss the 2021 study results and status. Within 15 days following the USR meeting, GLWP will file a meeting summary.

FERC staff, or any relicensing participant, may file a disagreement concerning GLWP's meeting summary within 30 days of its issuance. This filing must set forth the basis of any disagreement with the material content of the meeting summary and propose any necessary alternative modifications to ongoing studies or new studies. GLWP will then have 30 days to respond to the disagreements and possibly propose revised study modifications or new studies. Within 30 days of the GLWP's response, any remaining disagreements will be resolved by FERC, and the study plan will be amended as appropriate.

In accordance with 18 CFR § 5.15(f), any proposal to modify an ongoing study must demonstrate that the study was not conducted as described in the approved Revised Study Plan, was conducted under anomalous environmental conditions, or that environmental conditions have changed in a material way since the Study Plan's approval. The proposal must also explain why the study's objectives cannot be met via the approved methods and why the proposal for modification was not made earlier, or that significant new information has become available that affects the study.

2.0 UPDATED STUDY REPORT

2.1.1 Downstream Benthic Macroinvertebrate (BMI) Study 1-4:

At the time when we did the Initial Study Report and ISR supplement BMI sites 2 and 3 data had not been analyzed. This work is now complete and the report is included below.

2020

Macroinvertebrate Sampling Study

Downstream

of

Green Lake Hydroelectric Project

Ellsworth Maine

FERC No. 7189

Submitted by:

Paul C. Leeper
Moody Mountain Environmental
137 Diamond Str
Searsmont Maine 04973

Submitted to:

Green Lake Water Power Company
Ellsworth, Maine
Date: 2-4-22

Introduction

This macroinvertebrate sampling study was conducted for Green Lake Water Power Company (GLWP) in support of the relicensing of the Green Lake Hydroelectric Project, Federal Energy Regulatory Commission (FERC) Project No. 7189. This report details the 2020 study efforts downstream of the Project as part of the Water Quality Certification Process. A previous report (Leeper 2021) reported on the macroinvertebrate sampling and analysis in Reeds Brook, downstream of the Green Lake Dam.

Study Objectives

The goal of the macroinvertebrate sampling study was to generate data on the aquatic macroinvertebrate community downstream of the GLWP powerhouse and assess this community in terms of Maine's Aquatic Life Standards using the Maine Department of Environmental Protection (MDEP) Linear Discriminant Model (LDM).

Study Area

In 2020 we placed samples at three (3) sites in Reeds Brook to study aquatic macroinvertebrates (Figure 1). The locations of the sites were recommended by the MDEP. Site 1 (see Leeper 2021) was located in Reeds Brook approximately 290ft downstream of the Green Lake dam. This site was located upstream of the Green Lake Hatchery filter overflow discharge into Reeds Brook. Sites 2 and 3 are reported on in this paper. Site 2 was located approximately 240 ft downstream of the powerhouse and approximately 2240 ft downstream of the dam. Site 3 was located approximately 400 downstream of the powerhouse at the confluence of Reeds Brook and the powerhouse tailrace, approximately 2350 ft downstream of the dam. Both of the sites are periodically backwatered by impounded water levels in Graham Lake. In addition, Site 3 is located downstream of the Green Lake National Fish Hatchery treatment plant discharge.

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Figure 1. Location of aquatic macroinvertebrate sampling site downstream of the Green Lake Dam. Sites 2 and 3 are downstream of the powerhouse. Reeds Brook, August, September 2020.

Water Classification

Reeds Brook downstream of the Green Lake Dam is classified Class B ((38 M.R.S.A § 467(7)(A)(7)). With respect to designated uses, the Maine Water Quality Law requires that "Class B waters must be of such quality that they are suitable for the designated uses of drinking water supply after treatment; fishing; agriculture; recreation in and on the water; industrial process and cooling water supply; hydroelectric power generation, except as prohibited under Title 12, section 403; navigation; and as habitat for fish and other aquatic life. The habitat must be characterized as unimpaired" (38 M.R.S.A. § 465(3)(A)). The word "unimpaired" is defined to mean "without a diminished capacity to support aquatic life" (38 M.R.S.A. § 466(11)). In addition, for Class B waters, "Discharges to Class B waters may not cause adverse impact to aquatic life in that the receiving waters must be of sufficient quality to support all aquatic species indigenous to the receiving water without detrimental changes in the resident biological community" (38 M.R.S.A. § 465(3)(C). The term "resident biological community" is defined as "aquatic life expected to exist in a habitat which is free from the influence of the discharge of any pollutant" ((38 M.R.S.A. § 466(10)). The

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term “without detrimental changes in the resident biological community” means no significant loss of species or excessive dominance by any species or group of species attributable to human activity” ((38 M.R.S.A. § 466(12)).

Study Methods

The objective of the macroinvertebrate sampling study was to determine if the aquatic life, in this case the macroinvertebrate community, attained these Class B standards. The Maine Department of Environmental Protection (DEP) "Methods for Biological Sampling and Analysis of Maine's Inland Waters" (Davies and Tsomides Revised 2014) were used as the basis of the field and laboratory procedures in the macroinvertebrate sampling study. A summary of these methods is given below.

