Brookfield

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August 6, 2021

VIA E-FILING

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, DC 20426

Subject: Rumford Falls Hydroelectric Project (FERC No. 2333-091)
Initial Study Report

Dear Secretary Bose:

Rumford Falls Hydro LLC (RFH or Licensee), a subsidiary of Brookfield Renewable, herein submits to the Federal Energy Regulatory Commission (FERC or Commission) the Initial Study Report (ISR) for the Rumford Falls Hydroelectric Project (Project) (FERC No. 2333) in accordance with 18 Code of Federal Regulations (CFR) §5.15(c). The Project is a two-development hydroelectric facility on the Androscoggin River in the Town of Rumford, Oxford County, Maine. The FERC license for the Project expires on September 30, 2024, and RFH is pursuing a new license for the Project through the Commission's Integrated Licensing Process.

RFH initiated or completed several studies at the Project consistent with the July 7, 2020 Revised Study Plan, as modified and/or approved in the Commission's August 6, 2020 Study Plan Determination, which included the following eight studies:

1) Water Quality Study
2) Angler Creel Survey
3) Recreation Study
4) Historic Architectural Survey
5) Aesthetic Flow Study
6) Impoundment Bass Spawning Survey
7) Flow Study for Aquatic Habitat Evaluation
8) Whitewater Boating Study

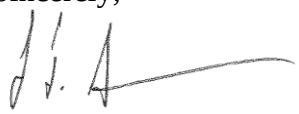
This ISR describes the Licensee's overall progress in implementing the study plan and associated schedule, the data collected, and any variances from the study plans and schedule.

In addition to filing this ISR with the Commission, RFH is distributing this letter to those on the enclosed distribution list. This submittal is also available electronically in FERC's eLibrary system at https://elibrary.ferc.gov/idmws/search/fercgensearch.asp under docket number P-2333.

Pursuant to 18 CFR §5.15(c)(2), RFH will hold a virtual ISR meeting with interested parties and Commission staff on Thursday, August 19, 2021, from 10:00AM to 12:00PM (EST). In order to plan accordingly, RFH respectfully requests that agencies or stakeholders who plan on attending the meeting RSVP by contacting Dawn Cousens at dawn.cousens@hdrinc.com or (207) 239-3791 on or before August 13, 2021. A meeting invitation will be distributed via email to those agencies and stakeholders that RSVP.

If there are any questions or comments regarding this submittal, please contact me by phone at (207) 755-5613 or at luke.anderson@brookfieldrenewable.com.

Sincerely,



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RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

INITIAL STUDY REPORT

RUMFORD FALLS HYDRO LLC
Rumford, Maine

AUGUST 2021

INITIAL STUDY REPORT
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

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List of Acronyms

Brookfield	Brookfield Renewable
CFR	Code of Federal Regulations
cfs	cubic feet per second
DLA	Draft License Application
EA	Environmental Assessment
FERC or Commission	Federal Energy Regulatory Commission
FLA	Final License Application
ILP	Integrated Licensing Process
ISR	Initial Study Report
KOP	key observation point
kV	kilovolts
kW	kilowatts
LIHI	Low Impact Hydro Institute
MBPL	Maine Bureau of Parks and Lands
MDACF	Maine Department of Agriculture, Conservation, and Forestry
MDEP	Maine Department of Environmental Protection
MDIFW	Maine Department of Inland Fisheries and Wildlife
MHPC	Maine Historic Preservation Commission
MW	megawatt
NGOs	non-governmental organizations
NGVD29	National Geodetic Vertical Datum of 1929
NOI	Notice of Intent
PAD	Pre-Application Document
PSP	Proposed Study Plan
RFH	Rumford Falls Hydro LLC
RM	river mile
RSP	Revised Study Plan
SD1	Scoping Document 1
SPD	Study Plan Determination
TU	Trout Unlimited

USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
USR	Updated Study Report

Section 1
Introduction

Rumford Falls Hydro LLC (RFH or Licensee), a subsidiary of Brookfield Renewable (Brookfield), is the Licensee of the 44.5 megawatt (MW) Rumford Falls Hydroelectric Project (FERC No. 2333) (Project), a multi-development hydroelectric facility located on the Androscoggin River in Rumford, Maine. As discussed below, the Project is operated in a run-of-river mode and generates renewable energy. The Project is a certified Low Impact Hydro Institute (LIHI) facility[1] (LIHI 2020).

The Federal Energy Regulatory Commission (FERC or Commission) issued the Project's current license on October 18, 1994, which expires on September 30, 2024. RFH is using FERC's Integrated Licensing Process (ILP) as defined by 18 Code of Federal Regulations (CFR) Part 5 of the Commission's regulations in support of obtaining a new Project license.

In accordance with 18 CFR §5.15, RFH initiated or completed several studies pursuant to RFH's July 7, 2020 Revised Study Plan (RSP) as modified and/or approved in the Commission's August 6, 2020 Study Plan Determination (SPD). This Initial Study Report (ISR) was developed pursuant to 18 CFR §5.15(c) and describes RFH's overall progress in implementing the study plan and schedule, the data collected, and any variances from the study plan and schedule.

[1] On June 24, 2019, the Project was recertified by LIHI through December 9, 2023.

Section 2
Project Description

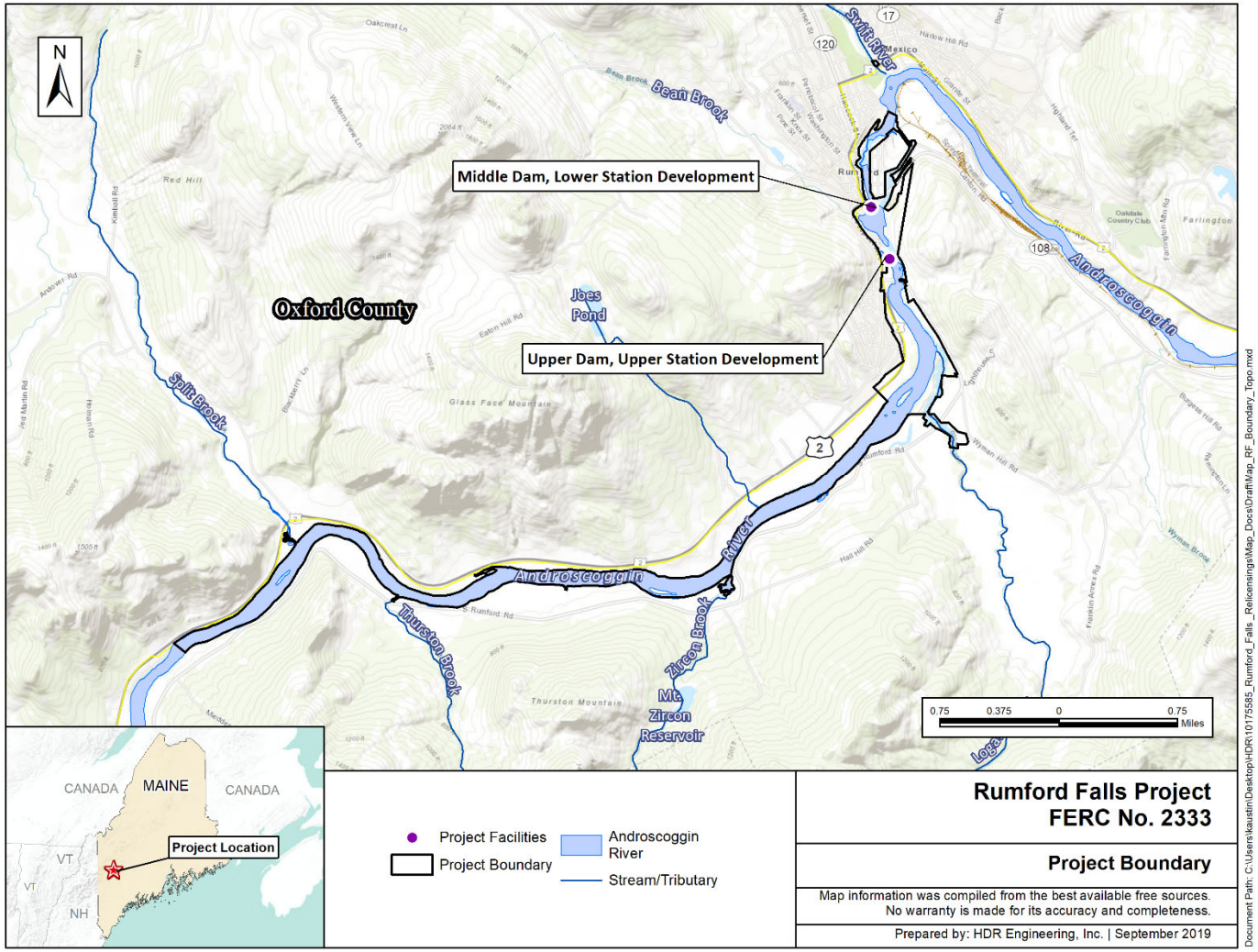
The Project is located at River Mile (RM) 80 on the Androscoggin River in Oxford County in the Town of Rumford, Maine. A Project location map is provided in Figure 2-1. The Project consists of two discrete developments – the Upper Station Development and the Lower Station Development. The total nameplate capacity of the Project is 44.5 MW. The Upper Station Development's total installed nameplate capacity is 29.3 MW, with a maximum hydraulic capacity of 4,550 cubic feet per second (cfs). The Lower Station Development's total nameplate capacity is 15.2 MW with a maximum hydraulic capacity of 3,100 cfs.

Consistent with Article 401 of the Project's existing FERC license, the Project is operated in a run-of-river mode for the protection of water quality and aquatic resources. The Licensee maintains the Upper Dam and Middle Dam impoundments within 1 foot of full pond elevation (elevation 601.24 feet U.S. Geological Survey Datum [USGS] at the Upper Dam impoundment and elevation 502.74 feet USGS at the Middle Dam impoundment) and acts to minimize the fluctuations of the reservoir surface elevation (i.e., maintain a discharge from the Project so that, at any point in time, flows immediately downstream from the Project tailraces approximate the sum of the inflows to the Project reservoirs).

Run-of-river operations may be temporarily modified if required by operating emergencies beyond the control of the Licensee, or for short periods upon mutual agreement between RFH and the U.S. Fish and Wildlife Service (USFWS), Maine Department of Environmental Protection (MDEP), and Maine Department of Inland Fisheries and Wildlife (MDIFW) pursuant to Article 401.

Pursuant to Article 402 of the Project's existing license, RHF releases a minimum flow of 1 cfs from the Upper Dam and 21 cfs from the Middle Dam for the protection of aquatic resources and water quality in the two bypass reaches of the Androscoggin River. This flow may be temporarily modified, if required by operating emergencies beyond the control of the licensee, or for short periods upon mutual agreement between the Licensee and the USFWS, MDEP, and MDIFW.

FIGURE 2-1
PROJECT LOCATION



On April 27, 2021, and supplemented on May 18, 2021, RFH requested Commission authorization to construct and maintain a battery storage system at the Project[2]. The battery system would not change Project operations or impact the water control or generating aspects of the Project. On June 3, 2021, FERC issued an order amending the license to include a battery system.

2.1 Upper Station Development

The Upper Station Development's principal features consist of the Upper Dam, a forebay, a gatehouse, four short penstocks, a powerhouse, an impoundment, two overhead transmission lines, and appurtenant facilities. The Upper Station Development has a total installed nameplate capacity of 29.3 MW and a maximum hydraulic capacity of 4,550 cfs.

The Upper Station Development consists of: 1) a concrete gravity dam having a 464-foot-long by 37-foot-high, ogee-type spillway section with a crest elevation of 598.74 feet National Geodetic Vertical Datum of 1929 (NGVD29), topped with 30-inch-high, pin-supported, wooden flashboards and an Obermeyer spillway system; (2) a forebay approximately 2,300 feet long by 150 feet wide; (3) a gatehouse with eight headgates (two headgates for each of the four penstocks), trashracks, and other appurtenant equipment; (4) four underground, steel-plate penstocks, each approximately 110 feet long, three of which are 12 feet in diameter and one which is 13 feet in diameter; (5) a masonry powerhouse integral with the dam, which includes two stations: (a) the older station, about 30 feet wide by 110 feet long by 92 feet high, equipped with one horizontal generating unit with a capacity of 4,300 kilowatt (kW), and (b) the newer station, approximately 60 feet wide by 140 feet long by 76 feet high, equipped with three vertical generating units, two with a capacity of 8,100 kW each and one with a capacity of 8,800 kW; (6) an impoundment with a gross storage capacity of 2,900 acre-feet, surface area of about 419 acres, normal maximum headwater elevation of 601.24 feet, and tailwater elevation of 502.74 feet; (7) four overhead 11.5 kilovolt (kV) transmission lines; and (8) appurtenant facilities.

[2] The battery storage system is located along the transmission line adjacent to the Project substation. The 8 MW battery storage system consists of 15 smaller battery enclosures with integrated heating/cooling and ventilation and have a rating of 372.7 kilowatt-hours each. The battery storage system also consists of DC-AC inverters, inverter step-up transformers, spill containment and associated auxiliary equipment.

2.2 Lower Station Development

The principal features of the Lower Station Development consist of the Middle Dam, the Middle Canal headgate structure with a waste weir, the Middle Canal, a gatehouse, two penstocks, a powerhouse, an impoundment, a short transmission line, and appurtenant facilities. The existing development has a total nameplate capacity of 15.2 MW and a total maximum hydraulic capacity of 3,100 cfs.

The Lower Station Development consists of: (1) a rock-filled, wooden-cribbed, and concrete-capped Middle Dam, having a 328.6-foot-long by 20-foot-high gravity spillway section, with a crest elevation at 502.74 feet with 16-inch-high, pin-supported, wooden flashboards; (2) a Middle Canal concrete headgate structure, located adjacent to the dam, approximately 120 feet long, with 10 steel headgates and a waste weir section perpendicular to the headgate structure, approximately 120 feet long, with a crest elevation of 502.6 feet with 12-inch-high flashboards; (3) a Middle Canal, approximately 2,400 feet long, with width ranging from 75 to 175 feet and depth from 8 to 11 feet; (4) a gatehouse containing two headgates, trashracks, and other appurtenant equipment; (5) two 12-foot-diameter, steel-plate penstocks, each extending approximately 815 feet to two cylindrical surge tanks, each approximately 36 feet in diameter by 50.5 feet high, and the penstocks continuing 77 feet to the powerhouse; (6) a masonry powerhouse, equipped with two identical vertical units, each with 7,600 kW capacity; (7) an impoundment with a gross storage capacity of 141 acre-feet, surface area of about 21 acres, normal maximum headwater elevation of 502.74 feet, and tailwater elevation of 423.24 feet; (8) 600-foot-long, 11.5 kV generator leads; and (9) appurtenant facilities.

Section 3
Study Plan Development and Implementation

On September 27, 2019, RFH filed a Pre-Application Document (PAD) that presented existing information about the Project, as well as a Notification of Intent (NOI) to initiate the ILP proceeding in support of relicensing the Project. The PAD provided a comprehensive description of the Project and summarized the existing, relevant, and reasonably available information to assist the Commission, resource agencies, Indian tribes, non-governmental organizations (NGOs), and other interested parties (collectively, "stakeholders") in identifying resource interests, determining information needs, preparing study requests, and analyzing the license application. A preliminary list of potential studies and information needs was included in Section 6 of the PAD, which included studies or surveys that may provide additional information regarding the Project's effects on specific resources.

On November 19, 2019, the Commission issued Scoping Document 1 (SD1) and solicited comments on the PAD and SD1, as well as study requests, by January 25, 2020. SD1 was intended to advise the stakeholders as to the proposed scope of the Environmental Assessment (EA) and to seek additional information pertinent to the Commission's analysis of the license application. As provided in 18 CFR §§5.8(a) and 5.8(c), the Commission issued a notice of commencement of proceeding concomitant with SD1.

On December 17, 2019, the Commission held a daytime public scoping meeting and an evening public scoping meeting in Rumford, Maine, to solicit comments regarding the scope of issues and analysis for the EA. The Commission typically conducts a site visit in conjunction with the scoping meetings. However, due to potential issues with access to Project facilities during the winter season, the Commission conducted the site visit on October 24, 2019.

Comments and study requests were received through January 28, 2020. A total of five comment letters were received from the following stakeholders: FERC, MDEP, MDIFW, Trout Unlimited (TU), and the Town of Rumford. Although some comments were received following the Commission's deadline, all comments were considered in the development of the Proposed Study Plan (PSP).

RFH filed the PSP with the Commission on March 10, 2020, and a PSP Meeting was held on April 7, 2020, per 18 CFR §5.11(e) to provide stakeholders the opportunity to review, comment, and ask questions related to the PSP. Subsequent to the PSP Meeting, and pursuant to 18 CFR §5.12, stakeholder comments on the PSP were due by June 8, 2020. RFH received 60 comment letters (45 of the comment letters were provided via FERC's eComment system), 43 of which were from members of the public[3]. Comment letters were received up to June 12, 2020, and although comments were received after the regulatory deadline, all comments were considered during development of the Revised Study Plan (RSP).

RFH filed the RSP with the Commission on July 7, 2020. On August 6, 2020, the Commission issued a Study Plan Determination (SPD) for the Project approving and/or modifying the studies outlined in the RSP. The SPD included the following eight studies:

1. Water Quality Study
2. Angler Creel Survey
3. Recreation Study
4. Historic Architectural Survey
5. Aesthetic Flow Study
6. Impoundment Bass Spawning Survey
7. Flow Study for Aquatic Habitat Evaluation
8. Whitewater Boating Study

As described in the following sections and in accordance with 18 CFR §5.15, RFH is in the first study season consistent with the Commission-issued Process Plan and Schedule for the Project and has initiated or completed several studies pursuant to RFH's July 7, 2020 RSP as modified and/or approved in the Commission's SPD.

Additionally, RFH filed quarterly progress reports with the Commission on October 30, 2020, January 29, 2021, and April 30, 2021, and distributed the reports to stakeholders to provide routine updates on each of the studies.

[3] Some members of the public filed more than one comment letter.

Section 4
Study Status and Summary

4.1 Overview of Study Status

Consistent with the Commission-issued Process Plan and Schedule for the Project, RFH is currently in the first study season within the ILP schedule. Table 4-1 provides the status of the eight studies RFH is conducting in support of relicensing the Project. Studies which are scheduled or in progress are identified as "ongoing."

TABLE 4-1
STUDY STATUS

Study	Status			Study Report in ISR
	Postponed	Ongoing	Completed	
Water Quality Study		X[1]		X
Angler Creel Survey		X[2]		
Recreation Study	X[1]			
Historic Architectural Survey			X[3]	
Aesthetic Flow Study		X		
Impoundment Bass Spawning Survey			X	X
Flow Study for Aquatic Habitat Evaluation		X		
Whitewater Boating Study		X		

[1] The majority of the Water Quality Study has been completed, although some limited additional data will be collected.

[2] Postponed to 2022 due to safety concerns and anticipated anomalous usage due to the COVID-19 pandemic. Although, the Angler Creel Survey has been postponed, study and on-site consultation with MDIFW has been conducted and, therefore, this study is being identified as "ongoing."

[3] The Draft Historic Architectural Survey has been submitted electronically to the Maine Historic Preservation Commission (MHPC) for approval. Per the MHPC's review process, RFH will continue to consult with the MHPC regarding the results and recommendations in the Draft Historic Architectural Survey Report, as well as providing appropriate hardcopy documentation. Once the Historic Architectural Survey Report has been accepted by the MHPC, RFH will file the final report and documentation of consultation with the MHPC with FERC.

The Impoundment Bass Spawning Survey has been completed. The majority of the Water Quality Study has been completed, although some limited additional data will be collected. The study reports for these studies are provided in Appendices A and B of this ISR.

RFH expects the Aesthetic Flow Study, Flow Study for Aquatic Habitat Evaluation, and Whitewater Boating Study will be completed in 2021 and the reports will be provided in the Updated Study Report (USR) that will be filed with the Commission on or before August 6, 2022.

Components of the Water Quality Study will continue to be performed in 2021 and may continue into 2022 (see Appendix A). The Angler Creel Survey and Recreation Study were postponed to 2022 due to safety concerns and anticipated anomalous usage due to the COVID-19 pandemic. RFH anticipates the study reports and/or supplemental data for the Angler Creel Survey, Recreation Study, and additional Water Quality data will be filed with the Commission and distributed to stakeholders by the end of 2022. RFH will continue to provide quarterly progress reports, with the next report being filed on November 1, 2021. Additional detail on the status of each of the ongoing studies, including the implementation of the study plan and associated schedule, the data collected, and any variances from the study plans to date are provided in the following sections.

4.2 Status of Ongoing Studies

4.2.1 Angler Creel Survey

4.2.1.1 Study Status

The RSP specified that the first year of the Angler Creel Survey would be conducted in 2021 and that RFH would provide a revised study schedule in the event the proposed schedule changed due to COVID-19. RFH filed a revised study schedule along with notification of postponement with FERC on April 8, 2021 indicating the first year of the Angler Creel Survey would be conducted in 2022. The study was postponed based on the status of the COVID-19 pandemic at that time and concern that 2021 may not be reflective of typical angler usage in the Project area (e.g., may be biased by either an increase in use by individuals looking to recreate outdoors and socially distance or by a decrease in use due to public safety concerns or individuals opting to refrain from angling to maintain isolation). However, as explained further below, RFH has been consulting with MDIFW consistent with the FERC-approved study plan.

4.2.1.2 Study Progress

Consistent with the FERC-approved study plan, RFH has consulted with MDIFW to refine the list of creel survey index sites and the period of interest for the study. Table 4-2 provides the revised list of index sites that will be visited in 2022, which were developed in consultation with MDIFW during a June 2021 site visit. The Veteran's Park index site identified in the RSP was eliminated

due to a lack of water access at the site. The Veteran's Park index site was replaced by "Middle Canal" which sits immediately adjacent to the Park and is accessible via Bridge Street and Canal Street. RFH and MDIFW agreed to remove the Dixfield Opera House from the list of index sites proposed in the RSP due to its distance downstream from the Project. The Carlton Bridge Carry-In Launch and Route 108 Bridge were added as index sites. Additionally, RFH will develop a series of vantage points along the shoreline of the Upper Dam impoundment from the boat barrier to the upper extent of the FERC Project boundary to collect index counts of angler use to supplement counts at the boat launch.

The RSP indicated a period of interest for the study would be developed and reviewed with MDIFW. Based on consultation with MDIFW, RFH will initiate the survey between April 1 and May 15, 2022, depending on river flow and weather conditions. RFH will consult with MDIFW at the onset of the 2022 Angler Creel Survey period to identify an appropriate start date based on river conditions in the Project area.

As part of ongoing consultation, MDIFW provided an angler activity curve that MDIFW developed from voluntary angler activity data for the section of the Androscoggin River from the Town of Bethel to the Town of Riley (Rumford is located approximately midway between these two towns) and requested that the curve be used during analysis to determine daily counts (Figure 4-1). Therefore, hourly effort counts obtained during the Angler Creel Survey at the Project will be used to determine daily counts using the estimated hourly proportion in Figure 4-1 where Expanded Count = Total Count for the day/Proportion. RFH will calculate and report mean weekday and weekend count estimates. Per request of MDIFW, RFH will also use a standardized set of forms that MDIFW provided to conduct angler interviews (Figure 4-2). The standardized forms provided by MDIFW are inclusive of the data parameters identified in the RSP.

4.2.1.3 Variances from Approved Study Plan

The Angler Creel Survey is ongoing and RFH anticipates it will be conducted in conformance with the FERC-approved study plan.

TABLE 4-2
REVISED LIST OF ANGLER CREEL INDEX SITES DEVELOPED IN CONSULTATION WITH MDIFW

Index Site	Position Relative to Project
Hastings Boat Launch	Upper Dam impoundment
Maine Department of Agriculture, Conservation, and Forestry (MDAFC) Boat Launch in Rumford	Upper Dam impoundment
Upper Dam impoundment access sites[a]	Upper Dam impoundment
J. Eugene Boivin Park	Middle Dam bypass reach
Chisholm Overlook	Middle Dam bypass reach
Middle Canal	Lower Powerhouse Canal
Carlton Bridge Carry-in Launch	Swift River upstream of confluence with Androscoggin River
MDAFC Boat Launch in Mexico	Androscoggin River downstream of Project
Route 108 Bridge	Androscoggin River downstream of Project

a. RFH will develop a series of vantage points along the shoreline of Upper Dam impoundment to the upper extent of the FERC Project boundary to collect index counts of angler use to supplement counts at the boat launch facilities.

FIGURE 4-1
MDIFW ANGLER ACTIVITY CURVE FOR THE ANDROSCOGGIN RIVER FROM THE TOWN OF BETHEL TO THE TOWN OF RILEY

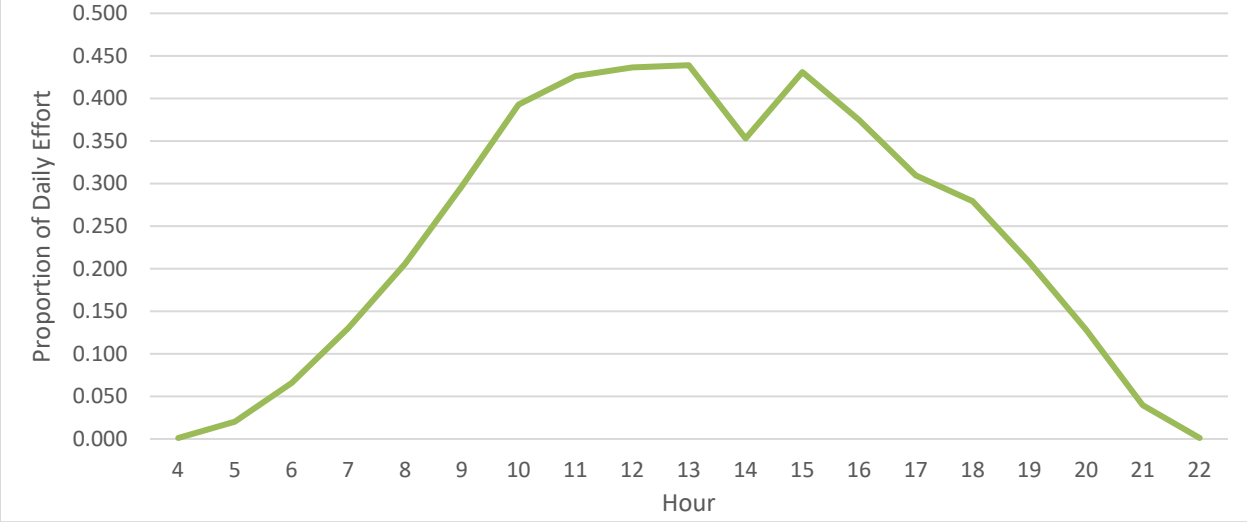
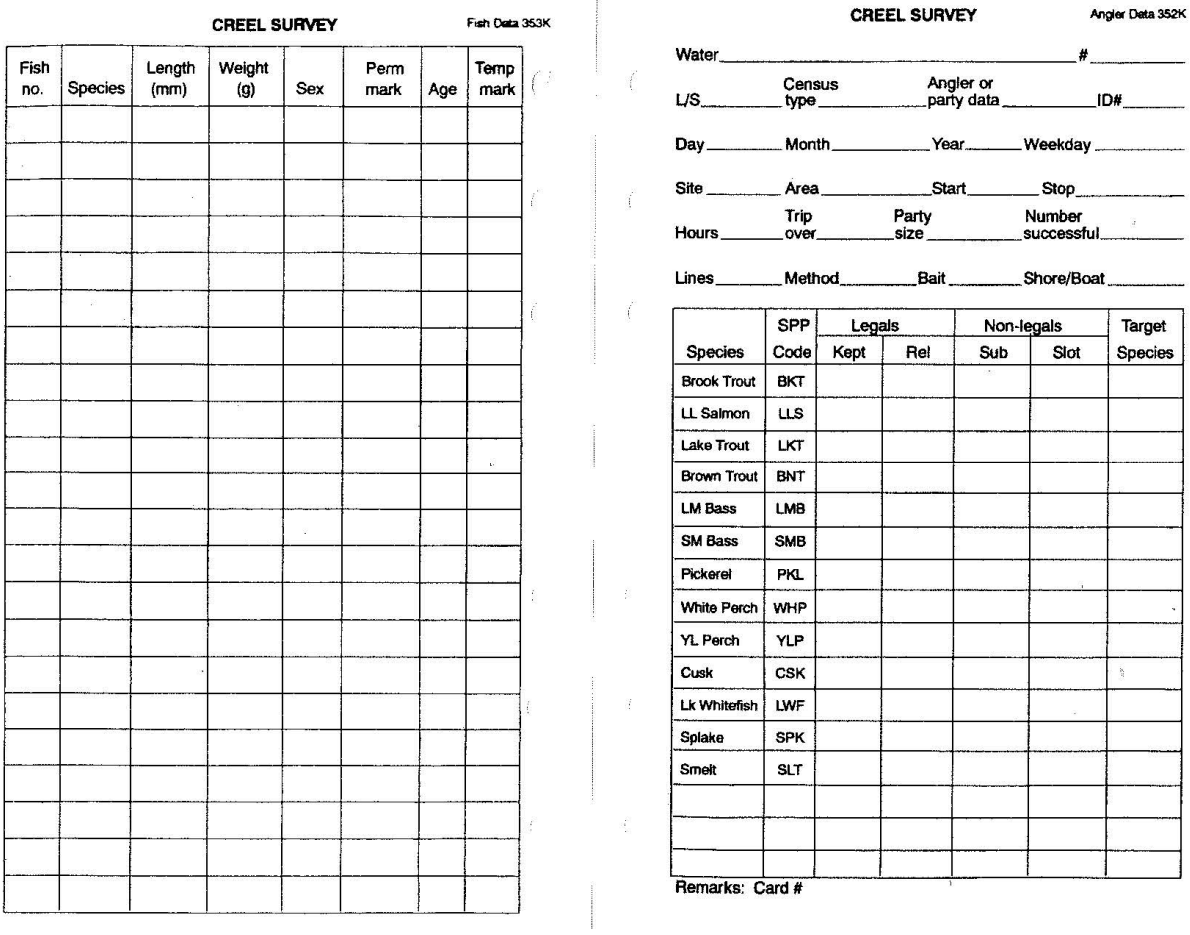


FIGURE 4-2
MDIFW ANGLER CREEL SURVEY FORMS 352K AND 353K



CREEL SURVEY Fish Data 353K

Fish no.	Species	Length (mm)	Weight (g)	Sex	Perm mark	Age	Temp mark

CREEL SURVEY Angler Data 352K

Water _____ #_____

L/S _____ Census type _____ Angler or party data _____ ID# _____

Day _____ Month _____ Year _____ Weekday _____

Site _____ Area _____ Start _____ Stop _____

Hours _____ Trip over _____ Party size _____ Number successful _____

Lines _____ Method _____ Bait _____ Shore/Boat _____

Species	SPP Code	Legals		Non-legals		Target Species
		Kept	Rel	Sub	Slot	
Brook Trout	BKT					
LL Salmon	LLS					
Lake Trout	LKT					
Brown Trout	BNT					
LM Bass	LMB					
SM Bass	SMB					
Pickerel	PKL					
White Perch	WHP					
YL Perch	YLP					
Cusk	CSK					
Lk Whitefish	LWF					
Splake	SPK					
Smelt	SLT					

Remarks: Card #

4.2.2 Aesthetic Flow Study

4.2.2.1 Study Status

RFH initiated and completed components of the Aesthetic Flow Study in conformance with the FERC-approved study plan and through use of the methodology developed by Whittaker and Shelby (2017). As described further below, RFH has completed components of both Phase 1 and Phase 2 of the study including two focus group meetings. Drought conditions have resulted in low flows in the Androscoggin River (National Integrated Drought Information System 2021), which resulted in postponing the controlled flow assessment. Consequently, this study has not been completed. RFH continues to consult with study participants, monitor flows on the river, and will complete the study when suitable flows exist.

4.2.2.2 Study Progress

Phase 1 – Desktop Analysis

RFH has assessed and summarized the timing and ranges of historic flows to characterize existing flow conditions as they relate to the aesthetic character of Rumford Falls. The analysis identified flows that occur over Rumford Falls based on the Project's existing license and natural river hydrology.

Phase 2 – Identification of Key Observation Points, Key Viewing Characteristics, Target Flows, and Evaluation Forms

RFH assembled a focus group of interested stakeholders. On April 30, 2021, RFH invited twelve individuals, including representatives from the Town of Rumford, Pennacook Falls Investment, Inland Woods + Trails (formerly known as Mahoosuc Pathways), Maine Bureau of Parks and Lands (MBPL), MDIFW, and EnvisionRumford, among others, via email to participate in the Aesthetic Flow Study focus group (Table A-1 in Attachment 1). RFH sent a follow-up email to these parties on May 5, 2021, to confirm interest in participating in the focus group. Responses were received from the Town of Rumford, Inland Woods + Trails, MBPL, MDIFW, and a resident which indicated interest in participation. After identifying an agreed upon date and time that worked well for the group, two focus group meetings were held. The initial focus group meeting was held via Webex on May 25, 2021, from 1PM to 3PM. Attendees included the Town of Rumford, MBPL, RFH, and HDR. The purpose of the first meeting was to:

- Review the FERC-approved Aesthetic Flow Study Plan;
- Receive input on the proposed key observation points (KOPs) (i.e., Veteran's Park, J. Eugene Boivin Park, the West Viewing Area, and Rumford Falls Trail); and
- Receive input on the proposed flows (i.e., 500 cfs, 1,000 cfs, 1,500 cfs, and 2,000 cfs) and evaluation form for the controlled flow assessment.

The group agreed that the proposed KOPs and flows were appropriate. The group requested some minor modifications to the evaluation form for the controlled flow assessment. RFH implemented the recommended edits and the evaluation form was recirculated to the focus group via email on May 27, 2021.

An on-site visit was held with the focus group on June 10, 2021, from 8AM to 12PM. Attendees included the Town of Rumford, MBPL, Inland Woods + Trails, RFH, and HDR. The focus group visited each of the proposed KOPs and identified the viewing locations within each of the KOPs. The focus group determined that adequate views of Rumford Falls were not available at Veteran's Park and agreed that this area should not be included as a KOP. Concurrence was received again from the group on the revised evaluation form and the proposed flows.

Phase 3 – Controlled Flow Assessment and Focus Group Consultation

The controlled flow assessment was tentatively scheduled for June 16, 2021, from 8AM to 5PM; however, the river flows were too low (around 1,500 cfs according to preliminary data from *USGS 01054500 Androscoggin River at Rumford, Maine*) to conduct the assessment and it was postponed. The focus group was notified of the cancelation and RFH continues to monitor flows in the river to allow RFH to provide sufficient notice to the focus group to reschedule the controlled flow assessment when there are appropriate flows. Due to continued drought conditions and low flows, the controlled flow assessment has yet to be conducted.

4.2.2.3 Variances from Approved Study Plan

The Aesthetic Flow Study is ongoing and RFH anticipates it will be conducted in conformance with the FERC-approved study plan.

4.2.3 Flow Study for Aquatic Habitat Evaluation

4.2.3.1 Study Status

RFH initiated the Flow Study for Aquatic Habitat Evaluation in conformance with the FERC-approved study plan and has initiated consultation with MDIFW on transect placement, target species suitability criteria, and the range of flow conditions to be evaluated. RFH anticipates completing the study in 2021.

4.2.3.2 Study Summary

Consistent with the FERC-approved study plan, mesohabitat mapping of the Middle Dam bypass reach was conducted on June 8, 2021. The preliminary results have been compiled, along with additional information, and provided to MDIFW on July 26, 2021 to assist in the selection of

transect placement and the selection of (1) target species, lifestages, and habitat suitability criteria, and (2) the Middle Dam bypass reach flows to be evaluated. Although not specified in the FERC-approved study plan, per consultation with MDEP, this information was also provided to MDEP and included habitat suitability criteria for benthic macroinvertebrates to supplement information obtained during the Outlet Stream Aquatic Habitat Study component of the Water Quality Study (See Section 5.5 of Appendix A).

4.2.3.3 Variances from Approved Study Plan

The Flow Study for Aquatic Habitat Evaluation is ongoing and RFH anticipates it will be conducted in conformance with the FERC-approved study plan.

4.2.4 Whitewater Boating Study

4.2.4.1 Study Status

RFH initiated and completed several components of the Whitewater Boating Study in conformance with FERC's SPD. RFH is following the Whittaker et al. (2005) methodology for the study and the Level 1 (Desktop Evaluation) and Level 2 (Field Reconnaissance) evaluations have been completed. The kickoff call and two Working Group meetings have been held, as well as an on-land boating feasibility assessment. As with the Aesthetic Flow Study, flows in the Androscoggin River have been too low to complete the on-water, multi-flow assessment. RFH continues to monitor flows on the river and coordinate with the Working Group. RFH will complete the on-water portion of the study when suitable flows are present.

4.2.4.2 Study Summary

Level 1: Desktop Evaluation

RFH has completed a desktop evaluation to better understand whitewater opportunities at the Project. A literature review was performed to summarize existing information specific to whitewater in the bypass reach (e.g., length, gradient, width, play areas). In addition, RFH conducted research on existing whitewater in the region (including the Swift River) and the immediate Project area.

A flow analysis was also completed to evaluate recreation-relevant hydrology and identify existing and operational constraints on existing or alternative flow regimes.

Structured interviews were held with experienced recreation users and resource experts to obtain local knowledge on the river, recreation opportunities, and potential flow effects.

Level 2: Field Reconnaissance

An initial kickoff meeting was held virtually on February 10, 2021 (Table A-2 in Attachment 1). RFH provided meeting attendees with an overview of the study plan methodology, which had been distributed prior to the meeting.

Following the kickoff meeting, a Working Group was developed consisting of one representative each from MDIFW, American Whitewater, the Town of Rumford, and a public safety entity (i.e., Town of Rumford fire department). Additionally, stakeholders, including members of the public/NGOs, who identified themselves as experienced whitewater boaters were invited. Consistent with standard methodologies for consensus building, the Working Group was kept to a manageable size to effectively make decisions.

Working Group members include:

- Bob Nasdor, American Whitewater (whitewater kayaker)
- Todd Papianou, Local Resident (whitewater kayaker)
- Karen Wilson, Local Resident (whitewater kayaker)
- John Preble, Local Resident (whitewater kayaker)
- George O'Keefe (Economic Development Director) and Chris Reed (Fire Chief), Town of Rumford
- Jim Pellerin, Maine Department of Inland Fisheries and Wildlife

A preparation call for the on-land boating feasibility assessment was held on May 20, 2021, with the on-land assessment following on May 26, 2021. Working Group members and three additional experienced whitewater boaters (Table A-2 in Attachment 1) participated in the on-land assessment where the potential boating access locations within the Middle Dam bypass reach were

visited and the associated safety hazards were discussed. Assessment forms were completed by participants to assess the feasibility of boating the Middle Dam bypass reach.

Following the on-land assessment, a second Working Group meeting was held virtually on June 24, 2021, to discuss the on-land boating feasibility assessment, present the results of the desktop hydrologic analysis, and identify potential on-water assessment flows (i.e., 800 cfs, 1,500 cfs, and 2,000 cfs). The assessment forms completed during the on-land assessment indicated support to move to an on-water assessment.

Level 3: Full Analysis

The on-water multi-flow assessment is currently scheduled to take place in August or September 2021, pending water availability. The on-water multi-flow assessment will focus on the two identified whitewater features (Class IV-V) and play spot (Class I-III) in the vicinity of the Portland Street Bridge. RFH is currently working with American Whitewater to identify skilled study participants. RFH will continue to coordinate with Working Group members for the multi-flow assessment and will complete the study when suitable flows exist.

4.2.4.3 Variances from Approved Study Plan

The Whitewater Boating Study is ongoing and RFH anticipates it will be conducted in conformance with FERC's SPD.

Section 5
Process and Schedule

5.1 Initial Study Report Meeting

Pursuant to §5.15(c)(2), RFH will hold a virtual ISR Meeting with interested parties and Commission staff on Thursday, August 19, 2021, from 10:00AM to 12:00PM (EST). The purpose of the meeting is to discuss the available study results, as well as to discuss RFH's or the other relicensing participants' proposals, if any, to modify the study plans in light of the progress of the studies and data collected.

In order to plan accordingly, RFH respectfully requests agencies or stakeholders who plan on attending the meeting RSVP by contacting Dawn Cousens at dawn.cousens@hdrinc.com or (207) 239-3791 on or before August 13, 2021. A meeting invitation will be distributed via email to those agencies and stakeholders that RSVP.

5.2 Initial Study Report Meeting Summary

Subsequent to the ISR Meeting and in accordance with §5.15(c)(3), RFH will file a summary of the ISR Meeting within 15 days of the meeting on or before September 3, 2021. Participants may file, on or before October 3, 2021, any disagreement concerning the ISR Meeting summary and RFH's study proposals, as well as any recommendations for modifications to ongoing studies or requests for new studies.

5.3 Study Plan Modification and FERC Determination

Recommendations for modified or new studies must be accompanied by justification in accordance §5.15(c)(4) and meet the applicable criteria as defined by §5.15(d) for modification of an approved study and §5.15(e) for a new study. RFH will then have 30 days (on or before November 2, 2021) to file any responses to comments, disagreements, or requests, and then FERC will have an additional 30 days (on or before December 2, 2021) to issue a determination regarding any disagreements and/or modifications to the approved study plans.

Section 6
Intent to File Draft License Application

As required by 18 CFR §5.16(c), RFH hereby advises the Commission of the intent to file a Draft License Application (DLA), which will include the contents of a license application, rather than a Preliminary License Proposal. The DLA will be filed with the Commission on or before May 3, 2022.

Section 7
Literature Cited

Low Impact Hydro Institute (LIHI). 2020. LIHI Certificate #38 – Rumford Falls Project, Maine. Online [URL]: https://lowimpacthydro.org/certified-facilities/. (Accessed July 16, 2021).

National Integrated Drought Information System. 2021. Drought Conditions for Oxford County. Online [URL]: https://www.drought.gov/states/maine/county/oxford. (Accessed July 6, 2021).

Whittaker, D. and B. Shelby. 2017. Flows and Aesthetics: A Guide to Concepts and Methods.

Whittaker, D., B. Shelby, and J. Gangemi. 2005. Flows and Recreation: A Guide to Studies for River Professionals. Online [URL]: https://hydroreform.org/wp-content/uploads/2020/05/flowrec.pdf (Accessed July 16, 2021).

ATTACHMENT 1
SUPPLEMENTAL INFORMATION

TABLE A-1
LIST OF INVITEES AND ATTENDEES OF THE
AESTHETIC FLOW STUDY FOCUS GROUP MEETINGS

Focus Group Invitees			Focus Group[1]	First Focus Group Meeting - Attendee	Second Focus Group Meeting - Attendee
Affiliation	**First Name**	**Last Name**			
State					
Maine Bureau of Parks and Lands	Jim	Vogel	X	X	X
Maine Department of Inland Fisheries and Wildlife	James	Pellerin	X		
Maine Department of Inland Fisheries and Wildlife	John	Perry	X[2]		
Maine Senate District 18	Lisa	Keim			
Municipal					
Town of Rumford	George	O'Keefe	X	X	X
Town of Rumford	Stacy	Carter	X	X	
NGOs					
Inland Woods + Trails	Gabe	Perkins			
Inland Woods + Trails/Resident	John	Preble	X		X
Town Resident					
Town of Rumford Resident	Todd	Papianou			
Town of Rumford Resident	Karen	Wilson	X[3]		
Local Business Owners					
EnvisionRumford	Jennifer	Kreckel			
Pennacook Falls Investment	Tony	Carter			

[1] Those individuals that expressed interest in participating in the focus group per response to the April 30, 2021 and May 5, 2021 email from RFH inviting participants.
[2] Indicated participation would occur as schedule allows.
[3] Indicated participation would be limited to attending the controlled flow assessment.