The DEP standard rock bag samplers were used for this study. These samplers hold approximately 16 lbs. of clean, washed, bank-run cobble, graded to uniform diameter range of 1.5 to 3 inches. Three (3) samplers were placed at the sample sites; samplers were left in the river for approximately 28 days (± 4 days) to allow for invertebrate colonization. Retrieval of the samplers was done using an aquatic D-net. The net was placed directly downstream of a sampler; the sampler was then picked up and placed in the net. The contents of each sampler and the net were washed through a sieve bucket and preserved in labeled jars. Habitat measurements including substrate type, depth, and temperature were collected at sampler collection retrieval.

Samples were collected, preserved, and transported to the Moody Mountain Environmental laboratory. The three (3) samplers (replicates) were sorted, identified, and enumerated. The results were entered on MDEP Excel spreadsheets and sent to MDEP for modelling using the LDM.

Results

The samplers were placed in the river on August 27, 2020. Samplers were retrieved on September 24, 2020. Upon retrieval it was evident that samplers at Site 2 had washed downstream approximately 30 ft and had been disturbed. In addition, Site 2 had been backwatered by impounded water levels in Graham Lake from spring to shortly before the samplers were deployed.

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Therefore, the community being sampled was impacted by water levels in Graham Lake and were in a lentic habitat rather than a lotic habitat in the months prior to sampling. Site 3 was also backwatered by impounded water levels in Graham Lake and was in a lentic habitat rather than a lotic habitat during the colonization period. Habitat measurements for Sites 2 and 3 are shown in Table 1 and Appendix 1. Photos of the areas around the sample sites and substrates are included below.

Table 1. Habitat measurements at Sites 2 and 3 in Reeds Brook downstream of GLWP powerhouse for aquatic macroinvertebrate sampling. August, September 2020

Macroinvertebrate Field Data Sheet

Log _____	Directions	Type of Sampler **RB**
Station Number 2	_____	Date Deployed **8/27/20**
Waterbody **Reeds Brk.**	_____	Number Deployed **3**
River Basin **Union R.**	Lat-Long Coordinates	Date Retrieved **9/24/20**
Town **Ellsworth**	**N 44.624446°**	Number Retrieved **3**
Stream Order **4**	**W 68.437384°**	Collector(s) **P Leeper MME**

1. **Land Use** (surrounding watershed)		2. **Terrain**	3. **Canopy Cover**
☐ Urban	**X** Upland conifer	☐ Flat	☐Dense (75-100% shaded)
☐ Cultivated	☐ Swamp hardwood	**X** Rolling	☐Partly open (25-75% shaded)
☐ Pasture	☐ Swamp conifer	☐ Hilly	**X** Open (0-25% shaded)
X Upland hardwood	☐ Marsh	☐ Mountains	(% daily direct sun) _____

4. **Physical Characteristics of Bottom** estimate % over 12 m stretch							
[ ]	Bedrock	[70]	Cobble (2.5" – 10")	[]	Sand (<1/8")	[ ]	Clay
[10]	Boulders (>10")	[15]	Gravel (1/8" – 2.5")	[	Silt	[5]	Detritus

5. **Habitat Characteristics** (immediate area)		Temp. Probe # ☐ deployed	7. **Water Samples**
Time **1000h**	Time **1000h**		☐ Standard
Wetted Width **5.8m**	Wetted Width (m)**5.8m**	6. **Observations**	☐ Other
Bank Fl Width	Bank Full Width	Attached algae	Lab Number
Depth **23cm**	Depth **43cm**	Aq. Moss	
Velocity 18cm/s	Velocity 91 cm/s	In Tailrace	8. **Photograph**
Diss. O_2 (ppm) 9.3	Diss. O_2 (ppm) 9.3	Samplers Disturbed	Put-In Yes
Temp (C) 19.5	Temp (C) 16.9	Transported downstream by current	Take-Out **Yes**
Turbidity	Turbidity		
DO Meter # YSI Pro 1 Cal? **Y**/	DO Meter # YSI Pro 1 Cal? **Y** /		

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Table 1. Continued

Macroinvertebrate Field Data Sheet

Log _____	Directions	Type of Sampler **RB**
Station Number 3	_____	Date Deployed **8/27/20**
Waterbody **Reeds Brk.**	_____	Number Deployed **3**
River Basin **Union R.**	Lat-Long Coordinates	Date Retrieved **9/24/20**
Town **Ellsworth**	**N 44.624516°**	Number Retrieved **3**
Stream Order **4**	**W 68.436840°**	Collector(s) **P Leeper MME**

1. Land Use (surrounding watershed)		**2. Terrain**	**3. Canopy Cover**
☐ Urban	**X** Upland conifer	☐ Flat	☐Dense (75-100% shaded)
☐ Cultivated	☐ Swamp hardwood	**X** Rolling	☐Partly open (25-75% shaded)
☐ Pasture	☐ Swamp conifer	☐ Hilly	**X** Open (0-25% shaded)
X Upland hardwood	☐ Marsh	☐ Mountains	(% daily direct sun) _____