TABLE A-2
LIST OF ATTENDEES OF THE WHITEWATER BOATING STUDY MEETINGS

Attendees			Kickoff Meeting (February 10, 2021)	Working Group Meeting (May 20, 2021)	On-Land Assessment (May 26, 2021)	Working Group Meeting (June 24, 2021)
Affiliation	**First Name**	**Last Name[1]**				
State						
Maine Bureau of Parks and Lands	Jim	Vogel	X			
Maine Department of Inland Fisheries and Wildlife	John	Perry	X			
Maine Senate District 18[2]	Meredith	Cherry	X			
Maine Department of Inland Fisheries and Wildlife	Jim	Pellerin*		X		
Municipal						
Town of Rumford	George	O'Keefe*	X	X	X	X
Town of Rumford, Fire Chief	Chris	Reed*			X	
NGOs						
Trout Unlimited	Stephen	Heinz	X			
Penobscot Paddle and Chowder Society	Helen	Hess	X			
American Whitewater	Bob	Nasdor*	X	X	X	X
Inland Woods + Trails	Gabe	Perkins	X			
Appalachian Mountain Club	Mark	Zakutansky	X			
Individuals						
Town of Rumford Resident	Todd	Papianou*	X		X	
Town of Rumford Resident	John	Preble*	X	X	X	
Town of Rumford Resident	Karen	Wilson*	X			
Mahoosuc Mountain Rescue Team[2]	Harold	Herschlag			X	
Sawyer River Group[4]	Jake	Risch			X	
Mahoosuc Mountain Rescue Team[3]	Alex	Kerney			X	

[1] Asterisk identifies working group members
[2] Meredith Cherry, Legislative Aide for Senator Lisa Keim participated
[3] Invited by John Preble, Town of Rumford Resident
[4] Invited by Bob Nasdor, American Whitewater
Note: 'X' indicates participant attended

APPENDIX A
WATER QUALITY STUDY REPORT

Water Quality Study Report

1.0 Introduction

Rumford Falls Hydro LLC (RFH or Licensee) conducted a Water Quality Study at the Rumford Falls Hydroelectric Project (Project) pursuant to RFH's July 7, 2020 Revised Study Plan (RSP), as approved in the Federal Energy Regulatory Commission's (FERC or Commission) August 6, 2020 Study Plan Determination (SPD).

1.1 State Water Quality Standards

The Androscoggin River is classified by the Maine Department of Environmental Protection (MDEP) as a Class C water "from its confluence with the Ellis River to a line formed by the extension of the Bath-Brunswick boundary across Merrymeeting Bay in a northwesterly direction" and includes all Project-affected waters. Class C waters must be of such quality that they are suitable for the designated uses of drinking water supply after treatment, fishing, agriculture, recreation, 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.

Class C waters must meet an instantaneous dissolved oxygen (DO) standard of 5.0 parts per million (ppm) or 60 percent saturation, whichever is higher. In addition, DO must meet a 30-day average 6.5 ppm requirement using a temperature of 24 degrees centigrade (°C) or the ambient temperature of the water body, whichever is less. Discharges to Class C waters may cause some changes to aquatic life, except the receiving waters must be of sufficient quality to support all species of fish indigenous to the receiving waters and maintain the structure and function of the resident biological community.

2.0 Goals and Objectives

The goal of the study was to demonstrate that the Project meets water quality standards. The objectives of the study were to complete the following:

- An Impoundment Trophic State Study within the deepest locations of the Upper and Middle Dam impoundments;

- Temperature and DO monitoring within the Middle Dam bypass reach and in the lower powerhouse discharge[1];
- A Benthic Macroinvertebrate Study in the Middle Dam bypass reach[2]; and,
- An Outlet Stream Aquatic Habitat Study conducted in the Project's Middle Dam bypass reach.

3.0 Study Area

The study area included the Androscoggin River in the vicinity of the Project.

4.0 Methodology

4.1 Impoundment Trophic State Study

Trophic sampling was conducted in accordance with the *DEP Lake Trophic State Sampling Protocol for Hydropower Studies* (MDEP 2019). Sampling personnel received certification from MDEP on June 4, 2020, to collect water quality data prior to conducting the sampling activities. During the initial site reconnaissance, the deepest location within each impoundment was identified using a depth finder and confirmed with a weighted tape measure. The Global Positioning System (GPS) of the sample sites were recorded.

Sampling occurred twice monthly over five consecutive months (June through October) in the Upper and Middle Dam impoundments (Figure 1), except in October when only the Upper Dam impoundment was sampled due to sampling constraints. RFH coordinated with MDEP regarding this sampling event, and in an email dated November 2, 2020, MDEP indicated the data collected was sufficiently representative of the conditions; therefore, additional sampling was not conducted.

[1] Based on consultation with MDEP, a site was selected at the downstream end of the Middle Canal adjacent to the lower powerhouse intake to be representative of the discharge from the lower powerhouse due to the proximity of the ND Paper mill discharge.

[2] Based on consultation with MDEP, a single macroinvertebrate sampling location was selected just downstream of the Middle Dam within the Middle Dam bypass reach. A site downstream of the Project was not established to avoid any influence from the ND Paper mill per consultation with MDEP.

FIGURE 1
LOCATION OF UPPER AND MIDDLE DAM IMPOUNDMENT TROPHIC STATE SAMPLING STATIONS

The bimonthly sampling parameters, methods, and detection limits for the trophic state study are presented in Table 1.

TABLE 1
BIMONTHLY TROPHIC STATE STUDY SAMPLING PARAMETERS, METHODS, AND DETECTION LIMITS

Parameter	Sampling Method	Detection Limit
Secchi disk transparency	Water scope	0.1 meter
Temperature	Profile	0.1 °C
DO	Profile	0.1 milligrams per liter (mg/L)
Total Phosphorus	Integrated core	0. 1 mg/L[1]
Chlorophyll *a*	Integrated core	0.001 mg/L
Color	Integrated core	1.0 Standard Platinum-cobalt Units (SPU)
pH	Integrated core	0.1 standard units (SU)
Total alkalinity	Integrated core	1.0 mg/L

[1] The laboratory detection limit for total phosphorus was 0.1 mg/L for the samples analyzed during this study. The laboratory detection limit specified for total phosphorus in the *DEP Sampling Protocol for Hydropower Studies* (MDEP 2019) is 0.001 mg/L.

Secchi disk transparency was measured using a Secchi disk and viewscope. The Secchi disk was lowered on the sunny side of the boat while looking through the viewscope until the disk disappeared from view. The disk was then slowly raised until the white portion of the disk was just visible, and the depth noted from premeasured markers on the suspending line. A minimum of two readings were obtained and averaged to determine the Secchi disk depth.

Water temperature and DO profile data were measured using a portable, hand-held multiparameter YSI ProDSS meter. The equipment performance specifications are shown in Table 2. The water quality instrument was calibrated for DO on-site prior to use and post-calibrated at the end of the field day. Profiles were conducted by lowering the water quality meter to the desired depth, allowing the instrument to stabilize, and recording the water quality readings on a field data sheet. Measurements were taken from just below the water surface (0.1 meter) and then at 1-meter intervals to 0.5 meter from the bottom depth.

TABLE 2
YSI ProDSS HAND-HELD METER SPECIFICATIONS

Parameter	Range	Accuracy	Resolution
DO	0 to 50 mg/L	±0.1 mg/L or 1% of reading, whichever is greater (for 0 to 20 mg/L)	0.01 mg/L
Temperature	-5 to +70 °C	±0.2 °C	0.1 °C

An integrated core method was used to collect laboratory water samples for analysis of total phosphorus, chlorophyll *a*, color, pH, and total alkalinity. A weighted tube was lowered to the desired water depth, the open end of the tube at the water surface was sealed (i.e., crimped), and the water core was extracted and transferred to a sample container. Since thermal stratification did not occur in either impoundment, the integrated core sampler was extended to twice the Secchi disk depth, 1 meter from the bottom or 10 meters, whichever was less.

An additional laboratory sample was collected from each impoundment sample site in late summer 2020 (mid to late August) and analyzed for additional water quality parameters (Table 3). Since thermal stratification did not occur in either impoundment, an integrated core sample was collected from the surface to two times the Secchi disk depth, 1 meter from the bottom or 10 meters, whichever was less.

All samples taken to the laboratory for analysis were collected and preserved in accordance with MDEP and laboratory requirements. Katahdin Analytical Services conducted all laboratory analysis except for chlorophyll *a*, which was analyzed by ClearWater Laboratory. Both laboratories are certified by the State of Maine.

TABLE 3
TROPHIC STATE STUDY ADDITIONAL LATE SUMMER SAMPLING PARAMETERS, METHODS, AND DETECTION LIMITS

Parameter	Sampling Method	Detection Limits
Total Phosphorus	Integrated core	0.1 mg/L[1]
Nitrate	Integrated core	0.05 mg/L[2]
Chlorophyll *a*	Integrated core	0.001 mg/L
Color	Integrated core	1.0 SPU
DOC	Integrated core	0.25 mg/L
pH	Integrated core	0.1 SU
Total alkalinity	Integrated core	1.0 mg/L
Total Iron	Integrated core	0.005 mg/L
Total and Dissolved Aluminum	Integrated core	0.300 mg/L[3]
Total Calcium	Integrated core	1.0 mg/L
Total Magnesium	Integrated core	0.1 mg/L
Total Sodium	Integrated core	0.05 mg/L
Total Potassium	Integrated core	0.05 mg/L
Total Silica	Integrated core	0.05 mg/L
Specific Conductance	Integrated core	1 mS/cm
Chloride	Integrated core	1.0 mg/L
Sulfate	Integrated core	0.5 mg/L

[1] The laboratory detection limit for total phosphorus was 0.1 mg/L for the samples analyzed during this study. The laboratory detection limit specified for total phosphorus in the *DEP Sampling Protocol for Hydropower Studies* (MDEP 2019) is 0.001 mg/L.

[2] The laboratory detection limit for nitrate was 0.05 mg/L for the samples analyzed during this study. The laboratory detection limit specified for nitrate in the *DEP Sampling Protocol for Hydropower Studies* (MDEP 2019) is 0.01 mg/L.

[3] The laboratory detection limit for total and dissolved aluminum was 0.300 mg/L for the samples analyzed during this study. The laboratory detection limit specified for total and dissolved aluminum in the *DEP Sampling Protocol for Hydropower Studies* (MDEP 2019) is 0.010 mg/L.

4.2 Temperature and DO Monitoring

Hourly water temperature and DO levels were monitored at two locations during the summer low flow, high temperature period with HOBO DO Data Loggers (model U26-001) (Figure 2, Table 4). The sampling locations were established with MDEP (Attachment 1). Monitoring was conducted in accordance with the *DEP Sampling Protocol for Hydropower Studies* (MDEP 2019).

A monitoring site was established in the Middle Dam bypass reach and in the Middle Dam Canal adjacent to the intake at the lower powerhouse in consultation with MDEP. Prior to logger deployment, DO measurements were obtained along a cross-channel transect in the Middle Dam

bypass reach at the first, second, and third quarter points to determine if there were significant difference (defined by MDEP as less than 0.4 mg/L) in DO concentrations between points. At the lower powerhouse, DO measurements were initially taken along the retaining walls on both sides of the intake canal. DO criteria were met for all samples and no significant differences in concentrations were observed at either location. As a result, water quality loggers were deployed in the location of the main river flow at mid-depth.

Loggers were maintained and data was downloaded approximately every two weeks during the monitoring period. Water quality data sondes were field calibrated prior to deployment and QC checked and recalibrated during subsequent site visits.

FIGURE 2
CONTINUOUS WATER TEMPERATURE AND DO MONITORING LOCATIONS

TABLE 4
HOBO U26-001 DO LOGGER SPECIFICATIONS

Parameter	Range	Accuracy	Resolution
DO	0 to 30 mg/L	0.2 mg/L up to 8 mg/l;	0.02 mg/L
		0.5 mg/L from 8 to 20 mg/L	
Temperature	-5 to +40°C	±0.2°C	0.02°C

4.3 Benthic Macroinvertebrate Study

Benthic macroinvertebrate sampling was conducted downstream of the Middle Dam consistent with MDEP's *Methods for Biological Sampling and Analysis of Maine's Rivers and Streams* (Davies and Tsomides 2014).

A set of three rock baskets were deployed at the sampling location, which was established with MDEP (Attachment 1, Figure 3). Samplers were filled with 7.25 ± 0.5 kilograms of clean, washed cobble graded to a uniform diameter range of 3.8 to 7.6 centimeters. Rock basket samplers were deployed during the late summer low-flow period from July 1 to September 30 for 28 days (± 4 days). Baskets were oriented parallel to stream flow, were placed at locations where they would remain watered for the duration of the study period, and were outside of any potential bank effects.

Upon retrieval, samplers were approached from the downstream side and collected by carefully lifting them into an aquatic sampling net. Following collection, samplers were washed through a 600-micron sieve bucket using filtered river water. Each rock was visually inspected and the surface was rinsed into the bucket. Contents of the sieve bucket were placed in labeled jars provided by the laboratory and preserved with a 70 percent ethyl alcohol solution. Habitat parameters and water quality measurements were collected at the time of deployment and retrieval. Habitat parameters included substrate composition, canopy coverage, land use, and terrain characteristics. Water quality measurements included velocity, water temperature, specific conductance, DO, and pH.

FIGURE 3
LOCATION OF THE MIDDLE DAM BYPASS REACH MACROINVERTEBRATE SAMPLING STATION

Macroinvertebrate samples were sent to Normandeau's benthic taxonomy laboratory in Stowe, PA. Taxonomists there sorted, identified, and enumerated the contents of the three rock basket samples. Samples were analyzed using stereo-zoom and compound microscopes. Organisms were identified and enumerated to the lowest practical taxonomic level, generally genus and species, dependent on specimen condition and instar/age using published taxonomic keys. Chironomidae (i.e., midge) larvae were slide mounted after being prepared in a clearing solution and identified using a compound microscope. Worms encountered were also mounted and identified using a compound microscope.

Macroinvertebrate data were provided to MDEP for analysis using the Department's linear discriminant analysis to assess the attainment of aquatic life standards.

The following metrics were evaluated for macroinvertebrate samples collected in the Middle Dam bypass reach:

- **Total number of Taxa**: The number of genera identified.
- **Number of Ephemeroptera, Plecoptera, and Trichoptera Taxa**: Number of genera in the insect orders Ephemeroptera (mayflies), Plecoptera (stoneflies), and Trichoptera (caddisflies), collectively referred to as 'EPT' taxa. These three groups are considered particularly sensitive to environmental degradation.
- **Number of Ephemeroptera Taxa**: The number of genera classified as mayflies.
- **Number of Plecoptera Taxa**: The number of genera classified as stoneflies.
- **Number of Trichoptera Taxa**: The number of genera classified as caddisflies.
- **Percent EPT**: The percentage of the total number of specimens in a sample representing individuals classified as mayflies, stoneflies, and caddisflies.
- **Percent Ephemeroptera**: The percentage of the total number of specimens in a sample classified as mayflies.
- **Number of Intolerant Taxa**: The number of genera considered to be sensitive to environmental perturbation (scores from 0 to 3 with tolerance values ranging from 0-intolerant to 10-tolerant).

- **Percent Tolerant Organisms**: The percent of macroinvertebrate specimens in a sample considered to be tolerant to environmental perturbations (scores from 7 to 10 with tolerance values ranging from 0-intolerant to 10-tolerant).
- **Percent Dominant Taxon**: The percent abundance of the single most abundant taxon.
- **Hilsenhoff Biotic Index (HBI)**: A weighted average of the tolerance values of all taxa present. Organisms are assigned a tolerance value from 0 to 10 (0 being most sensitive to environmental degradation, 10 being the most tolerant).
- **Shannon Diversity Index (base e)**: This metric compares the distribution of individuals among all taxa present in a sample. A value near zero indicates community dominance by a small number of taxa. Higher values indicate that the numbers of individuals are more evenly distributed.

4.4 Outlet Stream Aquatic Habitat Study

Aquatic habitat data were collected at two transects established with MDEP within the Middle Dam bypass reach for analysis using a HEC-RAS model. As noted in Section 5.0 of this report, RFH has been discussing the preliminary results with MDEP, and it was agreed that information from the Flow Study for Aquatic Habitat Evaluation study, including some additional analysis, need to be incorporated into this study in order to evaluate appropriate minimum flows in the bypass reach. The study is consequently ongoing and will be presented as part of the August 2022 Updated Study Report.

5.0 Results

5.1 Environmental Conditions

The mean daily river flow at the USGS Gage No. 01054500 Androscoggin River at Rumford, Maine, which is located approximately 550 feet below the powerhouse at the Lower Station Development, ranged from 1,057 cubic feet per second (cfs) on September 17, 2020, to 11,745 cfs on July 15, 2020 during the study period (Figure 4). Flows were above average during most of

July and the latter half of October and were below average from August through the first half of October.

Monthly air temperatures for the 2020 study period, as recorded at the National Weather Service Forecast in Rumford, Maine[3], are presented in Table 5. Monthly mean air temperatures during the study period appeared to be slightly warmer than the historic period of 1991 to 2020 in the months of June and July, whereas air temperatures in the months of August and October appeared to be slightly cooler.

FIGURE 4
RIVER FLOW AT USGS GAGE NO. 01054500 ANDROSCOGGIN RIVER AT RUMFORD, MAINE

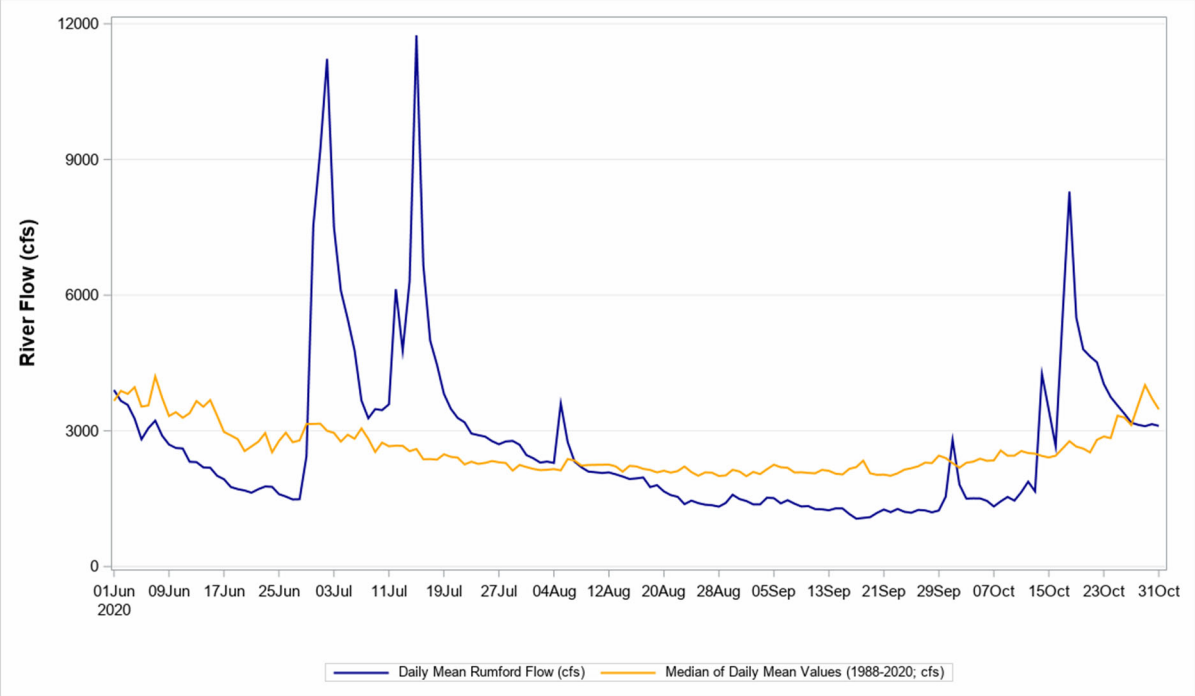


TABLE 5
2020 AND HISTORIC MEAN MONTHLY AIR TEMPERATURE RECORDED AT THE NATIONAL WEATHER SERVICE FORECAST IN RUMFORD, MAINE

Temperature (°C)	June	July	August	September	October
Mean (2020)	17.2	21.1	18.6	14.4	7.4
Mean (1991-2020)	17.0	19.6	18.8	14.4	7.8
Difference	0.2	1.4	-0.2	0.0	-0.4

[3] https://w2.weather.gov/climate/xmacis.php?wfo=gyx

5.2 Impoundment Trophic State Study

A trophic state study was completed in the Upper Dam and Middle Dam impoundments from June through October 2020. The study consisted of the collection of water temperature and DO vertical profile data and water quality samples for laboratory analysis in a deep sampling location of each impoundment. Sampling occurred twice per month except in October when only the Upper Dam impoundment was sampled due to sampling constraints. RFH coordinated with MDEP regarding this sampling event, and in an email dated November 2, 2020, MDEP indicated the data collected was sufficiently representative of the conditions; therefore, additional sampling was not conducted.

5.2.1 Impoundment Water Temperature and DO Profile

The vertical water temperature and DO profile data are presented in Table 6 and Table 7 and Figure 5 through Figure 10 below.

TABLE 6
WATER QUALITY PROFILES AT THE UPPER DAM IMPOUNDMENT

Depth (m)	Temp (°C)	DO (mg/L)	DO (% Sat)	Temp (°C)	DO (mg/L)	DO (% Sat)	Temp (°C)	DO (mg/L)	DO (% Sat)
	6/16/2020			6/29/2020			7/23/2020		
0	18.0	9.53	100.8	22.4	8.36	96.4	23.0	8.36	97.4
1	17.8	9.52	100.1	22.4	8.37	96.5	22.9	8.38	97.5
2	17.7	9.51	99.8	22.4	8.38	96.6	22.9	8.36	97.2
3	17.7	9.50	99.7	22.4	8.36	96.5	22.9	8.35	97.1
4	17.7	9.48	99.6	22.4	8.37	96.4	22.9	8.35	97.0
5	17.7	9.48	99.5	22.4	8.37	96.5	22.8	8.35	97.0
6	17.7	9.47	99.5	22.4	8.37	96.4	22.8	8.35	97.0
7	17.7	9.47	99.4	22.4	8.36	96.3	22.8	8.36	97.1
8	17.7	9.45	99.2	22.4	8.33	96.0	22.8	8.35	97.0
Max	18.0	9.53	100.8	22.4	8.38	96.6	23.0	8.38	97.5
Min	17.7	9.45	99.2	22.4	8.33	96.0	22.8	8.35	97.0
	7/30/2020			8/13/2020			8/27/2020		
0	25.1	8.24	99.8	25.9	7.80	96.5	20.4	9.26	102.6
1	25.0	8.22	99.4	25.7	7.79	96.0	20.3	9.30	103.0
2	24.9	8.20	98.9	25.7	7.76	95.6	20.3	9.27	102.5
3	24.8	8.20	98.9	25.7	7.74	95.4	20.2	9.29	102.7
4	24.8	8.22	99.1	25.7	7.72	95.2	20.2	9.27	102.4
5	24.8	8.22	99.1	25.7	7.70	94.9	20.2	9.25	102.1
6	24.8	8.21	98.9	25.6	7.68	94.6	20.2	9.25	102.0
7	24.7	8.21	98.9	25.6	7.68	94.6	-	-	-

Depth (m)	Temp (°C)	DO (mg/L)	DO (% Sat)	Temp (°C)	DO (mg/L)	DO (% Sat)	Temp (°C)	DO (mg/L)	DO (% Sat)
8	24.7	8.20	98.8	25.6	7.69	94.6	-	-	-
Max	25.1	8.24	99.8	25.9	7.80	96.5	20.4	9.30	103.0
Min	24.7	8.20	98.8	25.6	7.68	94.6	20.2	9.25	102.0
	9/10/2020			**9/24/2020**			**10/13/2020**		
0	20.9	8.67	97.2	14.2	9.69	98.9	10.7	9.99	90.1
1	20.9	8.67	97.1	14.1	9.69	98.6	10.6	9.77	88.0
2	20.9	8.65	96.9	14.0	9.68	98.4	10.6	9.72	87.6
3	20.9	8.63	96.7	14.0	9.66	98.2	10.7	9.59	86.4
4	20.9	8.61	96.5	13.9	9.66	97.9	10.6	9.59	86.3
5	20.9	8.60	96.3	13.9	9.64	97.8	10.7	9.60	86.5
6	20.9	8.58	96.1	13.9	9.62	97.6	10.6	9.53	85.8
7	-	-	-	13.9	9.61	97.4	10.6	9.46	85.3
8	-	-	-	-	-	-	-	-	-
Max	20.9	8.67	97.2	14.2	9.69	98.9	10.7	9.99	90.1
Min	20.9	8.58	96.1	13.9	9.61	97.4	10.6	9.46	85.3
	10/27/2020								
0	8.0	11.32	95.5						
1	8.0	11.26	95.3						
2	8.0	11.26	95.0						
3	8.0	11.25	94.9						
4	8.0	11.24	94.8						
5	8.0	11.20	94.6						
6	8.0	11.23	94.8						
7	8.0	11.19	94.5						
8	8.0	11.18	94.4						
Max	8.0	11.32	95.5						
Min	8.0	11.18	94.4						

TABLE 7
WATER QUALITY PROFILES AT THE MIDDLE DAM IMPOUNDMENT

Depth (m)	Temp (°C)	DO (mg/L)	DO (% Sat)	Temp (°C)	DO (mg/L)	DO (% Sat)	Temp (°C)	DO (mg/L)	DO (% Sat)
	6/16/2020			**6/29/2020**			**7/23/2020**		
0	18.5	9.45	100.8	22.6	8.02	92.7	23.1	8.28	96.7
1	18.3	9.44	100.4	22.5	8.02	92.7	23.1	8.28	96.7
2	18.3	9.44	100.4	22.5	8.02	92.6	23.1	8.27	96.6
3	18.2	9.45	100.4	22.5	8.01	92.5	23.1	8.28	96.7
4	18.2	9.46	100.4	22.5	8.01	92.5	23.1	8.28	96.7

Depth (m)	Temp (°C)	DO (mg/L)	DO (% Sat)	Temp (°C)	DO (mg/L)	DO (% Sat)	Temp (°C)	DO (mg/L)	DO (% Sat)
5	18.2	9.45	100.2	22.5	8.01	92.5	23.1	8.27	96.6
6	18.2	9.45	100.1	22.5	8.01	92.5	23.1	8.27	96.6
7	18.1	9.43	99.9	22.5	8.01	92.4	23.1	8.27	96.6
8	17.7	9.39	98.8	22.1	8.07	92.4	23.1	8.27	96.6
9	17.6	9.28	97.2	21.9	8.06	92.0			
Max	18.5	9.46	100.8	22.6	8.07	92.7	23.1	8.28	96.7
Min	17.6	9.28	97.2	21.9	8.01	92.0	23.1	8.27	96.6
	7/30/2020			**8/13/2020**			**8/27/2020**		
0	25.1	8.06	97.7	25.2	7.73	94.0	21.3	9.07	102.2
1	25.1	8.04	97.5	25.2	7.71	93.8	21.3	9.07	102.2
2	25.1	8.04	97.5	25.2	7.70	93.7	21.3	9.06	102.2
3	25.1	8.04	97.5	25.2	7.69	93.5	21.3	9.06	102.2
4	25.1	8.04	97.5	25.2	7.68	93.4	21.3	9.05	102.1
5	25.1	8.03	97.4	25.2	7.66	93.2	21.3	9.05	102.0
6	25.1	8.03	97.4	25.2	7.65	93.0	21.2	9.05	101.9
7	25.1	7.98	96.7	25.2	7.63	92.9	21.2	9.04	101.8
8	25.1	7.97	96.7	25.2	7.62	92.8	21.2	9.04	101.8
Max	25.1	8.06	97.7	25.2	7.73	94.0	21.3	9.07	102.2
Min	25.1	7.97	96.7	25.2	7.62	92.8	21.2	9.04	101.8
	9/10/2020			**9/24/2020**			**10/13/2020**		
0	20.9	8.76	98.0	13.8	9.75	98.3	10.9	9.70	87.7
1	20.9	8.75	97.9	13.8	9.75	98.3	10.9	9.48	86.0
2	21.0	8.73	97.6	13.8	9.74	98.2	10.9	9.44	85.6
3	21.0	8.72	97.5	13.8	9.72	98.1	10.9	9.27	83.7
4	21.0	8.71	97.3	13.8	9.72	98.0	10.9	9.44	85.5
5	21.0	8.69	97.2	13.8	9.70	97.7	10.8	9.51	85.9
6	21.0	8.68	97.0	13.7	9.70	97.7	10.8	9.42	85.1
7	21.0	8.67	96.9	13.7	9.68	97.4	10.9	9.51	86.0
8	20.1	8.42	96.2	13.7	9.67	97.3	10.9	9.41	84.9
Max	21.0	8.76	98.0	13.8	9.75	98.3	10.9	9.70	87.7
Min	20.1	8.42	96.2	13.7	9.67	97.3	10.8	9.27	83.7