4. Physical Characteristics of Bottom estimate % over 12 m stretch					
[ ] Bedrock	[ ] Cobble (2.5" – 10")	**[90]** Sand (<1/8")	[ ] Clay		
[ ] Boulders (>10")	[ ] Gravel (1/8" – 2.5")	**[10]** Silt	[ ] Detritus		

5. Habitat Characteristics (immediate area)		Temp. Probe # ☐ deployed	**7. Water Samples**
Time **1045h**	Time **1010h**	**6. Observations**	☐ Standard
Wetted Width **21m**	Wetted Width (m)	Confluence of brook and tailrace	☐ Other
Bank Fl Width	Bank Full Width	Downstream of hatchery discharge	Lab Number
Depth **70cm**	Depth **43cm**		**8. Photograph**
Velocity 16cm/s	Velocity 49 cm/s		Put-In Yes
Diss. O_2 (ppm) 9.5	Diss. O_2 (ppm) 9.3		Take-Out **No**
Temp (C) 17.8	Temp (C) 16.9		
Turbidity	Turbidity		
DO Meter # YSI Pro 1 Cal? **Y**/	DO Meter # YSI Pro 1 Cal? **Y** /		

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Photo 1. View west-northwest, upstream from Site 2 looking at powerhouse tailrace. 8/27/20 PCL

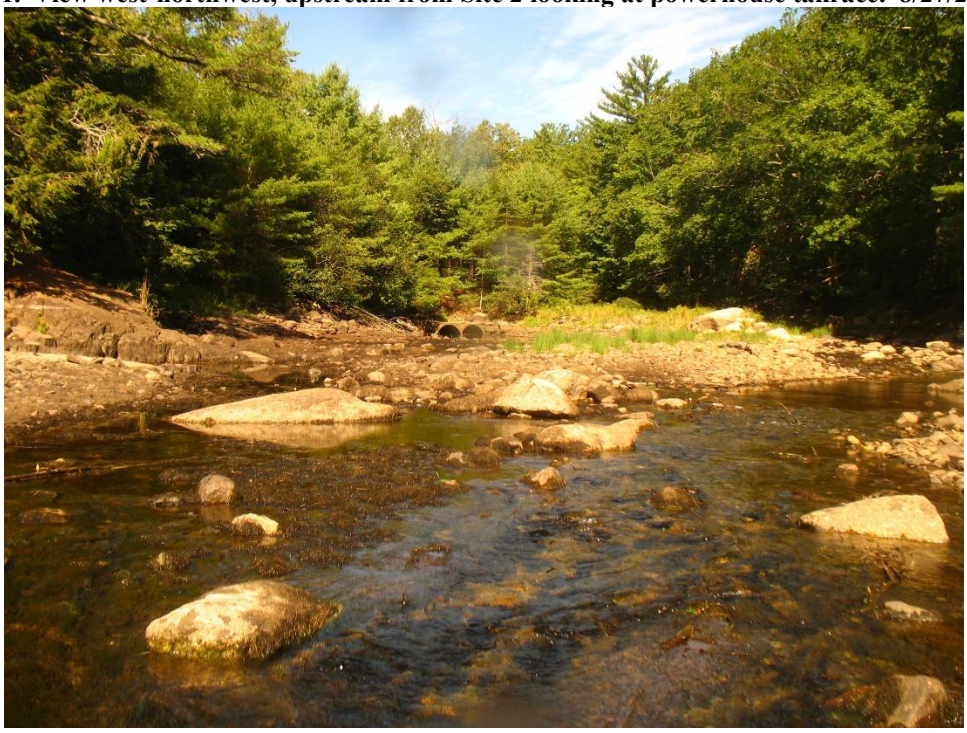

Photo 2. View east from Site 2. Note GLNFH treatment plant discharge at center right of picture. 8/27/20 PCL

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Photo 3. Typical substrate and deployed samplers at Site 2. 8/27/20 PCL