FIGURE 5
WATER TEMPERATURE PROFILES AT THE UPPER DAM IMPOUNDMENT

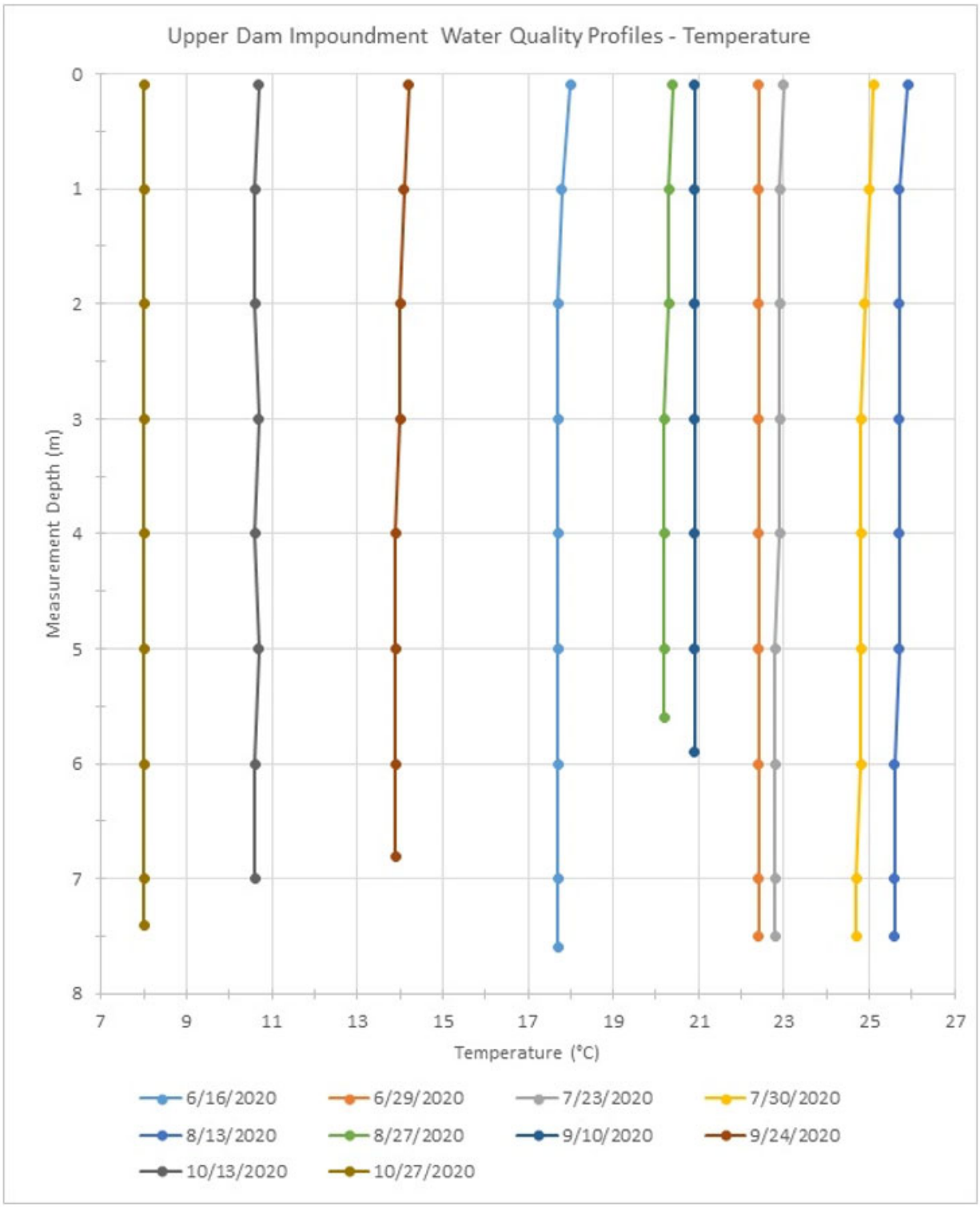


FIGURE 6
WATER TEMPERATURE PROFILES AT THE MIDDLE DAM IMPOUNDMENT

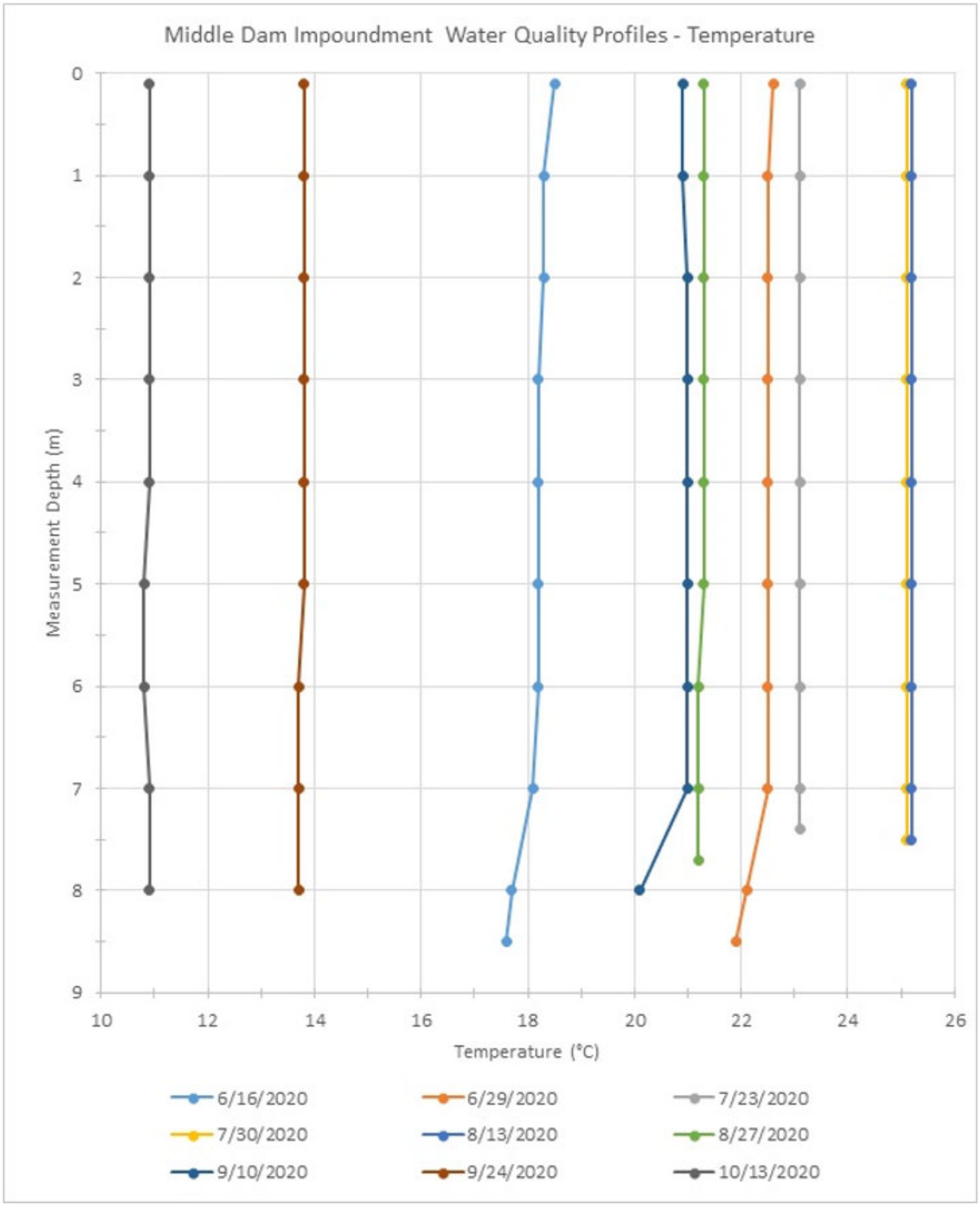


FIGURE 7
DO PROFILES AT THE UPPER DAM IMPOUNDMENT

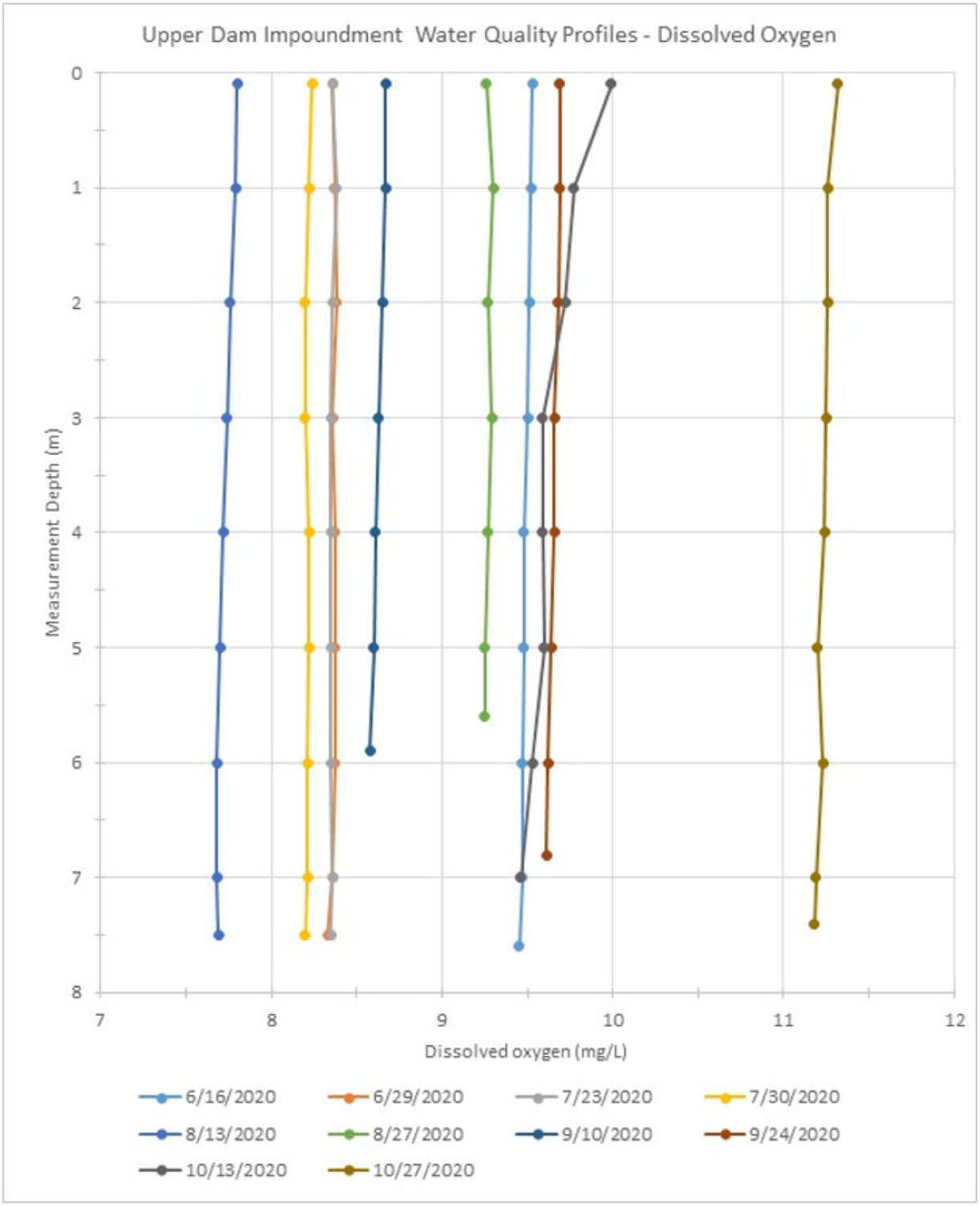


FIGURE 8
DO PROFILES AT THE MIDDLE DAM IMPOUNDMENT

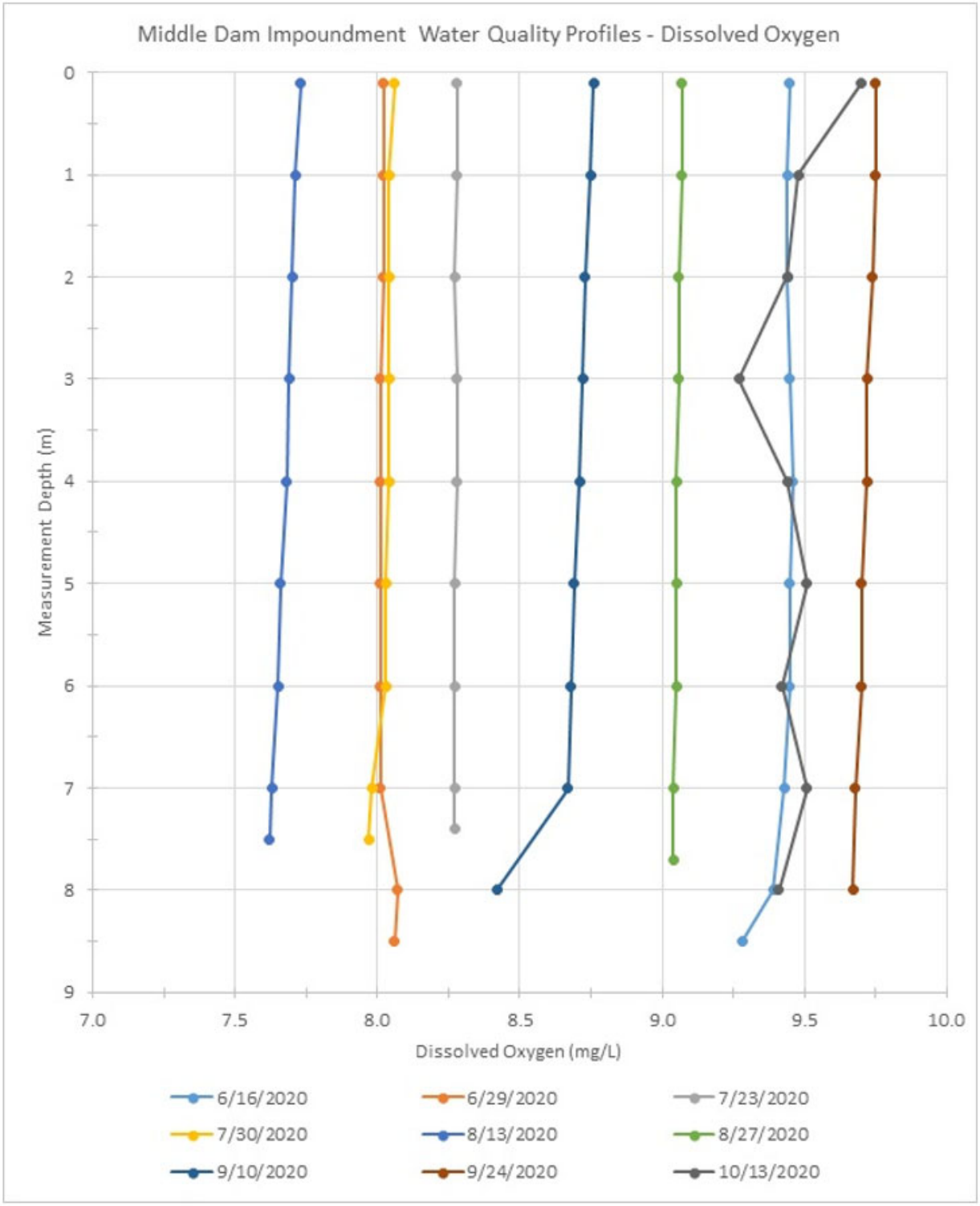


FIGURE 9
DO SATURATION PROFILES AT THE UPPER DAM IMPOUNDMENT

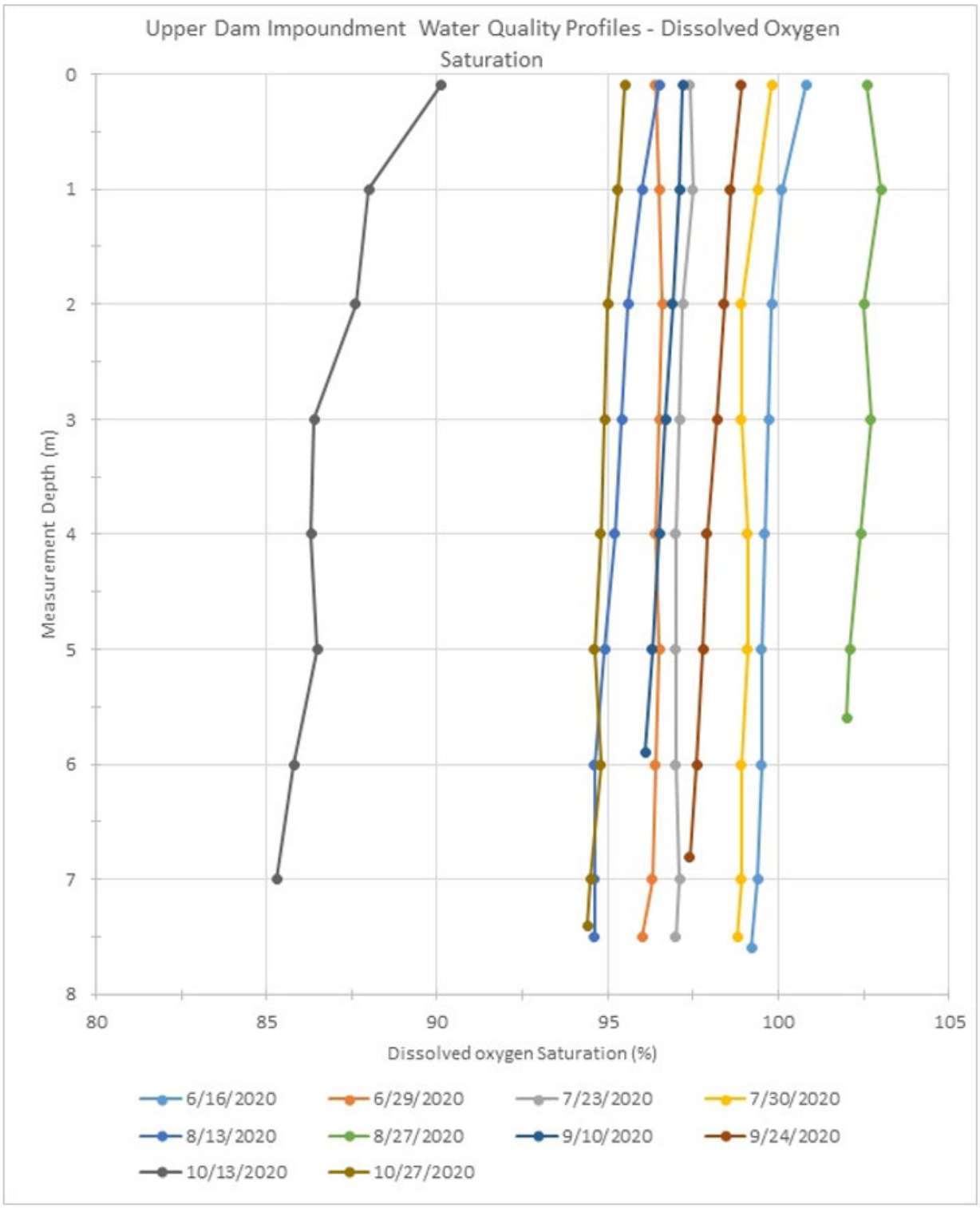
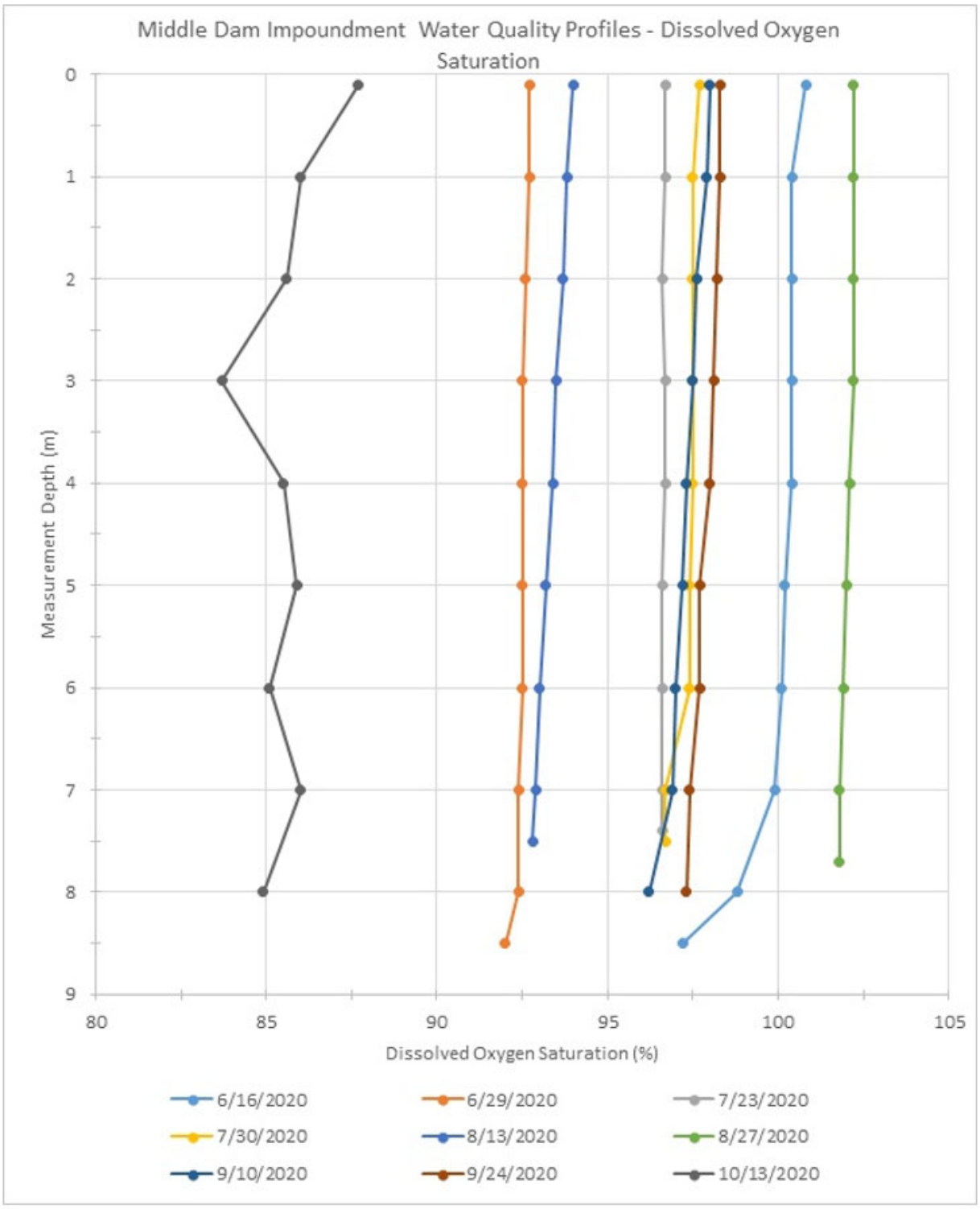


FIGURE 10
DO SATURATION PROFILES AT MIDDLE DAM IMPOUNDMENT



Water temperatures were comparable between the Upper and Middle Dam impoundments and increased from the beginning of the study in June reaching a peak temperature of 25.9°C at the Upper Dam impoundment and 25.2°C at the Middle Dam impoundment on August 13, then decreased through the end of the study reaching a minimum temperature of 8.0°C on October 27 at the Upper Dam impoundment (Table 6 and Table 7; Figure 5 and Figure 6). Water temperatures were generally uniform throughout the water columns of both impoundments and varied by less than 1°C; therefore, there was no evidence of thermal stratification during this study in either impoundment.

DO levels were also comparable between the Upper and Middle Dam impoundments (Table 6 and Table 7; Figure 7 and Figure 8) and the average values were slightly higher in the Upper Dam impoundment (9.1 mg/L) than the Middle Dam impoundment (8.7 mg/L); although if the last sampling round on October 27, 2020, is removed from the Upper Dam impoundment average (no data were collected from the Middle Dam impoundment on that date) then the DO averages are almost identical (8.8 mg/L at Upper Dam impoundment and 8.7 mg/L at Middle Dam impoundment). As with water temperature, there was little variation in DO with depth in either impoundment, varying by 0.53 mg/L or less in any profile DO which ranged from 7.68 to 11.3 mg/L at the Upper Dam impoundment and from 7.62 to 9.75 mg/L in the Middle Dam impoundment. No DO concentrations were below the state 5.0 mg/L instantaneous or the 6.5 mg/L 30-day average DO standards for Class C waters.

DO saturation followed similar patterns and ranged from 85.3 to 103 percent at the Upper Dam impoundment with an average of 96.9 percent and from 83.7 to 102.2 percent at the Middle Dam impoundment with an average of 96.1 percent (Table 6 and Table 7; Figure 9 and Figure 10). DO saturation was not below the instantaneous DO standard of 60 percent or the 30-day average DO standard of 78 percent (as estimated from the 6.5 mg/L standard at a temperature of 24 °C) at either impoundment.

5.2.2 Water Quality Sampling

Lake trophic state is determined primarily by three indicators: chlorophyll *a*, Secchi disk depth, and total phosphorus, which were analyzed in water quality samples, among other parameters that

are discussed below. There are currently no state surface water quality standards for Class C waters for the parameters collected in this study. Laboratory results for this sampling effort are presented in Table 8 and Table 9 and the laboratory reports are included as Attachment 2. Minimum, maximum, average (mean), and median values are presented for the laboratory results. For the purpose of calculating average and median values, any laboratory results less than a reporting limit are assumed to equal the reporting limit (a conservative assumption).

TABLE 8
EPILIMNETIC CORE SAMPLE RESULTS – UPPER DAM IMPOUNDMENT

Upper Dam Impoundment							
Sample Date	**Sample Time**	**Alkalinity as CaCO3**	**Apparent Color**	**Chlorophyll *a***	**pH**	**Total Phosphorus as P**	**Secchi Disk Depth**
		mg/L	**SPU**	**ug/L**	**SU**	**mg/L**	**m**
06/16/2020	10:20	9.2	30	2.4	7.5	<0.1	3.8
06/29/2020	11:32	10	20	2.7	6.5	<0.1	3.0
07/23/2020	11:50	8.8	30	1.7	6.7	<0.1	3.0
07/30/2020	11:50	<5	30	1.5	7.1	<0.1	3.8
08/13/2020	10:45	9.8	25	1.6	7.0	<0.1	4.0
08/27/2020	12:30	180	20	2.3	6.7	<0.1	4.0
09/10/2020	09:55	11	<5	1.1	6.9	<0.1	5.0
09/24/2020	09:45	11	25	<1	7.0	<0.1	4.3
10/13/2020	09:55	10	30	<1	7.0	<0.1	3.2
10/27/2020	09:20	10	35	1.0	7.0	<0.1	2.7
	Average	26.5	25	1.6	6.9	<0.1	3.7
	Median	10.0	28	1.6	7.0	<0.1	3.8
	Minimum	<5	<5	<1	6.5	<0.1	2.7
	Maximum	180	35	2.7	7.5	<0.1	5.0

TABLE 9
EPILIMNETIC CORE SAMPLE RESULTS – MIDDLE DAM IMPOUNDMENT

Middle Dam Impoundment							
Sample Date	**Sample Time**	**Alkalinity as CaCO3**	**Apparent Color**	**Chlorophyll *a***	**pH**	**Total Phosphorus as P**	**Secchi Disk Depth**
		mg/L	**SPU**	**ug/L**	**SU**	**mg/L**	**m**
06/16/2020	13:20	9.0	25	2.4	7.3	<0.1	3.7
06/29/2020	08:50	10	25	3.4	6.2	<0.1	1.8
07/23/2020	07:27	8.7	35	1.4	6.4	<0.1	2.9
07/30/2020	07:55	10	30	1.1	7.0	<0.1	3.2
08/13/2020	07:35	<5	30	<1	7.0	<0.1	4.0
08/27/2020	07:35	9.5	20	2.0	4.6	<0.1	4.0
09/10/2020	07:30	12	10	1.0	6.8	<0.1	4.6
09/24/2020	08:40	11	20	<1	7.1	<0.1	4.6
10/13/2020	08:42	10	25	<1	6.7	<0.1	3.2
	Average	9.5	24	1.6	6.6	<0.1	3.5
	Median	10.0	25	1.1	6.8	<0.1	3.7
	Minimum	<5	10	<1	4.6	<0.1	1.8
	Maximum	12.0	35	3.4	7.3	<0.1	4.6

5.2.2.1 Alkalinity

The concentration of calcium carbonate in a water sample is used to determine the alkalinity or pH buffering capacity of a water body and sensitivity to acid precipitation (Godfrey 1988). Alkalinity ranged from less than 5 to 180 mg/L CaCO3 in the Upper Dam impoundment, with an average value of 26.5 mg/L and a median value of 10.0 mg/L. The 180 mg/L CaCO3 value appears to be an outlier, and with that sample omitted from the dataset, the average value was 9.4 mg/L and the median value was 10.0 mg/L. In the Middle Dam impoundment, alkalinity varied from less than 5 to 12.0 mg/L CaCO3, with an average value of 9.5 mg/L and a median value of 10.0 mg/L. Alkalinity values greater than 10 to 20 mg/L is considered to be sensitive to acid precipitation, while values of less than 10 mg/L are considered to be highly sensitive (Godfrey 1988). Therefore, the samples collected during this study indicate both impoundments are generally poorly buffered and sensitive to acid precipitation.

5.2.2.2 Color

Water color is an indicator of lake trophic status as it may mitigate high phosphorus concentrations and potential algal blooms (MDEP 2016). All samples collected during the trophic state study were analyzed for color on the platinum-cobalt scale, which compares water samples to the brown-yellow color of a platinum-cobalt solution. In the Upper Dam impoundment, color values ranged from less than 5 to 35 Standard Platinum-cobalt Units (SPU), with an average value of 25 SPU. In the Middle Dam impoundment, color values ranged from 10 to 35 SPU, with and average value of 24 SPU. MDEP uses a threshold of 30 SPU for evaluating whether a water sample is colored when determining lake trophic status (MDEP 2016). The samples collected in this study were generally at or below the 30 SPU color threshold and, therefore, conducive to determining the Trophic State Indices (TSI) where adequate data exists.

5.2.2.3 Chlorophyll *a*

Chlorophyll *a* is a photosynthetic pigment that is analyzed in water quality samples as an indicator of algal biomass and lake trophic state (MDEP 2016). All samples collected during this study were analyzed for chlorophyll *a* and compared to the thresholds for trophic status as specified by MDEP. Chlorophyll *a* ranged from less than 1.0 to 2.7 ug/L in the Upper Dam impoundment with an average concentration of 1.6 ug/L. In the Middle Dam impoundment, chlorophyll *a* ranged from less than 1.0 to 3.4 ug/L, with an average concentration of 1.6 ug/L. MDEP defines oligotrophic waters as having chlorophyll *a* concentrations of less than 1.5 ug/L and mesotrophic waters as having chlorophyll *a* concentrations of 1.5 to 7 ug/L (MDEP 2016). The samples collected during this study were in the oligotrophic and mesotrophic ranges for chlorophyll *a*.

5.2.2.4 pH

The pH is a measure of acidity or basicity in water samples and can indicate water quality impairments in rivers and lakes that can result in physiological stress on aquatic organisms (Godfrey 1988). During this study, pH varied from 6.5 to 7.5 SU in the Upper Dam impoundment, with an average value of 6.9 SU. At the Middle Dam impoundment, pH ranged from 4.6 to 7.3 SU, with an average value of 6.6 SU and a median value of 6.8 SU. The single result of 4.6 SU

appears to be an outlier and there is no obvious explanation for that anomalously low value. With that value omitted from the dataset, the average pH value was 6.8 SU and the median was 6.9 SU. Maine does not currently have numeric water quality standards for pH.

5.2.2.5 Total Phosphorus

Phosphorus is typically the primary limiting nutrient in freshwater systems, and excess amounts of phosphorus can lead to water quality degradation and eutrophication (Carpenter 2005). Total phosphorus concentrations tend to be very low in freshwater lakes in Maine and concentrations greater than 0.020 mg/L are considered to be eutrophic (MDEP 2016). Total phosphorus was not detected above the laboratory detection limit of 0.100 mg/L in any of the samples analyzed. We note the laboratory reporting limit of 0.100 mg/L exceeds MDEP thresholds for assigning trophic classes (MDEP 2016); however, other parameters collected in the trophic state study assist with determining an estimated trophic class as discussed below.

5.2.2.6 Secchi Disk

Secchi disk transparency (SDT) is a measure of water clarity or opacity that is used as an indicator of algal biomass and trophic state (MDEP 2016). SDT ranged from 2.7 to 5.0 meters in the Upper Dam impoundment, with an average of 3.7 meters. In the Middle Dam impoundment, SDT ranged from 1.8 to 4.6 m, with an average value of 3.5 m. MDEP considers those waters with a SDT of 4 to 8 meters as mesotrophic and a SDT of less than 4 meters as eutrophic. The SDT values obtained in the Upper and Lower Dam impoundments were characteristic of eutrophic and mesotrophic waters.

5.2.3 Trophic State

Lake trophic status is determined by evaluating a number of indicators, including chlorophyll *a*, Secchi disk transparency, and total phosphorus (MDEP 2016). Total phosphorus laboratory results were all below the reporting limit (0.100 mg/L), as well as the method detection limit (0.046 mg/L), used by the laboratory and were just above the reporting guidelines for determining the trophic state of the impoundments (i.e., total phosphorus threshold of 0.020 mg/L for eutrophic waters and 0.0045 mg/L for mesotrophic waters). However, the chlorophyll *a* and SDT data were sufficient

for determining trophic state. The Maine Trophic State Indices (TSI) (MDEP 1996) were calculated from the mean chlorophyll *a* data and the mean SDT data as:

Chlorophyll *a* TSI = 70 * log (mean chlorophyll *a* + 0.7);

SDT TSI = 70 * log (105 + 0.7) / mean SDT

At the Upper Dam impoundment, the chlorophyll *a* TSI was 26 and the SDT TSI was 38 for the study data. At the Middle Dam impoundment, the chlorophyll *a* TSI was 25 and the SDT TSI was 40 for the study data. The TSI values calculated for both dams were in the mesotrophic range of 25 to 60 (MDEP 2016). The chlorophyll *a* and SDT data collected during this study generally support a determination of mesotrophic status in both the Upper and Middle Dam impoundments based on the MDEP numerical guidelines. The SDT averages at both impoundments were slightly below the mesotrophic threshold of 4 meters and indicate conditions just inside the eutrophic range; however, the TSI values calculated from the SDT data were within the mesotrophic range. Additional consideration for trophic status is provided by the DO data collected during the impoundment water quality profiles, as presented in Section 5.2.1, which indicate DO concentrations at the Upper and Middle Dam impoundments well above the state water quality standards. Eutrophic water bodies are typically associated with low DO conditions (Carpenter 2005), whereas high DO levels are consistent with a determination of mesotrophic status in the Upper and Middle Dam impoundments.

5.2.4 Late Summer Sampling

During the sampling event on August 13, 2020, additional samples were collected from the Upper and Middle Dam impoundments and submitted for laboratory analysis of dissolved metals, organics, and inorganic parameters as presented in Table 10. There are state surface water quality standards for iron at 1 mg/L, chloride at 230 mg/L, and aluminum at 0.087 mg/L, while the other parameters tested do not have state surface water standards. There were no exceedances of water quality standards in any of the samples collected and analyzed for iron or chloride. The laboratory reporting limit for aluminum analysis was 0.300 mg/L, which was greater than the state standard of 0.087 mg/L and, therefore, not conclusive for determining exceedances of that standard.

TABLE 10
LATE SUMMER ADDITIONAL SAMPLING RESULTS

Parameter	Units	Middle Dam Impoundment	Upper Dam Impoundment
Aluminum	mg/L	<0.3	<0.3
Calcium	mg/L	3.32	3.25
Chloride	mg/L	3.1	3.1
Dissolved Organic Carbon	mg/L	4.3	3.7
Iron	mg/L	0.249	0.236
Magnesium	mg/L	0.824	0.806
Nitrate as N	mg/L	<0.05	<0.05
Potassium	mg/L	<1	<1
Silica	mg/L	4.38	4.39
Silicon	mg/L	2.05	2.05
Sodium	mg/L	3.1	2.96
Sulfate	mg/L	15	1.9

5.3 Temperature and DO Monitoring

5.3.1 Temperature and DO Continuous Monitoring

Continuous monitoring of water temperature and DO was completed at the Middle Dam bypass reach and in the Middle Canal adjacent to the intake at the lower powerhouse from July 23 to September 24, 2020. Water temperatures were comparable between the two stations, reaching a maximum temperature of 26.4°C in mid-August then cooling through the end of the study period (Figure 11 and Figure 12). Water temperatures in the Middle Dam bypass reach varied from 13.3 to 26.4°C, with an average of 21.3°C. Water temperatures in the Middle Canal varied from 13.3 to 26.4°C, with an average of 21.2°C. The water temperatures documented were sufficiently high (i.e., ≥24°C for portions of the study) to characterize typical seasonal maximum temperatures which are usually correlated with seasonal minimum DO concentrations.