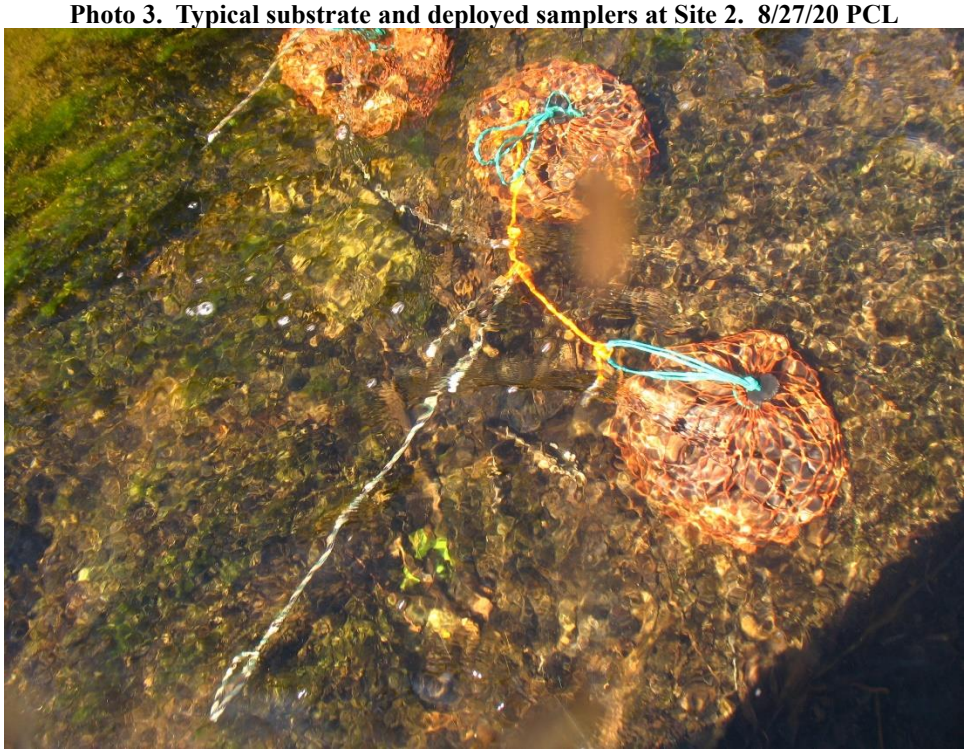
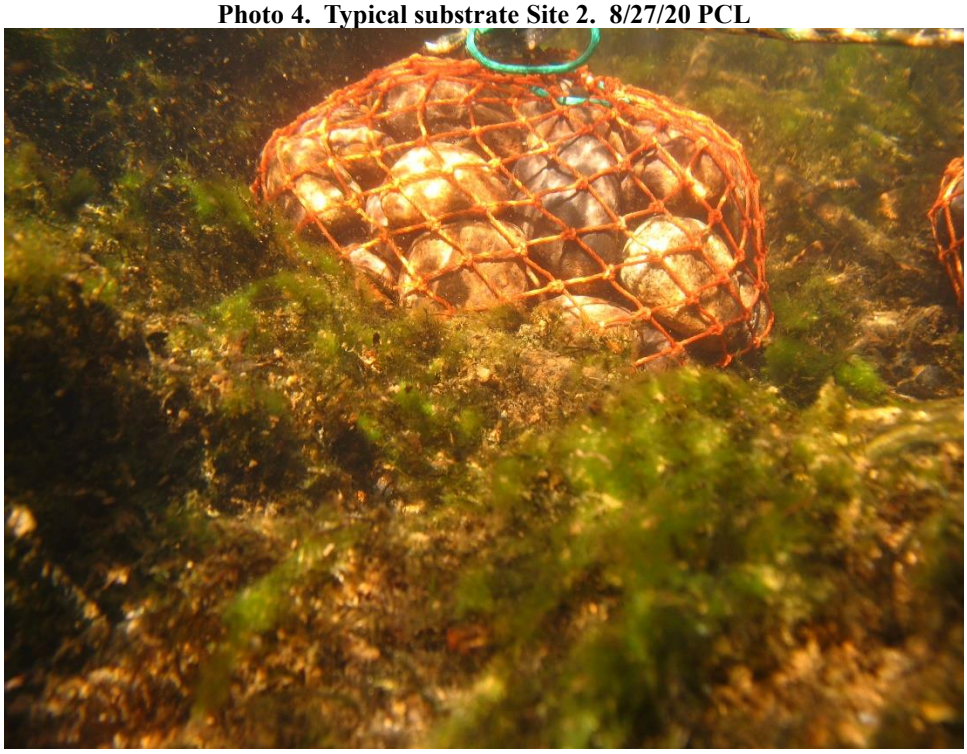


Photo 4. Typical substrate Site 2. 8/27/20 PCL



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LDM Results

The LDM biocriteria preliminary results are shown in Table 2 and Appendix 1. To attain a particular class a site must have a 60% or greater score in the test for that class. DEP finds that the communities at Sites 2 and 3 were not in attainment of Aquatic Life Class B Standards. The final determinations are not shown on these reports but are as follows (MDEP email dated 1/26/22 Jeanne DiFranco to Paul Leeper):

Station 1198 (Reeds Brook 2): The model result was NA (non-attainment of any class), but the finding was raised to Class C based on Best Professional Judgement considering the community present and potential habitat issues related to periodic inundation from Graham Lake backwatering.

Station 1199 (Reeds Brook 3): The model result was NA and indeterminant for Class C (in BPJ range). The finding was raised to Class C based on BPJ for similar reasons as above.

The make-up of this community and a discussion of the results are presented below.

Table 2. Results of the DEP linear discriminant model (LDM) for 2 sites downstream of the GLWP powerhouse in Ellsworth Maine in 2020. A score of 60% or greater is needed to attain a particular class.

Site	Probability of Class A	Probability of Class B	Probability of Class C	Probability of Non-Attainment
2	1%	0%	0%	100%
3	1%	0%	52%	48%

Community Analysis

The macroinvertebrate communities sampled downstream of the GLWP powerhouse were abundant and relatively rich in taxa (Table 3 and Appendix 1). The community at Site 2 was populated with 26 different taxa with a Mean Total Abundance of 350. The Site 3 community was less numerous (Total Abundance of 232) but more rich with 30 taxa. The Site 2 community was dominated by filter-feeding caddisflies, representing over 52% of Total Abundance. The Site 3 community was dominated by the Amphipod *Hyalella* and the midge *Cricotopus,* representing over 57%of the community. The Diversity values were moderate at 2.78 (Site 2) and 3.16 (Site 3). Structural indices for the sampled community are shown in Tables 3 and 4.

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Table 3. Indices of community structure for the aquatic invertebrate communities downstream of the GLWP powerhouse. August, September 2020.

Site	Tot. Abund.	Taxa Richness	S-W Div.	Hils. Biotic Index (HBN)	Water Quality indication from HBN	Mayfly, Stonefly, Caddisfly (EPT) Richness	Mayfly, Stonefly (EP)		Midge	
							Rich	% Ab	Rich	% Ab
2	350	26	2.78	5.29	Good	12	4	2%	3	3%
3	232	30	3.16	6.79	Fairly Poor	10	6	7%	7	24%

Indexes measuring the community tolerance to poor riverine water quality conditions at Site 2 were mixed. The community was dominated by net-spinning caddisflies (*Hydropsyche* and *Cheumatopsyche*), generally considered to be "clean water organisms" that are generally sensitive to poor water quality. The Hilsenhoff Biotic Index (HBI) value, 5.29, indicated good water quality (Hilsenhoff 1987). However, the EP index of sensitive mayflies and stoneflies had 4 taxa representing just 2% of the community and no sensitive stoneflies were found in the samples.

The Site 3 community indices indicated a more stressed riverine community. Dominant organisms (representing over 5% of the Total Abundance) in the community are shown in Table 4 arranged from the most sensitive organisms to the organisms most tolerant of poor water quality conditions. The community had four (4) organisms that made up 75% of the total abundance that, when found in stream habitats, are tolerant of poor riverine water quality. The HBI value of 6.8 indicated fairly poor water quality (Hilsenhoff 1987). The EP index of sensitive mayflies and stoneflies had 6 taxa representing just 7% of the community and no sensitive stoneflies were found in the samples. Finally, midge larvae (Chironomidae), organisms generally more tolerant of poor riverine water quality, made up 24% of the total abundance.

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Table 4. Dominant aquatic invertebrate organisms downstream of the GLWP powerhouse. July, August 2020.

	Site 2		Site 3	
Sensitivity to Poor Water Quality	**Dominant Organism**	**% of Community**	**Dominant Organism**	**% of Community**
Sensitive	*Hydropsyche*	28%		
Intermediate	*Cheumatopsyche*	24%	*Polycentropus*	5%
Tolerant	*Hyalella*	23%	*Hyalella*	36%
	Isopoda	8%	*Cricotopus*	21%
	Hydrobiidae	5%	Isopoda	9%
			Planariidae	9%

Summary

1. The objective of the macroinvertebrate sampling study was to generate data on the aquatic macroinvertebrate community in downstream of the GLWP powerhouse and assess this community in terms of Maine's Aquatic Life Standards. Reeds Brook downstream of the powerhouse is classified Class B.

2. The Maine Department of Environmental Protection (DEP) "Methods for Biological Sampling and Analysis of Maine's Inland Waters" (Davies and Tsomides Revised 2014) were used as the basis of the field and laboratory procedures in this study.

3. Samplers were placed at 2 sites on August 27. Retrieval was on September 24. Site 2 had been backwatered by impounded water levels in Graham Lake from spring to shortly before the samplers were deployed. Therefore, the community being sampled was impacted by water levels in Graham Lake and were in a lentic habitat rather than a lotic habitat in the months prior to sampling. Site 3 was also backwatered by impounded water levels in Graham Lake and was in a lentic habitat rather than a lotic habitat during the colonization period. Site 3 is also located downstream of the Green Lake National Fish Hatchery treatment plant discharge. At retrieval it was found that samplers at sites 2 had been disturbed by high flows and washed downstream approximately 30 ft.

4. The DEP finds that the LDM biocriteria results indicate that the community is not in attainment of Class B Aquatic Life Standards rather, the communities attain Class C

Aquatic Life Standards.

5. The invertebrate communities sampled downstream of the GLWP powerhouse were abundant and relatively rich in taxa. Indexes measuring the community tolerance to poor riverine water quality conditions at Site 2 were mixed. The Site 3 community indices indicated a more stressed riverine community.

References

Davies, S.P. and L. Tsomides. Revised 2014. Methods for biological sampling and analysis of Maine's rivers and streams. ME Dept. of Env. Prot. Augusta, ME. 31p.

Hilsenhoff, W.L. 1987. An improved biotic index of organic stream pollution. The Great Lake Entomologist. Pgs. 31-39.

Leeper, Paul C. 2021. 2020 Macroinvertebrate Sampling Study Downstream of Green Lake Dam, Ellsworth Maine, FERC No. 7189. Report to Green Lake Water Power Company, March 15, 2021. 13p.

Appendix 1- LDM results and data files including field data, and individual replicate data.