FIGURE 11
CONTINUOUS TEMPERATURE AND DO IN THE MIDDLE DAM BYPASS REACH

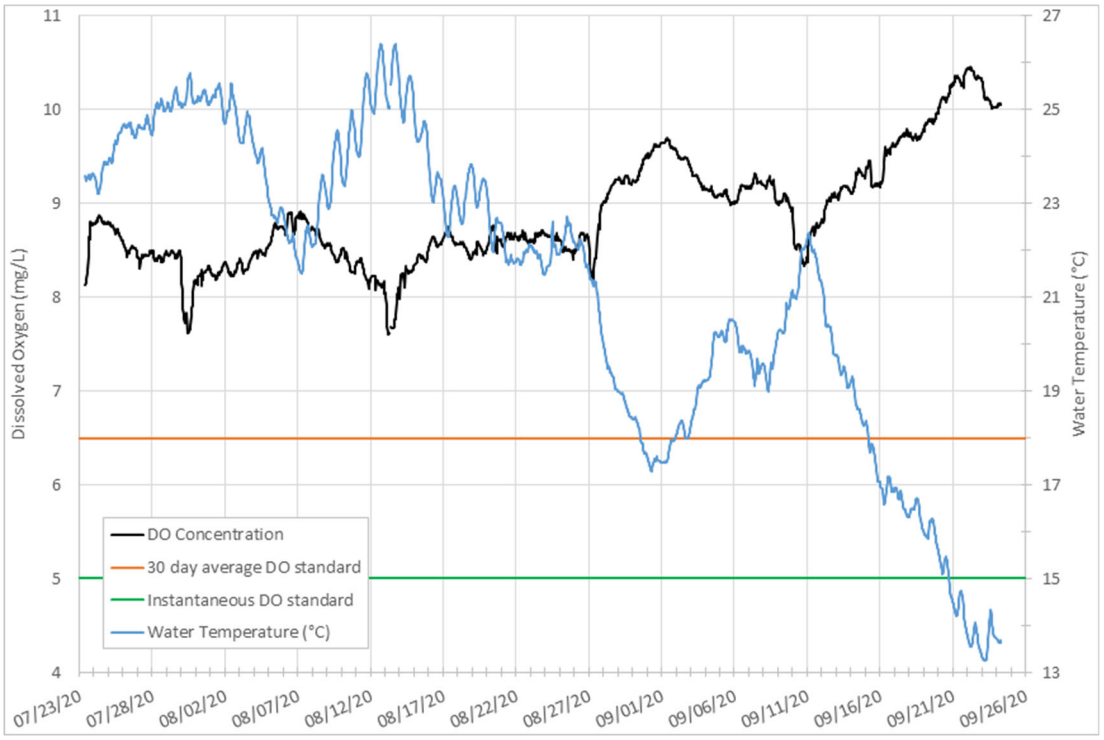
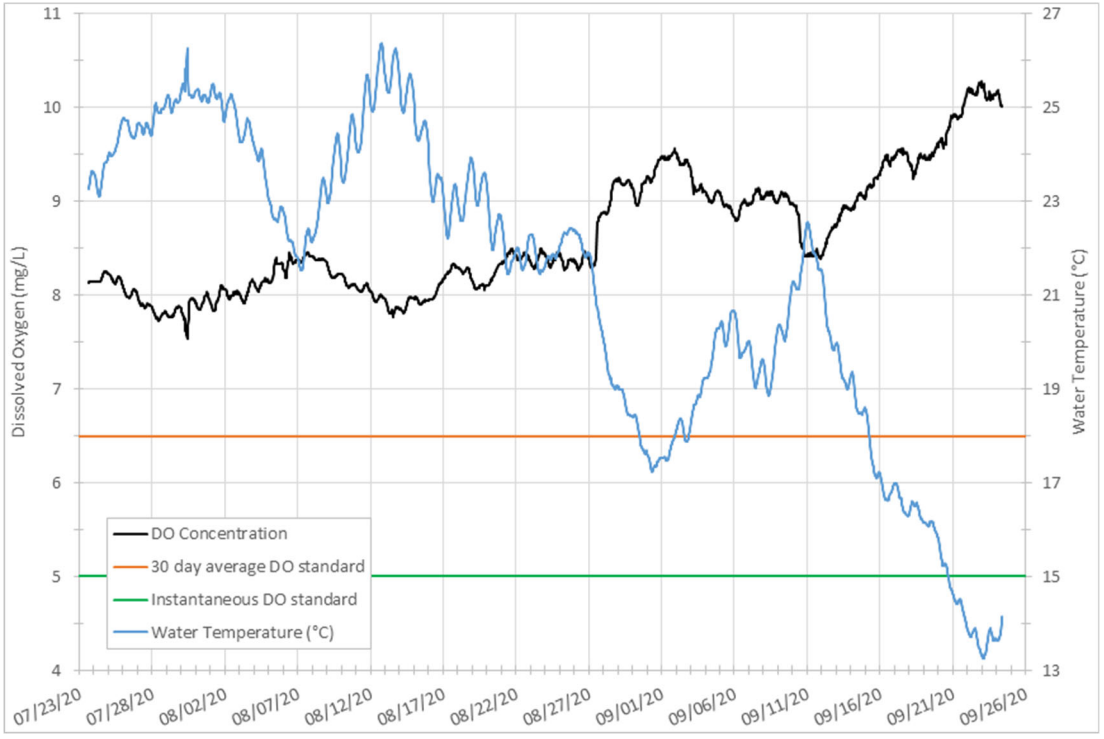


FIGURE 12
CONTINUOUS TEMPERATURE AND DO IN THE MIDDLE CANAL



DO appeared to vary with water temperature at both monitoring stations with lower DO concentrations corresponding with higher water temperatures and higher DO concentrations corresponding with lower water temperatures (Figure 11 and Figure 12). DO values ranged from 7.61 to 10.46 mg/L at the Middle Dam bypass reach monitoring station, with an average of 8.89 mg/L. At the Middle Canal monitoring station, DO values were on average slightly lower than at the Middle Dam bypass monitoring station and varied from 7.53 to 10.28 mg/L, with an average of 8.63 mg/L. No DO concentrations were below the 5.0 mg/L instantaneous or the 6.5 mg/L 30-day average DO state standard for Class C waters during this study.

DO saturation was estimated from DO concentration and water temperature during this study based on standard published DO saturation - temperature/pressure tables and is presented in Figure 13 and Figure 14. At the Middle Dam bypass reach monitoring station, DO saturation was consistently at or slightly above 100 percent and varied from 92.5 to 105.3 percent, with an average of 101.5 percent. At the Middle Canal monitoring station, DO saturation was consistently just below 100 percent in the first half of the study and were often above 100 percent in the second half of the study. DO saturation varied from 93.0 to 103.9 percent, with an average of 98.4 percent at the Middle Canal monitoring station. During this study, percent saturation was above the 60 percent instantaneous DO saturation standard.

FIGURE 13
CONTINUOUS DO SATURATION IN MIDDLE DAM BYPASS REACH

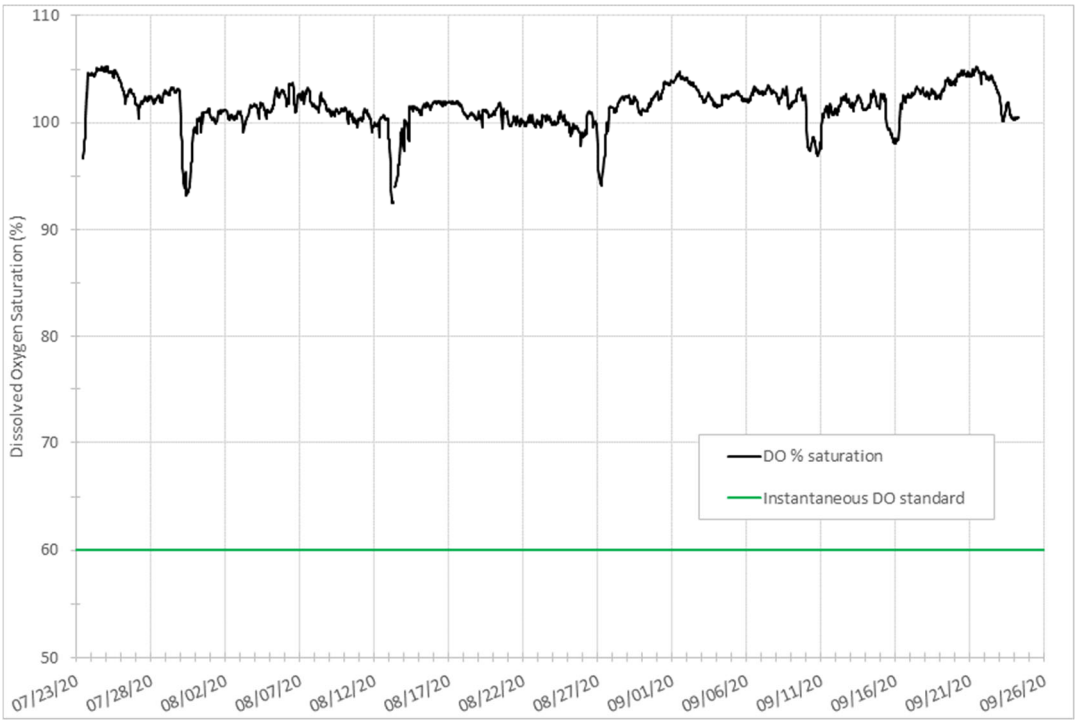
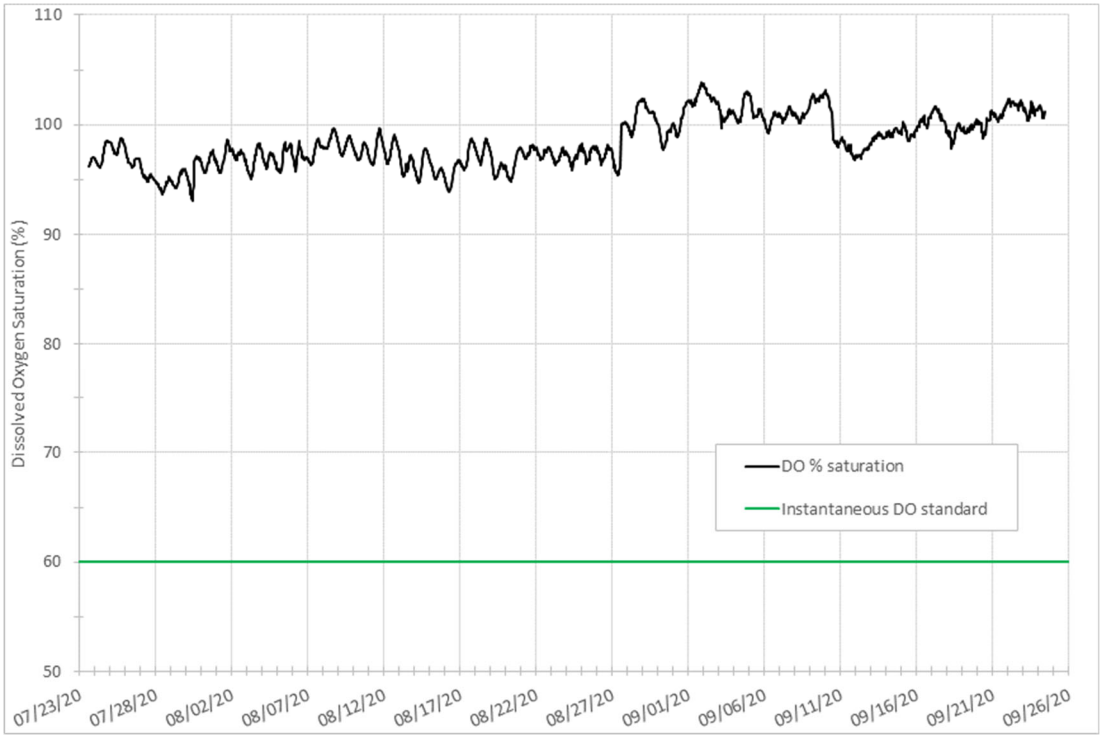


FIGURE 14
CONTINUOUS DO SATURATION IN THE MIDDLE CANAL



5.4 Benthic Macroinvertebrate Study

Macroinvertebrate rock basket samplers were deployed at the designated station in the Middle Dam bypass reach on July 30, 2020 and retrieved 29 days later on August 27, 2020. Physical habitat parameters and point water quality readings collected at the time of deployment and retrieval are presented in Table 11. In general, the aquatic habitat in the bypass reach approximately 200 feet downstream of the Middle Dam was classified as a pool reach with substrate dominated by boulder (greater than 10-inch) and some small amounts of rubble/cobble (2.5 to 10-inch). Channel width, depth, and velocities were relatively similar during deployment and retrieval.

TABLE 11
SUMMARY OF MACROINVERTEBRATE SAMPLING LOCATION HABITAT AND CONDITIONS IN THE MIDDLE DAM BYPASS REACH

Parameter	Sample Location	
	Deployment	Retrieval
Date-Time	7/30/2021-09:30	8/27/21-08:45
Number of Samplers	3	3
Coordinates	N 44.543399, W 70.546343	
Land Use (500-meter radius US)	Urban, Upland Hardwood	
Terrain (500-meter radius US)	Hilly	
Canopy Cover (upstream view)	Open	
Physical Bottom Characteristics	Boulder (>10") – 95%	
	Rubble/Cobble (2.5" to 10") – 5%	
Channel Width (m)	28.8	29.1
Site Depth (cm)	99	97
Flow (cm/s)	11.28	11.1
DO (mg/L)	7.95	9.05
Temperature (°C)	25.3	21.3
pH	6.6	6.7
Specific conductance (µS/cm)	38	37

Parameter	Sample Location	
	Deployment	Retrieval
Observations		
Fish	None noted	None noted
Algae/Macrophytes	None noted	None noted
Habitat Quality	Good – boulder/coble with flow	
Dams/Impoundments	Below Middle Dam Impoundment	
Discharges	Flow from Upper powerhouse via Middle Dam	

A total of 1,900 individual macroinvertebrates were collected in the three discrete samplers ranging from 331 individuals in Sampler 1 to 979 individuals in Sampler 2 (Table 12). From the combined results of all three samplers, the dominant taxon was a caddis fly (genus *Chimmara*) composing 20.4 percent of the total community. Benthic macroinvertebrates belonging to the orders Ephemeroptera, Plecoptera, and Trichoptera (EPT) are used to provide an assessment of the community based on their sensitivity to impaired water quality. In total, EPT taxa (at the genus level) represented 28 of the 60 total taxa collected from the Middle Dam bypass reach and accounted for 82.7 percent of the benthic community. In addition to evaluating the contribution of EPT taxa to the community, tolerance values were attributed to each taxonomic group based on classifications provided by MDEP. Tolerance values (range 0 to 10) were further classified as Intolerant (i.e., sensitive to water quality; values 0 to 3), Semi-tolerant (i.e., intermediate in their tolerance to water quality; values 4 to 6), or Tolerant (i.e., low sensitivity to water quality; values 7 to 10). Genera classified as Intolerant to poor water quality conditions comprised 33.3 percent of all taxa, while individuals belonging to taxonomic organisms considered to be tolerant of impaired water quality composed 2.6 percent of all specimens enumerated.

TABLE 12
SUMMARY OF MACROINVERTEBRATE METRICS FOR REPLICATES COLLECTED IN THE MIDDLE DAM BYPASS REACH

Metric	Replicate			
	1	2	3	All
Total Number of Individuals	331	979	590	1,900
Total Number of Taxa (genus level)	32	46	40	60
Number of EPT Taxa (genus level)	15	26	22	28
Number of Ephemeroptera Taxa (genus level)	8	11	9	12

Metric	Replicate			
	1	2	3	All
Number of Plecoptera Taxa (genus level)	1	4	4	4
Number of Trichoptera Taxa (genus level)	6	11	9	12
Percent EPT Specimens	78.5%	82.0%	86.1%	82.7%
Percent Ephemeroptera Specimens	70.1%	35.0%	26.1%	38.4%
Number of Intolerant Taxa (genus level)	8	16	15	20
Percent Tolerant Organisms	5.1%	2.2%	1.7%	2.6%
Percent Dominant Taxon (genus level)	31.7%	19.9%	32.5%	20.4%
Hilsenhoff Biotic Index	3.56	3.88	3.65	3.75
Water Quality Rating	excellent	very good	excellent	excellent
Shannon Diversity (base e)	2.26	2.76	2.56	2.87

The Hilsenhoff Biotic Index rating (values ranging from 0 to 10) provides an estimate of the overall tolerance in the sampled aquatic community. Low scores reflect a higher abundance of sensitive (intolerant of impaired water quality) groups. The estimate for the Rumford Falls macroinvertebrate community is supportive of a water quality rating of 'excellent' (Hilsenhoff 1987).

A full listing of taxonomic classifications and abundance values for each of the three replicates from the Middle Dam bypass reach were provided to MDEP along with the physical data recorded during the placement and retrieval of rock baskets on October 20, 2020. Taxonomic and habitat information provided by Normandeau to MDEP and returned on November 24, 2020, are provided in Attachment 3 as a Preliminary Classification Attainment Report. The preliminary determination indicates that the macroinvertebrate community in the Middle Dam bypass reach attains Class A standards.

5.5 Outlet Stream Aquatic Habitat Study

The Outlet Stream Aquatic Habitat Study is still in progress. RFH has been discussing preliminary results with MDEP, including at meetings on April 8, 2021 and May 20, 2021. It was agreed that information from the Flow Study for Aquatic Habitat Evaluation study, including some additional analysis, should be incorporated into this study in order to evaluate appropriate minimum flows in

the bypassed reach. Therefore, the results of this study will be presented as part of the August 2022 Updated Study Report.

6.0 Summary

A comprehensive water quality study was completed in June to October 2020 in accordance with the FERC-approved Water Quality Study Plan in the RSP. Trophic state monitoring indicated that both the Upper and Middle Dam impoundments have low levels of chlorophyll *a*, moderate water clarity, neutral to slightly acidic pH with poor buffering capacity, and little coloration. Nutrient data collected were not useful for evaluating trophic state due to high laboratory reporting limits; however, the measured parameters, including the calculated trophic state indices using chlorophyll *a* and Secchi disk transparency data, indicate both impoundments have parameters measured within the slightly eutrophic to mesotrophic range and are best characterized as mesotrophic water bodies. Trophic state is a determination of the amount of biological productivity in a water body and is an indicator of overall water quality. Eutrophication is an over-enrichment with nutrients that can lead to algal blooms and anoxic conditions in a water body (Carpenter 2005). In Maine, the large majority of lakes are classified as mesotrophic which indicates a moderate level of biological productivity and fair water quality (MDEP 2016). MDEP Environmental and Geographic Analysis Database has limited available total phosphorus data for the Androscoggin River in the Project area; however, the available data indicate total phosphorus concentrations are in the mesotrophic range (MDEP 2021). Therefore, characterizing the Upper and Middle Dam impoundments as generally mesotrophic as determined by the chlorophyll *a* and SDT data and supported by vertical profile water quality data, which indicated that DO concentrations were well above the Class B water quality standards and with no documented vertical stratification, is appropriate and consistent with regional water quality data.

Continuous monitoring of water temperature and DO at the Middle Dam bypass reach and the Middle Canal documented consistently high DO levels throughout the summer study period, including during seasonal high water temperatures up to 26.4°C when DO levels would typically be at a seasonal minimum. DO concentrations were well above the minimum state standards for Class C waters.

Additionally, the results of the macroinvertebrate study showed the community in the Middle Dam bypass reach consisted of a substantial number of species intolerant to degraded water quality and had a relatively even distribution of species. The Preliminary Classification Attainment Report provided by MDEP indicated that the macroinvertebrate community attained Class A water quality standards and met the aquatic life standards.

RFH will continue to consult with MDEP and conduct studies in the Middle Dam bypass reach. The final results of this effort will be presented as part of the August 2022 Updated Study Report.

7.0 Variances from FERC-Approved Study Plan

There were no variances from the FERC-approved RSP for the Benthic Macroinvertebrate Study or the Outlet Stream Aquatic Habitat Study components of the Water Quality Study. With regards to the Impoundment Trophic State Study and Temperature and DO monitoring Study, there were the following variances:

1) In October 2020, trophic sampling was conducted once, not twice, in the Middle Dam impoundment due to sampling constraints. RFH coordinated with MDEP regarding this sampling event and in a November 2, 2020 email, MDEP indicated the data collected was sufficiently representative of the conditions and no additional sampling was conducted. RFH summarized this modification to methodology in the first and second quarterly study progress reports filed with the Commission on October 30, 2020 and January 29, 2021, respectively.

2) MDEP's *DEP Sampling Protocol for Hydropower Studies* (MDEP 2019) provides minimum reporting or laboratory detection limits for the suite of water quality parameters considered as part of the trophic state study. The following parameters did not meet the desired MDEP laboratory detection or reporting limit:

    a. Total phosphorus: MDEP detection limit for total phosphorus is 0.001 mg/L. The laboratory used USEPA method 365.4 with a standard reporting limit of 0.1 mg/L. RFH has discussed this with MDEP and will continue to consult with the Department on this matter.

b. Nitrate: MDEP detection limit for nitrate is 0.010 mg/L. The laboratory used EPA method 353.2 with a standard reporting limit of 0.050 mg/L. Nitrate was only analyzed during a single sampling event during this study per MDEP protocol. However, RFH will consult with MDEP on this matter.

c. Aluminum: MDEP detection limit for total and dissolved aluminum is 0.010 mg/L. The laboratory used EPA method SW-846 with a standard reporting limit of 0.30 mg/L. Total and dissolved aluminum were only analyzed during a single sampling event during this study per MDEP protocol. However, RFH will consult with MDEP on this matter.

8.0 References

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Godfrey, P.J. 1988. Acid rain in Massachusetts. University of Massachusetts Water Resources Research Center. Amherst, MA.

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Maine Department of Environmental Protection (MDEP). 1996. 06-096 Chapter 581 Regulations Relating to Water Quality Evaluations. May 4, 1996. Accessed Jul 14, 2021 from http://www.maine.gov/dep/water/wd/general.html.

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Maine Department of Environmental Protection (MDEP). 2019. DEP Sampling Protocol for Hydropower Studies. September 2019.

Maine Department of Environmental Protection (MDEP). 2021. Email communication from Tracy Kruger, EGAD Data Manager, Bureau of Water Quality. June 9, 2021.