Maine Department of Environmental Protection
Biological Monitoring Program
Aquatic Life Classification Attainment Report

Station Information

Station Number:	**S-1198**	River Basin:	
Waterbody:	Reeds Brook - Station 1198	HUC8 Name:	
Town:	Ellsworth	Latitude:	
Directions:	GREEN LAKE HATCHERY, DRIVE UP ROAD TO POWERHOUSE, SITE IS JUST DOWNSTREAM OF POWERHOUSE OUTLET. REEDS BROOK 2.	Longitude:	
		Stream Order:	

Sample Information

Log Number:	**2927**	Type of Sample:	ROCK BAG	Date Deployed:	8/27/2020
Subsample Factor:	X1	Replicates:	3	Date Retrieved:	9/24/2020

Classification Attainment

Statutory Class:	**B**	**Final Determination:**	Date:
Model Result with P≥0.6:	NA	**Reason for Determination:**	
Date Last Calculated:	1/7/2022	Comments:	

Model Probabilities

First Stage Model				C or Better Model	
Class A	0.00	Class C	0.34	Class A, B, or C	0.00
Class B	0.00	NA	0.65	Non-Attainment	1.00

B or Better Model		A Model	
Class A or B	0.00	Class A	0.01
Class C or Non-Attainment	1.00	Class B or C or Non-Attainment	0.99

Model Variables

01 Total Mean Abundance	350.00	18 Relative Abundance Ephemeroptera	0.02
02 Generic Richness	26.00	19 EPT Generic Richness	12.00
03 Plecoptera Mean Abundance	0.00	21 Sum of Abundances: *Dicrotendipes, Micropsectra, Parachironomus, Helobdella*	0.00
04 Ephemeroptera Mean Abundance	5.33		
05 Shannon-Wiener Generic Diversity	2.78	23 Relative Generic Richness- Plecoptera	0.00
06 Hilsenhoff Biotic Index	5.29	25 Sum of Abundances: *Cheumatopsyche, Cricotopus, Tanytarsus, Ablabesmyia*	93.67
07 Relative Abundance - Chironomidae	0.03		
08 Relative Generic Richness Diptera	0.19	26 Sum of Abundances: *Acroneuria, Maccaffertium, Stenonema*	0.00
09 *Hydropsyche* Abundance	97.33		
11 *Cheumatopsyche* Abundance	85.00	28 EP Generic Richness/14	0.29
12 EPT Generic Richness/ Diptera Generic Richness	2.40	30 Presence of Class A Indicator Taxa/7	0.14
13 Relative Abundance - Oligochaeta	0.00		
15 Perlidae Mean Abundance (Family Functional Group)	0.00		
16 Tanypodinae Mean Abundance (Family Functional Group)	0.00		
17 Chironomini Abundance (Family Functional Group)	1.00		

Five Most Dominant Taxa

Rank	Taxon Name	Percent
1	*Hydropsyche*	27.81
2	*Cheumatopsyche*	24.29
3	*Hyalella*	23.05
4	Isopoda	7.52
5	Hydrobiidae	4.57

Report Printed: 1/7/2022 Contact: biome@maine.gov or (207)287-7688 Page 1

Maine Department of Environmental Protection
Biological Monitoring Program
Aquatic Life Classification Attainment Report

Station Number: S-1198 Town: Ellsworth Date Deployed: 8/27/2020
Log Number: 2927 Waterbody: Reeds Brook - Station 1198 Date Retrieved: 9/24/2020

Sample Collection and Processing Information

Sampling Organization: MOODY MOUNTAIN ENVIRONMENTA
Taxonomist: PAUL LEEPER (MOODY MOUNTAIN ENVIRONMENTAL)

Waterbody Information - Deployment		Waterbody Information - Retrieval	
Temperature:	19.5 deg C	Temperature:	16.9 deg C
Dissolved Oxygen:	9.3 mg/l	Dissolved Oxygen:	9.3 mg/l
Dissolved Oxygen Saturation:		Dissolved Oxygen Saturation:	
Specific Conductance:		Specific Conductance:	
Velocity:	18 cm/s	Velocity:	91 cm/s
pH:		pH:	
Wetted Width:	5.8 m	Wetted Width:	6 m
Bankfull Width:		Bankfull Width:	
Depth:	23 cm	Depth:	43 cm

Water Chemistry

Summary of Habitat Characteristics

Landuse Name	Canopy Cover	Terrain	
Upland Conifer	Open	Rolling	
Upland Hardwood			
Potential Stressor	**Location**	**Substrate**	
Impounded	Above Confluence	Boulder	10 %
Regulated Flows	Below Dam	Detritus	5 %
		Gravel	15 %
		Rubble/Cobble	70 %

Landcover Summary - 2004 Data

Sample Comments

IN TAILRACE PER DEP,ATTACHED ALGAE & MOSS NO BANKFUL MEASUREMENT BECAUSE INUNDATED BY GRAHAM LAKE AT NHW

Maine Department of Environmental Protection
Biological Monitoring Program
Aquatic Life Taxonomic Inventory Report

Station Number: S-1198 Waterbody: Reeds Brook - Station 1198 Town: Ellsworth

Log Number: 2927 Subsample Factor: X1 Replicates: 3 Calculated: 1/7/2022

Taxon	Maine Taxonomic Code	Count (Mean of Samplers)		Hilsenhoff Biotic Index	Functional Feeding Group	Relative Abundance %	
		Actual	Adjusted			Actual	Adjusted
Planariidae	03010101	8.00	8.00		--	2.3	2.3
Hirudinidae	08030201	0.67	0.67		--	0.2	0.2
Isopoda	090101	26.33	26.33		--	7.5	7.5
Hyalella	09010203006	80.67	80.67	8	CG	23.0	23.0
Orconectes	09010301008		0.33		CG		0.1
Orconectes limosus	09010301008013	0.33			--	0.1	
Boyeria	09020301004	0.33	0.33	2	PR	0.1	0.1
Baetidae	09020401	1.67	1.67		--	0.5	0.5
Stenacron	09020402014	0.33	0.33	7	SC	0.1	0.1
Leptophlebiidae	09020406	1.67	1.67		--	0.5	0.5
Eurylophella	09020410036	1.67	1.67	3	CG	0.5	0.5
Chimarra	09020601003	6.33	6.33	2	CF	1.8	1.8
Polycentropus	09020603010	0.67	0.67	6	PR	0.2	0.2
Cheumatopsyche	09020604015	85.00	85.00	5	CF	24.3	24.3
Hydropsyche	09020604016	97.33	97.33	4	CF	27.8	27.8
Macrostemum	09020604018	0.33	0.33	3	CF	0.1	0.1
Ochrotrichia	09020607027	0.67	0.67	4	P	0.2	0.2
Lepidostoma	09020611064	0.33	0.33	1	SH	0.1	0.1
Oecetis	09020618078	0.33	0.33	8	PR	0.1	0.1
Cricotopus	09021011037	8.33	8.33	7	SH	2.4	2.4
Tanytarsus	09021011076	0.33	0.33	6	CF	0.1	0.1
Pseudochironomus	09021011078	1.00	1.00	5	CG	0.3	0.3
Cnephia	09021012046	10.33	10.33	0	CF	3.0	3.0
Atherix	09021015055	0.33	0.33	2	PR	0.1	0.1
Hydrobiidae	10010104	16.00	16.00		--	4.6	4.6
Physidae	10010202	0.33	0.33		SC	0.1	0.1
Bivalvia	1002	0.67	0.67		CF	0.2	0.2

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Maine Department of Environmental Protection
Biological Monitoring Program
Aquatic Life Classification Attainment Report

Station Information

Station Number:	**S-1199**	River Basin:	
Waterbody:	Reeds Brook - Station 1199	HUC8 Name:	
Town:	Ellsworth	Latitude:	
Directions:	GREEN LAKE HATCHERY, DRIVE UP ROAD TO POWERHOUSE, SITE IS JUST DOWNSTREAM OF POWERHOUSE DISCHARGE. REEDS BROOK 3.	Longitude:	
		Stream Order:	

Sample Information

Log Number:	**2928**	Type of Sample:	ROCK BAG	Date Deployed:	8/27/2020
Subsample Factor:	X1	Replicates:	3	Date Retrieved:	9/24/2020

Classification Attainment

Statutory Class:	**B**	**Final Determination:**	Date:
Model Result with P≥0.6:	NA	**Reason for Determination:**	
Date Last Calculated:	1/7/2022	Comments:	

Model Probabilities

First Stage Model			
Class A	0.00	Class C	0.75
Class B	0.00	NA	0.24

C or Better Model	
Class A, B, or C	0.52
Non-Attainment	0.48

B or Better Model	
Class A or B	0.00
Class C or Non-Attainment	1.00

A Model	
Class A	0.01
Class B or C or Non-Attainment	0.99

Model Variables

01 Total Mean Abundance	231.67	18 Relative Abundance Ephemeroptera	0.07
02 Generic Richness	30.00	19 EPT Generic Richness	10.00
03 Plecoptera Mean Abundance	0.00	21 Sum of Abundances: *Dicrotendipes, Micropsectra, Parachironomus, Helobdella*	1.00
04 Ephemeroptera Mean Abundance	17.00	23 Relative Generic Richness- Plecoptera	0.00
05 Shannon-Wiener Generic Diversity	3.16	25 Sum of Abundances: *Cheumatopsyche, Cricotopus, Tanytarsus, Ablabesmyia*	54.33
06 Hilsenhoff Biotic Index	6.79	26 Sum of Abundances: *Acroneuria, Maccaffertium, Stenonema*	2.00
07 Relative Abundance - Chironomidae	0.24	28 EP Generic Richness/14	0.43
08 Relative Generic Richness Diptera	0.30	30 Presence of Class A Indicator Taxa/7	0.14
09 *Hydropsyche* Abundance	1.33		
11 *Cheumatopsyche* Abundance	6.67		
12 EPT Generic Richness/ Diptera Generic Richness	1.11		
13 Relative Abundance - Oligochaeta	0.00		
15 Perlidae Mean Abundance (Family Functional Group)	0.00		
16 Tanypodinae Mean Abundance (Family Functional Group)	1.33		
17 Chironomini Abundance (Family Functional Group)	1.33		