Attachment 1

Rumford Falls Project MDEP Site Visit Meeting Summary Notes

From: Drew Trested <dtrested@normandeau.com>
Sent: Tuesday, July 7, 2020 7:32 AM
To: Kathy Howatt (Kathy.howatt@maine.gov) (Kathy.howatt@maine.gov)
Cc: Anderson, Luke (Luke.Anderson@brookfieldrenewable.com); Cousens, Dawn
Subject: Rumford WQ sampling - site visit notes
Attachments: Summary notes for the June 24 Site Visit.pdf; Supplement to June 24 Site Visit.pdf

Good morning Kathy –

Please see the attached summary of our June 24 site visit at Rumford falls. Also attached is a supplement to that summary containing photos under minimum flow conditions of the two Middle Dam bypass locations we were considering for temp/DO monitoring and macroinvert samples. Based on our observations of the minimum flow conditions we are leaning towards installing samplers at the upstream location we looked at immediately downstream of the dam structure. You had indicated on June 24 that was your preferred location.

Our next scheduled trophic sampling date is Thursday July 9. I would like to get our temp/DO loggers in place on that date. Prior to doing so I was looking to get confirmation from you that you are comfortable that installation just below Middle Dam will provide you with representative data. If you can confirm that for me today that would be great.

My plan is to install our rock baskets/bags on our next trophic sampling date (July 23).

Thanks,
Drew

Drew Trested, PhD
Senior Principal Scientist, Fisheries Biologist
Normandeau Associates, Inc.
30 International Drive, Portsmouth, NH 03801
603-319-5310 (direct) 603-973-3179 (cell)

Summary notes for the June 24, 2020 – Rumford Falls Project MDEP Site Visit

Attendees:

- Luke Anderson (Brookfield)
- Mike Billings (Brookfield)
- Kathy Howatt (Maine DEP)
- Rob Mohlar (Maine DEP)
- Chris Sferra (Maine DEP)
- Drew Trested (Normandeau)

Purpose: Visual evaluation of the bypassed reach downstream of the Middle Dam and the lower powerhouse tailrace area to determine sampling locations for three components of the proposed water quality study (temperature and dissolved oxygen monitoring, benthic macroinvertebrates, and outlet stream aquatic habitat study).

Temperature and Dissolved Oxygen Sampling:

Maine DEP originally requested two loggers – *…in the bypass reach below middle dam, and in the free flowing tailwater reach downstream of the confluence of the bypassed reach and the lower powerhouse discharge*.

- Logger downstream of Middle Dam – <u>preferred location</u>
    - See Figures 1 and 2.
    - Logger should be placed in location downstream of bypass pipes and dam spouts so that unit remains submerged for duration of monitoring period.
    - Normandeau to collect photos of this area during June 29 trophic sampling to provide to MDEP for confirmation that appropriate wetted habitat is available at this location when no spill flows are present over Middle Dam.
- Logger downstream of Middle Dam – <u>secondary location</u>
    - See Figures 2 and 3.
    - In the event it is determined that sufficient wetted area and water depths at the preferred location are not available then logger will be installed in pool habitat located just upstream of the bedrock cascade portion of bypassed reach.
- Tailrace Logger
    - Based on visual observation of the integrated nature of the ND Paper mill discharge and unit discharge from the lower powerhouse (Figure 4) it was agreed that it would not be informative to place a temperature/DO logger in that area. There is not a suitable location outside of the influence of the paper mill discharge.
    - Maine DEP indicated that the placement of a temperature/DO logger at the downstream end of the power canal (adjacent to the lower powerhouse intake) would be representative of water quality following discharge out of the lower powerhouse (Figures 5 and 6).

Benthic Macroinvertebrate Sampling:

Maine DEP originally requested two benthic macroinvertebrate sample locations - *…in the bypass reach below middle dam, and in the free flowing tailwater reach downstream of the confluence of the bypass reach and lower powerhouse discharge.*

- Sample location downstream of Middle Dam
    - Likely will install mesh bags rather than rock baskets due to the likely shallow water depths in this location.
    - Normandeau to select specific location with appropriate substrate and adequate water depth for deployment period in the vicinity of the temperature/DO logger (Figures 1 and 2).
    - In the event it is determined that sufficient wetted area and water depths at the preferred location are not available then invertebrate samplers will be installed in pool habitat located just upstream of the bedrock cascade portion of bypassed reach.
- Sample location downstream of bypass and powerhouse confluence
    - Based on their visual assessment, MDEP concluded that collection of a macroinvertebrate sample from the area downstream of the bypassed reach and powerhouse confluence would be influenced by effluent from the ND Paper mill.
    - Maine DEP has a macroinvertebrate index site located in the Androscoggin River approximately one mile downstream of the Project.
    - Maine DEP will provide coordinates for that sample location as well as the water quality standards attainment report for the most recent sampling event.
    - Maine DEP will consider their most recent sampling at their downstream index site as representative and are reducing their original request for macroinvertebrate sampling to the single location in the Middle Dam bypass reach.

Outlet Stream Aquatic Habitat Study:

Maine DEP originally requested assessment of aquatic habitat *…in the bypass reach below middle dam to demonstrate that minimum flows to the bypass reach are adequate to provide habitat for fish and other aquatic species.*

- Maine DEP typically requests a minimum of three cross sections be evaluated for aquatic habitat within a bypass reach habitat. However, following review of the available habitat types in the bypassed reach Maine DEP indicated that placement of two cross sections was sufficient to quantify adequacy of bypass flows.
    - Cross section 1 – to be placed towards center of the "pool" habitat immediately downstream of Middle Dam and upstream of the bedrock/cascade area (Figures 7 and 8).
    - Cross section 2 – to be placed through the cobble/boulder section of habitat located downstream of the bedrock/cascade area and upstream of the backwater effect of the lower powerhouse tailrace (Figures 8 and 9).
- "Bankfull" conditions will be visually determined through identification of staining marks on vertical rock faces as well as the transition from aquatic to terrestrial vegetation.
- Due to the inability to adequately identify bankfull conditions within the bedrock/cascade section of the bypassed reach, a cross section in that area was not considered.

Figure 1. Preferred deployment location downstream of Middle Dam for the temperature/DO logger and macroinvertebrate samplers.

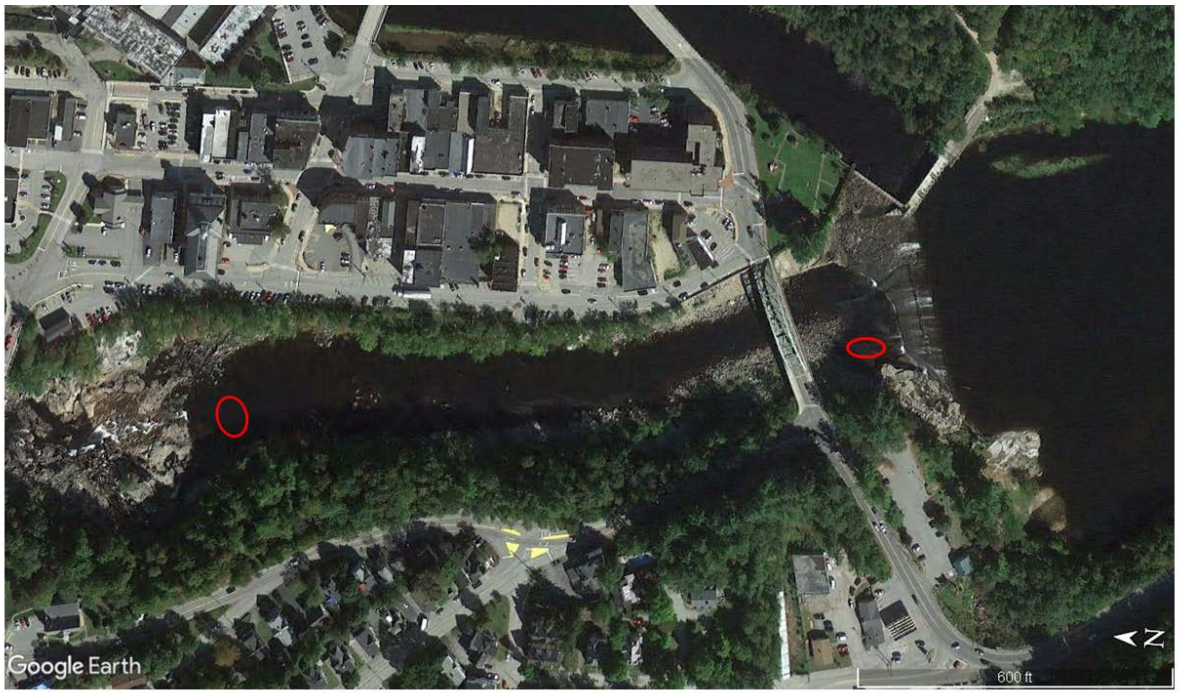

Figure 2. Preferred and alternate deployment location downstream of Middle Dam for the temperature/DO logger and macroinvertebrate samplers.

Figure 3. Alternate deployment location downstream of Middle Dam for the temperature/DO logger and macroinvertebrate samplers.

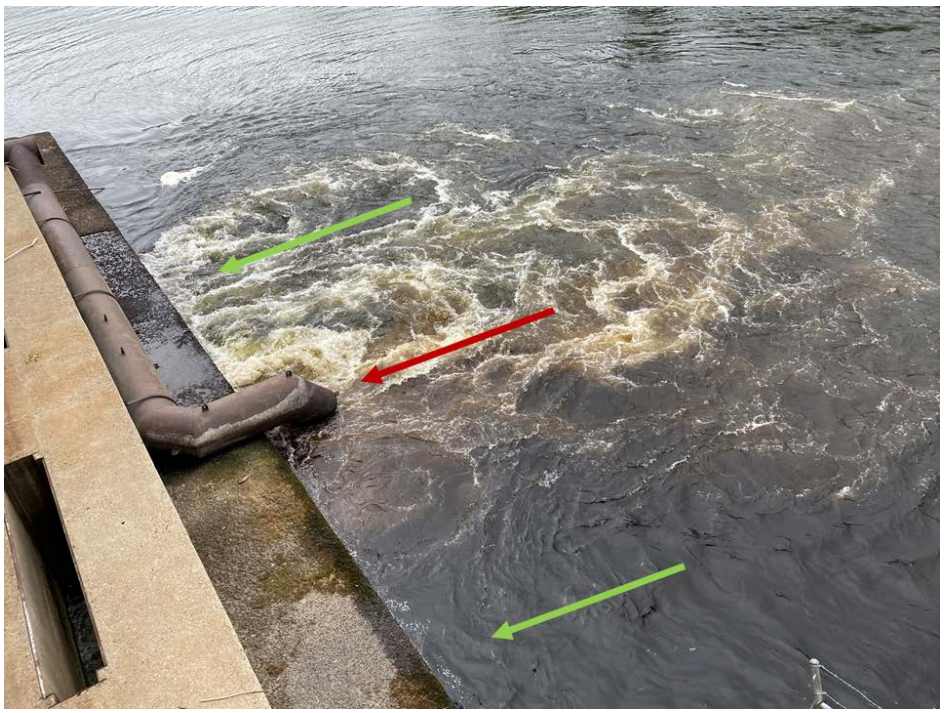

Figure 4. Lower powerhouse turbine unit (green arrows) and ND Paper mill (red arrow) discharge.

Figure 5. Power canal deployment location for the temperature/DO logger to be considered representative of conditions downstream of the confluence of the bypassed reach and lower powerhouse discharge.

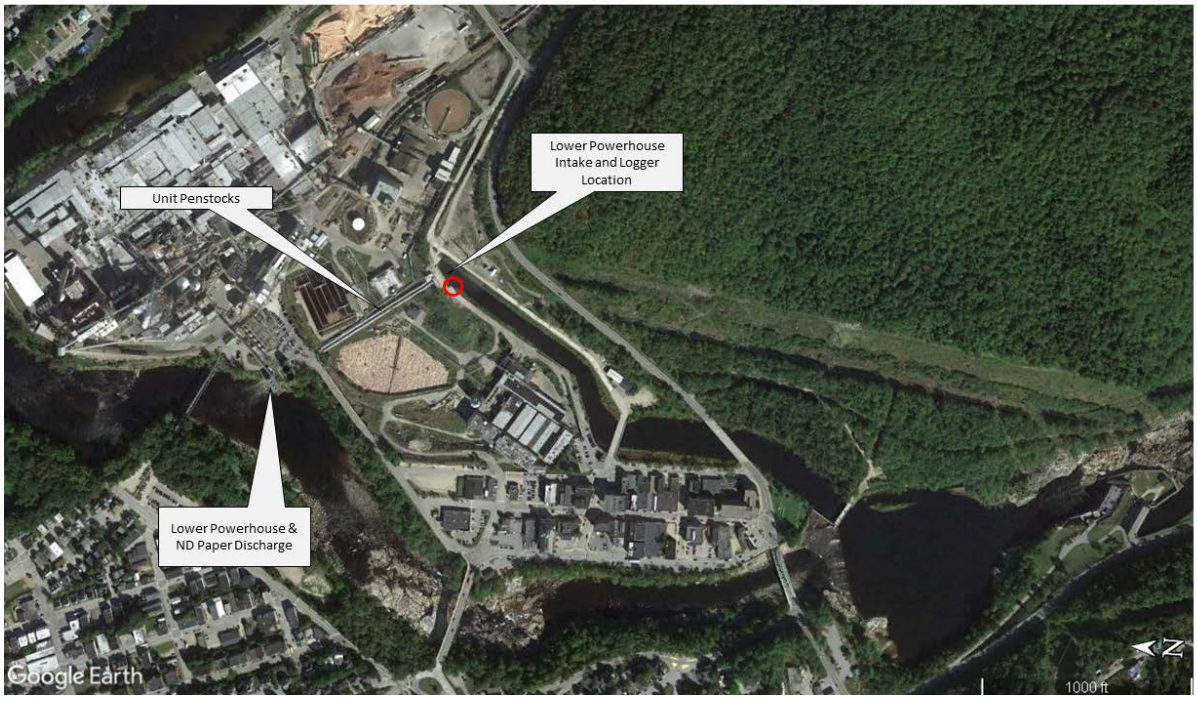

Figure 6. Relative position of the power canal deployment location for the temperature/DO logger to be considered representative of conditions downstream of the confluence of the bypassed reach and lower powerhouse discharge.

Figure 7. Approximate location of the upper cross section for evaluation of aquatic habitat within the bypassed reach.

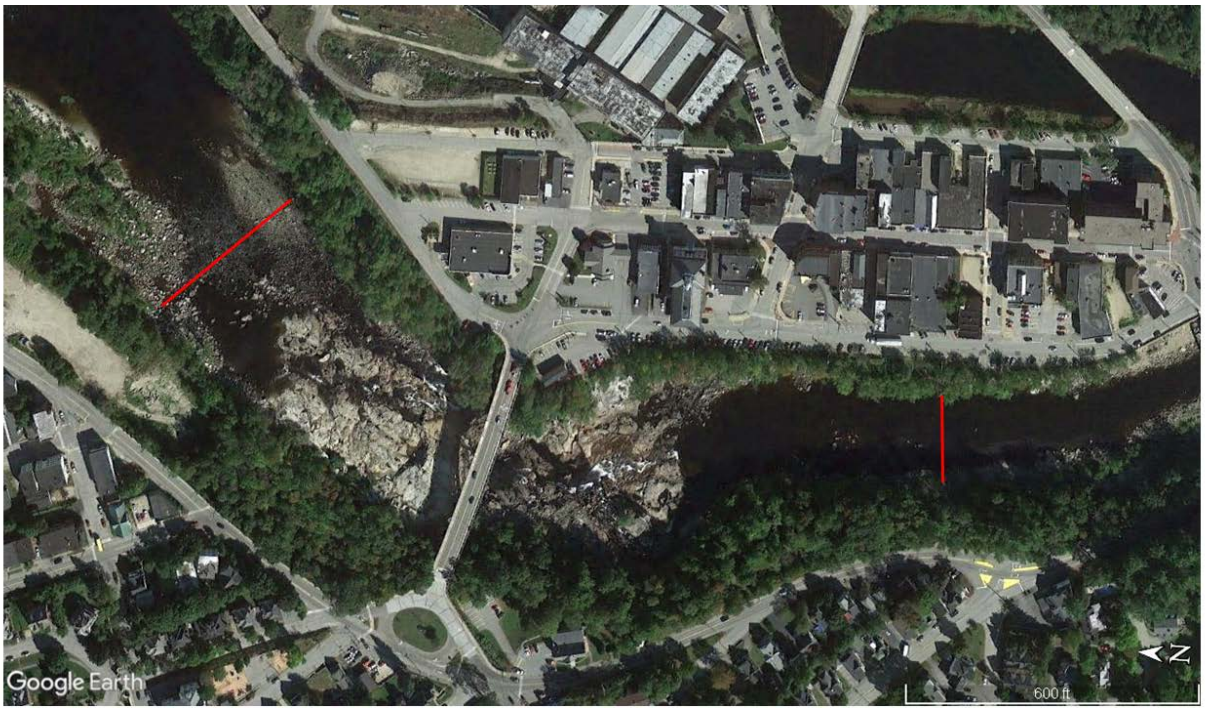

Figure 8. Approximate locations of the upper and lower cross sections for evaluation of aquatic habitat within the bypassed reach.

Figure 9. Approximate location of the lower cross section for evaluation of aquatic habitat within the bypassed reach.

Supplement #1: Summary notes for the June 24, 2020 – Rumford Falls Project MDEP Site Visit

During the June 24 site visit, spill was present at Middle Dam and as a result flow conditions through the Middle Dam bypass reach were in excess of minimum flow conditions normal for the summer period. Per the request of Maine DEP, Normandeau biologists revisited the preferred and secondary locations for deployment of a temperature/dissolved oxygen logger and benthic macroinvertebrate samplers on June 29 when the Middle Dam impoundment was drawn down two feet for trophic impoundment sampling. Conditions in the Middle Dam bypass reach on that date were representative of minimum flow.

Figures 1 and 2 present conditions in the Middle Dam bypass reach at the preferred deployment location downstream of the bypass pipe and dam spouts. Based on the photographed conditions, water depths in the preferred deployment area are sufficient for continuous submergence of the continuous monitor for a two month deployment and macroinvertebrate samplers for a 28 ±4 day deployment. Substrate in the preferred deployment location appears to be a mixture of bedrock, large and small boulder and cobble.

Figure 1. Preferred Middle Dam bypass reach logger deployment location under minimum flow conditions.

Figure 2. Preferred Middle Dam bypass reach logger deployment location under minimum flow conditions.

Figures 3 and 4 present conditions in the Middle Dam bypass reach at the secondary deployment location in pool habitat located just upstream of the bedrock cascade portion of bypassed reach. Based on the photographed conditions, water depths in the secondary deployment area are also sufficient for continuous submergence of the continuous monitor for a two month deployment and macroinvertebrate samplers for a 28 ±4 day deployment. Substrate in the secondary deployment location appears to be a mixture of large and small boulder and cobble.

Figure 3. Secondary Middle Dam bypass reach logger deployment location under minimum flow conditions.

Figure 4. Secondary Middle Dam bypass reach logger deployment location under minimum flow conditions.

Attachment 2

Preliminary Classification Attainment Report

From: Anderson, Luke <Luke.Anderson@brookfieldrenewable.com>
Sent: Tuesday, November 24, 2020 11:39 AM
To: Browne, Peter; Cousens, Dawn
Cc: Drew Trested
Subject: Fwd: Rumford Falls - Macroinvertebrate sampling results
Attachments: 2853.pdf; ATT00001.htm

FYI

Sent from my iPhone

Begin forwarded message:

From: "DiFranco, Jeanne L" <Jeanne.L.DiFranco@maine.gov>
Date: November 24, 2020 at 11:36:04 AM EST
To: Drew Trested <dtrested@normandeau.com>, "Anderson, Luke" <Luke.Anderson@brookfieldrenewable.com>
Cc: "Howatt, Kathy" <Kathy.Howatt@maine.gov>
Subject: FW: Rumford Falls - Macroinvertebrate sampling results

Hello Drew and Luke,

Attached is the preliminary site report for macroinvertebrate sampling results at Rumford Falls station 1186. The sample attained class A based on the DEP's stream macroinvertebrate model. Spatial data still need to be entered into our system and are therefore not included in the attached report, but I'll send an updated report once that step is completed. Also, the sampler type was actually rock baskets (not rock bags), which will be corrected on the final report.

Please feel free to contact me if you have any questions.