Five Most Dominant Taxa

Rank	Taxon Name	Percent
1	*Hyalella*	35.54
2	*Cricotopus*	20.58
3	Isopoda	9.21
4	Planariidae	8.63
5	*Polycentropus*	4.60

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Maine Department of Environmental Protection
Biological Monitoring Program
Aquatic Life Classification Attainment Report

Station Number: S-1199 Town: Ellsworth Date Deployed: 8/27/2020
Log Number: 2928 Waterbody: Reeds Brook - Station 1199 Date Retrieved: 9/24/2020

Sample Collection and Processing Information

Sampling Organization: MOODY MOUNTAIN ENVIRONMENTAL
Taxonomist: PAUL LEEPER (MOODY MOUNTAIN ENVIRONMENTAL)

Waterbody Information - Deployment		Waterbody Information - Retrieval	
Temperature:	17.8 deg C	Temperature:	16.9 deg C
Dissolved Oxygen:	9.5 mg/l	Dissolved Oxygen:	9.3 mg/l
Dissolved Oxygen Saturation:		Dissolved Oxygen Saturation:	
Specific Conductance:		Specific Conductance:	
Velocity:	16 cm/s	Velocity:	52 cm/s
pH:		pH:	
Wetted Width:	21.3 m	Wetted Width:	
Bankfull Width:		Bankfull Width:	
Depth:	70 cm	Depth:	43 cm

Water Chemistry

Summary of Habitat Characteristics

Landuse Name	Canopy Cover	Terrain	
Upland Conifer	Open	Rolling	
Upland Hardwood			
Potential Stressor	**Location**	**Substrate**	
Impounded	Above Confluence	Sand	90 %
Regulated Flows	Below Dam	Silt	10 %

Landcover Summary - 2004 Data

Sample Comments

BELOW CONFLUENCE WITH BYPASS NO BANKFUL MEASUREMENT BECAUSE INUNDATED BY GRAHAM LAKE AT NHW

Maine Department of Environmental Protection
Biological Monitoring Program
Aquatic Life Taxonomic Inventory Report

Station Number: S-1199 Waterbody: Reeds Brook - Station 1199 Town: Ellsworth

Log Number: 2928 Subsample Factor: X1 Replicates: 3 Calculated: 1/7/2022

Taxon	Maine Taxonomic Code	Count (Mean of Samplers)		Hilsenhoff Biotic Index	Functional Feeding Group	Relative Abundance %	
		Actual	Adjusted			Actual	Adjusted
Planariidae	03010101	20.00	20.00		--	8.6	8.6
Annelida	08	1.33	1.33		--	0.6	0.6
Hirudinidae	08030201	0.67	0.67		--	0.3	0.3
Isopoda	090101	21.33	21.33		--	9.2	9.2
Hyalella	09010203006	82.33	82.33	8	CG	35.5	35.5
Orconectes	09010301008		1.33		CG		0.6
Orconectes limosus	09010301008013	1.33			--	0.6	
Boyeria	09020301004	3.33	3.33	2	PR	1.4	1.4
Hagenius	09020302008	0.33	0.33	1	PR	0.1	0.1
Baetidae	09020401	1.00	1.00		--	0.4	0.4
Stenacron	09020402014	5.00	5.00	7	SC	2.2	2.2
Stenonema	09020402016	2.00	2.00	4	SC	0.9	0.9
Paraleptophlebia	09020406026	5.67	5.67	1	CG	2.4	2.4
Eurylophella	09020410036	3.00	3.00	3	CG	1.3	1.3
Caenis	09020412040	0.33	0.33	7	CG	0.1	0.1
Polycentropus	09020603010	10.67	10.67	6	PR	4.6	4.6
Cheumatopsyche	09020604015	6.67	6.67	5	CF	2.9	2.9
Hydropsyche	09020604016	1.33	1.33	4	CF	0.6	0.6
Ochrotrichia	09020607027	0.67	0.67	4	P	0.3	0.3
Nigronia	09020701003	1.00	1.00	0	PR	0.4	0.4
Tipulidae	09021001	0.33	0.33		--	0.1	0.1
Natarsia	09021011011	1.00	1.00	8	PR	0.4	0.4
Thienemannimyia	09021011020	0.33	0.33	3	PR	0.1	0.1
Cricotopus	09021011037	47.67	47.67	7	SH	20.6	20.6
Nanocladius	09021011049	2.67	2.67	3	CG	1.2	1.2
Psectrocladius	09021011056	1.67	1.67	8	CG	0.7	0.7
Dicrotendipes	09021011085	1.00	1.00	8	CG	0.4	0.4
Polypedilum	09021011102	0.33	0.33	6	SH	0.1	0.1
Cnephia	09021012046	0.33	0.33	0	CF	0.1	0.1
Psephenus	09021108058	0.33	0.33	4	SC	0.1	0.1
Hydrobiidae	10010104	7.67	7.67		--	3.3	3.3
Bivalvia	1002	0.33	0.33		CF	0.1	0.1

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