Jeanne

Jeanne DiFranco, Aquatic Biologist
Biological Monitoring Program Manager
Maine Department of Environmental Protection
17 State House Station, Augusta, ME 04333
(207) 699-8345
www.maine.gov/dep/water/monitoring/biomonitoring

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

Station Information

Station Number: S-1186
Waterbody: Androscoggin River - Station 1186
Town: Rumford
Directions: LOCATED APPROXIMATELY 200 FT DS OF MIDDLE IMPOUNMENT - IN BYPASS

River Basin:
HUC8 Name:
Latitude:
Longitude:
Stream Order: 6

Sample Information

Log Number: 2853 Type of Sample: ROCK BAG Date Deployed: 7/30/2020
Subsample Factor: X1 Replicates: 3 Date Retrieved: 8/27/2020

Classification Attainment

Statutory Class: C **Final Determination: A** Date: 11/23/2020
Model Result with P≥0.6: A **Reason for Determination: Model**
Date Last Calculated: 11/23/2020 Comments:

Model Probabilities

First Stage Model			
Class A	0.79	Class C	0.00
Class B	0.21	NA	0.00

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

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

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

Model Variables

01 Total Mean Abundance	633.33
02 Generic Richness	58.00
03 Plecoptera Mean Abundance	7.33
04 Ephemeroptera Mean Abundance	243.00
05 Shannon-Wiener Generic Diversity	3.93
06 Hilsenhoff Biotic Index	3.79
07 Relative Abundance - Chironomidae	0.11
08 Relative Generic Richness Diptera	0.38
09 *Hydropsyche* Abundance	96.00
11 *Cheumatopsyche* Abundance	20.00
12 EPT Generic Richness/ Diptera Generic Richness	1.23
13 Relative Abundance - Oligochaeta	0.00
15 Perlidae Mean Abundance (Family Functional Group)	4.67
16 Tanypodinae Mean Abundance (Family Functional Group)	12.39
17 Chironomini Abundance (Family Functional Group)	16.41
18 Relative Abundance Ephemeroptera	0.38
19 EPT Generic Richness	27.00
21 Sum of Abundances: *Dicrotendipes, Micropsectra, Parachironomus, Helobdella*	0.33
23 Relative Generic Richness- Plecoptera	0.07
25 Sum of Abundances: *Cheumatopsyche, Cricotopus, Tanytarsus, Ablabesmyia*	30.05
26 Sum of Abundances: *Acroneuria, Maccaffertium, Stenonema*	99.00
28 EP Generic Richness/14	1.14
30 Presence of Class A Indicator Taxa/7	0.57

Five Most Dominant Taxa

Rank	Taxon Name	Percent
1	*Chimarra*	20.37
2	*Maccaffertium*	15.21
3	*Hydropsyche*	15.16
4	*Acerpenna*	13.26
5	*Paraleptophlebia*	4.00

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

Station Number: S-1186 Town: Rumford Date Deployed: 7/30/2020

Log Number: 2853 Waterbody: Androscoggin River - Station 1186 Date Retrieved: 8/27/2020

Sample Collection and Processing Information

Sampling Organization: NORMANDEAU ASSOCIATES Taxonomist: NORMANDEAU ASSOCIATES

Waterbody Information - Deployment			Waterbody Information - Retrieval		
Temperature:	25.3	deg C	Temperature:	21.3	deg C
Dissolved Oxygen:	7.95	mg/l	Dissolved Oxygen:	9.05	mg/l
Dissolved Oxygen Saturation:	96.8	%	Dissolved Oxygen Saturation:	102.1	%
Specific Conductance:	38	uS/cm	Specific Conductance:	37	uS/cm
Velocity:	11.28	cm/s	Velocity:	11.13	cm/s
pH:	6.6		pH:	6.7	
Wetted Width:	28.8	m	Wetted Width:	29.1	m
Bankfull Width:	61.9	m	Bankfull Width:	60.9	m
Depth:	99	cm	Depth:	97	cm

Water Chemistry

Summary of Habitat Characteristics

Landuse Name	Canopy Cover	Terrain
Upland Hardwood	Open	Hilly
Urban		

Potential Stressor	Location
Regulated Flows	Below Dam
Thermal	Below Road Crossing
Urban Runoff	

Substrate	
Bedrock	0 %
Boulder	95 %
Clay	0 %
Detritus	0 %
Gravel	0 %
Muck	0 %
Rubble/Cobble	5 %
Sand	0 %
Silt	0 %

Landcover Summary - 2004 Data

Sample Comments

Maine Department of Environmental Protection
Biological Monitoring Program

Aquatic Life Taxonomic Inventory Report

Station Number: S-1186 Waterbody: Androscoggin River - Station 1186 Town: Rumford

Log Number: 2853 Subsample Factor: X1 Replicates: 3 Calculated: 11/23/2020

Taxon	Maine Taxonomic Code	Count (Mean of Samplers)		Hilsenhoff Biotic Index	Functional Feeding Group	Relative Abundance %	
		Actual	Adjusted			Actual	Adjusted
Dugesiidae	03010102	17.67	17.67		--	2.8	2.8
Nais	08020202009		0.33		CG		0.1
Nais communis	08020202009005	0.33			--	0.1	
Isoperla	09020207026	2.67	2.67	2	PR	0.4	0.4
Acroneuria	09020209042	2.67	2.67	0	PR	0.4	0.4
Paragnetina	09020209049		1.00	1	PR		0.2
Paragnetina immarginata	09020209049149	0.67			--	0.1	
Paragnetina media	09020209049151	0.33			--	0.1	
Agnetina	09020209050	0.67	1.00	2	PR	0.1	0.2
Agnetina capitata	09020209050152	0.33		2	PR	0.1	
Hagenius	09020302008		0.67	1	PR		0.1
Hagenius brevistylus	09020302008015	0.67			PR	0.1	
Libellulidae	09020306	0.33	0.33		--	0.1	0.1
Baetis	09020401001	3.00	3.00	4	CG	0.5	0.5
Acerpenna	09020401007		84.00	5	CG		13.3
Acerpenna pygmaea	09020401007011	84.00			--	13.3	
Plauditus	09020401012	4.33	4.33		CG	0.7	0.7
Leucrocuta	09020402011	14.67	14.67	1	SC	2.3	2.3
Stenacron	09020402014	1.33	1.33	7	SC	0.2	0.2
Maccaffertium	09020402015		96.33	4	SC		15.2
Maccaffertium modestum	09020402015051	96.33			--	15.2	
Isonychia	09020404018	5.67	5.67	2	CF	0.9	0.9
Paraleptophlebia	09020406026	25.33	25.33	1	CG	4.0	4.0
Ephemerella	09020410035	5.67	5.67	1	CG	0.9	0.9
Serratella	09020410037	0.67	0.67	2	CG	0.1	0.1
Tricorythodes	09020411038	1.00	1.00	4	CG	0.2	0.2
Caenis	09020412040	1.00	1.00	7	CG	0.2	0.2
Chimarra	09020601003	129.00	129.00	2	CF	20.4	20.4
Polycentropus	09020603010	10.67	10.67	6	PR	1.7	1.7
Cheumatopsyche	09020604015	20.00	20.00	5	CF	3.2	3.2
Hydropsyche	09020604016	72.67	96.00	4	CF	11.5	15.2
Hydropsyche morosa	09020604016030	10.67			--	1.7	
Hydropsyche phalerata	09020604016047	12.67			--	2.0	
Macrostemum	09020604018		2.67	3	CF		0.4
Macrostemum zebratum	09020604018054	2.67			--	0.4	
Rhyacophila	09020605019	0.33	0.33	2	PR	0.1	0.1
Hydroptila	09020607026	0.33	0.33	6	P	0.1	0.1
Mayatrichia	09020607033	0.33	0.33		SC	0.1	0.1
Psilotreta	09020614068	0.33	0.33	0	SC	0.1	0.1
Leptoceridae	09020618	8.00			--	1.3	

Station Number: S-1186 Waterbody: Androscoggin River - Station 1186 Town: Rumford

Log Number: 2853 Subsample Factor: X1 Replicates: 3 Calculated: 11/23/2020

Taxon	Maine Taxonomic Code	Count (Mean of Samplers) Actual	Count (Mean of Samplers) Adjusted	Hilsenhoff Biotic Index	Functional Feeding Group	Relative Abundance % Actual	Relative Abundance % Adjusted
Ceraclea	09020618072	2.00	4.82	3	CG	0.3	0.8
Oecetis	09020618078	3.67	8.84	8	PR	0.6	1.4
Corydalus	09020701002		0.33	6	PR		0.1
Corydalus cornutus	09020701002002	0.33			--	0.1	
Chironomidae	09021011	0.33			--	0.1	
Ablabesmyia	09021011001		3.01	8	PR		0.5
Ablabesmyia mallochi	09021011001004	3.00			--	0.5	
Labrundinia	09021011008	0.67	0.67	7	PR	0.1	0.1
Nilotanypus	09021011012		2.34	6	PR		0.4
Nilotanypus fimbriatus	09021011012027	2.33			--	0.4	
Pentaneura	09021011014		3.68	6	PR		0.6
Pentaneura inconspicua	09021011014028	3.67			--	0.6	
Thienemannimyia	09021011020		2.68	3	PR		0.4
Thienemannimyia group	09021011020041	2.67			--	0.4	
Diamesa	09021011024	1.33	1.34	5	CG	0.2	0.2
Corynoneura	09021011036	0.33	0.33	7	CG	0.1	0.1
Cricotopus	09021011037	5.33	5.36	7	SH	0.8	0.8
Eukiefferiella	09021011041	0.67	0.67	8	CG	0.1	0.1
Orthocladius	09021011050	3.33	3.35	6	CG	0.5	0.5
Rheocricotopus	09021011057		5.36	6	CG		0.8
Rheocricotopus robacki	09021011057105	5.33			--	0.8	
Synorthocladius	09021011061	0.33	0.33	2	CG	0.1	0.1
Tvetenia	09021011065		4.02	5	CG		0.6
Tvetenia vitracies	09021011065113	4.00			--	0.6	
Rheotanytarsus	09021011072	0.33	17.75	6	CF	0.1	2.8
Rheotanytarsus exiguus group	09021011072127	9.33			CF	1.5	
Rheotanytarsus pellucidus	09021011072128	8.00			CF	1.3	
Tanytarsus	09021011076	1.67	1.67	6	CF	0.3	0.3
Dicrotendipes	09021011085	0.33	0.33	8	CG	0.1	0.1
Microtendipes	09021011094		2.34	6	CF		0.4
Microtendipes pedellus group	09021011094166	2.33			--	0.4	
Polypedilum	09021011102		13.73	6	SH		2.2
Polypedilum aviceps	09021011102181	0.33			--	0.1	
Polypedilum flavum	09021011102182	12.67			--	2.0	
Polypedilum illinoense group	09021011102185	0.33			--	0.1	
Polypedilum ontario	09021011102194	0.33			--	0.1	
Helopelopia	09021011114	0.33	0.33	6	PR	0.1	0.1
Simulium	09021012047	8.33	8.33	4	CF	1.3	1.3
Atherix	09021015055		0.33	2	PR		0.1
Atherix lantha	09021015055089	0.33			--	0.1	

Maine Department of Environmental Protection
Biological Monitoring Program

Aquatic Life Taxonomic Inventory Report

Station Number: S-1186 Waterbody: Androscoggin River - Station 1186 Town: Rumford

Log Number: 2853 Subsample Factor: X1 Replicates: 3 Calculated: 11/23/2020

Taxon	Maine Taxonomic Code	Count (Mean of Samplers)		Hilsenhoff Biotic Index	Functional Feeding Group	Relative Abundance %	
		Actual	Adjusted			Actual	Adjusted
Hemerodromia	09021016057	0.33	0.33	3	PR	0.1	0.1
Dineutus	09021104032	1.33	1.33	2	--	0.2	0.2
Stenelmis	09021113070		9.00	5	SC		1.4
Stenelmis humerosa	09021113070056	9.00			--	1.4	
Sperchon	09030107001	1.33	1.33		--	0.2	0.2
Amnicola	10010104013	0.33	0.33		SC	0.1	0.1

Attachment 3

Laboratory Analytical Reports

Katahdin
ANALYTICAL SERVICES

NH ELAP Lab ID 2001 (DW, NPW, SCM)
NYSDOH ELAP Lab ID 11121 (AE - T015)

July 2, 2020

Mr. Michael Polchlopek
Normandeau Assoc., Inc.
25 Nashua Rd
Bedford,NH 03110

RE: Katahdin Lab Number: SN4805
Project ID: Maine Hydroelectric
Project Manager: Ms. Sara Colby
Sample Receipt Date(s): June 16, 2020

Dear Mr. Polchlopek:

Please find enclosed the following information:

* Report of Analysis (Analytical and/or Field)
* Laboratory results from subcontracted analysis (es)
* Quality Control Data Summary
* Chain of Custody (COC)
* Login Report

A copy of the Chain of Custody is included in the paginated report. If requested, the original COC is attached as an addendum to this report.

Should you have any questions or comments concerning this Report of Analysis, please do not hesitate to contact the project manager listed above. The results contained in this report relate only to the submitted samples. This cover letter is an integral part of the ROA.

We certify that the test results provided in this report meet all the requirements of the NELAC standards unless otherwise noted in an attached technical narrative or in the Report of Analysis.

We appreciate your continued use of our laboratory and look forward to working with you in the future. The following signature indicates technical review and acceptance of the data.

Please go to http://www.katahdinlab.com/cert for copies of Katahdin Analytical Services Inc. current certificates and analyte lists.

Sincerely,
KATAHDIN ANALYTICAL SERVICES

Leslie Dimond

Leslie Dimond - Quality Assurance Officer

07/02/2020

Date

KATAHDIN ANALYTICAL SERVICES – INORGANIC DATA QUALIFIERS

The sampled date indicated on the attached Report(s) of Analysis (ROA) is the date for which a grab sample was collected or the date for which a composite sample was completed. Beginning and start times for composite samples can be found on the Chain-of-Custody.

U Indicates the compound was analyzed for but not detected above the specified level. This level may be the Practical Quantitation Level (PQL) (also called Limit of Quantitation (LOQ)), the Limit of Detection (LOD) or Method Detection Limit (MDL) as required by the client.

Note: All results reported as "U" MDL have a 50% rate for false negatives compared to those results reported as "U" PQL "U" LOQ or "U" LOD, where the rate of false negatives is <1%.

E Estimated value. This flag identifies compounds whose concentrations exceed the upper level of the calibration range of the instrument for that specific analysis.

J Estimated value. The analyte was detected in the sample at a concentration less than the laboratory Practical Quantitation Level (PQL) (also called Limit of Quantitation (LOQ)), but above the Method Detection Limit (MDL).

I-7 The laboratory's Practical Quantitation Level (PQL) or LOQ could not be achieved for this parameter due to sample composition, matrix effects, sample volume, or quantity used for analysis.

A-4 Please refer to cover letter or narrative for further information.

H_ Please note that the regulatory holding time for _____ is "analyze immediately". Ideally, this analysis must be performed in the field at the time of sample collection. _____ for this sample was not performed at the time of sample collection. The analysis was performed as soon as possible after receipt by the laboratory.

H1 - pH H2 - DO H3 - sulfite H4 - residual chlorine

T1 The client did not provide the full volume of at least one liter for analysis of TSS. Therefore, the PQL of 2.5 mg/L could not be achieved.

T2 The client provided the required volume of at least one liter for analysis of TSS, but the laboratory could not filter the full one liter volume due to the sample matrix. Therefore, the PQL of 2.5 mg/L could not be achieved.

M1 The matrix spike and/or matrix spike duplicate recovery performed on this sample was outside of the laboratory acceptance criteria. Sample matrix is suspected. The laboratory criteria was met for the Laboratory Control Sample (LCS) analyzed concurrently with this sample.

M2 The matrix spike and/or matrix spike duplicate recovery was outside of the laboratory acceptance criteria. The native sample concentration is greater than four times the spike added concentration so the spike added could not be distinguished from the native sample concentration.

R1 The relative percent difference (RPD) between the duplicate analyses performed on this sample was outside of the laboratory acceptance criteria (when both values are greater than ten times the PQL).

MCL	Maximum Contaminant Level	NL	No limit
NFL	No Free Liquid Present	FLP	Free Liquid Present
NOD	No Odor Detected	TON	Threshold Odor Number

D-1 As required by Method 5210B, APHA Standard Methods for the Examination of Water and Wastewater (21st edition), the BOD value reported for this sample is 'qualified' because the check standard run concurrently with the sample analysis did not meet the criteria specified in the method (198 +/- 30.5 mg/L). These results may not be reportable for compliance purposes.

D-2 The measured final dissolved oxygen concentrations of all dilutions were less than the method-specified limit of 1 mg/L. The reported BOD result was calculated assuming a final oxygen concentration equal to 1 mg/L. The reported value should be considered a minimum value.

D-3 The dilution water used to prepare this sample did not meet the method and/or regulatory criteria of less than 0.2 or 0.4 mg/L dissolved oxygen (DO) uptake over the five day period of incubation. These results may not be reportable for compliance purposes.

Report of Analytical Results

Client: Michael Polchlopek
Normandeau Assoc., Inc.
25 Nashua Rd
Bedford,NH 03110

Lab Sample ID: SN4805-1
Report Date: 01-JUL-20
Project: Maine Hydroelectric
SDG: SN4805

Sample Description	Matrix	Date Sampled	Date Received
RUMFORD UPPER IMPOUNDMENT	AQ	16-JUN-20 10:20:00	16-JUN-20

Parameter	Result	Adj PQL	Adj MDL	Anal. Method	QC Batch	Analysis Date	Prep. Method	Prep. Date	Analyst	Footnotes	RPD/RSD
Alkalinity	9.2 mg/L	5.0	0.23	STDM 2320B	WG280789	25-JUN-20 09:40:14	N/A	N/A	ZL/ES		
Apparent Color	30. PTCO	5.0	5.0	SM2120B	WG280112	17-JUN-20 10:53:00	N/A	N/A	ZF		
Phosphorus, Total As P	U0.10 mg/L	0.10	.0461	EPA 365.4	WG280548	23-JUN-20 11:13:42	EPA 365.4	19-JUN-20	SS/ZF		
pH(Laboratory)	7.5 pH	0.10	0.10	SM 4500H-B	WG280526	19-JUN-20 12:23:50	N/A	N/A	JF/ZL	H1	

Katahdin
ANALYTICAL SERVICES

Report of Analytical Results

Client: Michael Polchlopek
Normandeau Assoc., Inc.
25 Nashua Rd
Bedford,NH 03110

Lab Sample ID: SN4805-2
Report Date: 01-JUL-20
Project: Maine Hydroelectric
SDG: SN4805

Sample Description	Matrix	Date Sampled	Date Received
RUMFORD MIDDLE IMPOUNDMENT	AQ	16-JUN-20 13:20:00	16-JUN-20

Parameter	Result	Adj PQL	Adj MDL	Anal. Method	QC Batch	Analysis Date	Prep. Method	Prep. Date	Analyst	Footnotes	RPD/RSD
Alkalinity	9.0 mg/L	5.0	0.23	STDM 2320B	WG280789	25-JUN-20 09:42:29	N/A	N/A	ZL/ES		
Apparent Color	25. PTCO	5.0	5.0	SM2120B	WG280112	17-JUN-20 10:53:00	N/A	N/A	ZF		
Phosphorus, Total As P	U0.10 mg/L	0.10	.0461	EPA 365.4	WG280548	23-JUN-20 11:19:14	EPA 365.4	19-JUN-20	SS/ZF		
pH(Laboratory)	7.3 pH	0.10	0.10	SM 4500H-B	WG280526	19-JUN-20 12:28:17	N/A	N/A	JF/ZL	H1	

Quality Control Report

Blank Sample Summary Report

Alkalinity

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL
MBLANK	WG280789	SM2320B	25-JUN-20	N/A	U 5.0 mg/L	5.0 mg/L

Apparent Color

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL
MBLANK	WG280112	SM2120B	17-JUN-20	N/A	U 5.0 PTCO	5.0 PTCO

Phosphorus, Total As P

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL
MBLANK	WG280548	EPA 365.4	23-JUN-20	19-JUN-20	U 0.10 mg/L	0.10 mg/L

Quality Control Report

Laboratory Control Sample Summary Report

Alkalinity

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG280789-9	LCS	WG280789	25-JUN-20	N/A	mg/L	120	130	109	80-120	
WG280789-14	LCSD	WG280789	25-JUN-20	N/A	mg/L	120	130	109	80-120	1

Apparent Color

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG280112-2	LCS	WG280112	17-JUN-20	N/A	PTCO	50	50.	100	80-120	

Phosphorus, Total As P

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG280548-2	LCS	WG280548	23-JUN-20	19-JUN-20	mg/L	.5	0.46	91	80-120	

pH(Laboratory)

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG280526-1	LCS	WG280526	19-JUN-20	N/A	pH	7	7.0	100	90-110	

7/2/2020

Ms. Sara Colby
Katahdin Analytical Services
P.O. Box 540
Scarborough, ME 04074

Dear Sara

Please find enclosed the results of your sample analysis. Below you will find any comments related to your sample results. We appreciate the opportunity to provide you with our analytical services. Please do not hesitate to contact our office if you have any questions or comments regarding these results.

Sincerely,
ClearWater Laboratory

Marc H. Hein (signature)

Marc H. Hein
Laboratory Manager

Enclosure

2020-06-287.2	Chlorophyll sample was extracted on 06/22/20 and analyzed on 06/23/20.
2020-06-287.1	Chlorophyll sample was extracted on 06/22/20 and analyzed on 06/23/20.

153 Main Street • Newport, ME 04953 • Phone: 207.368.5700 • Fax: 207.368.5120 • E-mail: MHein@ClearWaterLab.com

ClearWater Laboratory
The Premier Water Testing Lab in Maine

Client: Katahdin Analytical Services
Ms. Sara Colby
P.O. Box 540
Scarborough, ME 04074

** REVISED **
7/2/2020

Report Date: 07/02/2020

REPORT OF LABORATORY ANALYSIS

Sample Description	Result	Units	Reporting Limit	Method	Date / Time Sampled	Date / Time Analyzed
Chlorophyll-A (Corrected)	**2.4**	ug/L	1.0	EPA 445	06/16/20	06/23/20
2020-06-287.1 Rumford Upper Impoundment - Grab					1020	1120
					Lab: CWL	Analyst: nj
* Comments: Chlorophyll sample filtered and frozen upon arrival at lab - see cover page for extraction info.						
Chlorophyll-A (Corrected)	**2.4**	ug/L	1.0	EPA 445	06/16/20	06/23/20
2020-06-287.2 Rumford Middle Impoundment - Grab					1320	1120
					Lab: CWL	Analyst: nj
* Comments: Chlorophyll sample filtered and frozen upon arrival at lab - see cover page for extraction info.						

Clearwater

Katahdin
ANALYTICAL SERVICES

Sub-contract Laboratory Chain of Custody

Client:	Contact:	Email:	Phone #:
Katahdin Analytical Services	SJC	scolby@katahdinlab.com	(207) 874-2400
Address:	**City:**	**State:** / **Zip:**	**Project Name:**
600 Technology Way	Scarborough	Maine / 04074	
KAS WO #:	**Quote #:**	**Purchase Order #:**	**TAT:**
SN4805			**Verbal TAT:**
RPT Level:	**Reporting Format:**	**EDD:**	

	Sample ID:	Collect Date and Time:	Matrix:	No. of Containers	Pres.	MS/MSD Dup.	Analysis: Chlorophyll a Filtered? Y / N	Analysis: Filtered? Y / N	Analysis: Filtered? Y / N
01	RUMFORD UPPER IMPOUNDMENT	16-JUN-20 10:20	AQ	1			X		
02	RUMFORD MIDDLE IMPOUNDMEN	16-JUN-20 13:20	AQ	1			X		

Reqlinquished By:	Date/Time:	Received By:
	6/17/20 0730	Dune Cust 6/17/2020 1220

Comments:

w/ice @ 5.5°C

Reid

2020-06-287

Katahdin Analytical Services, LLC. — Sample Receipt Condition Report

Client:	Normandeau Assoc.	KAS PM:	SR	Sampled By:	Client
Project:		KIMS Entry By:	JCB	Delivered By:	Client
KAS Work Order#:	SN4805	KIMS Review By:	SR	Received By:	JCB
SDG #:		Cooler:	1 of 1	Date/Time Rec.:	6/16/20 1550

Receipt Criteria	Y	N	EX*	NA	Comments and/or Resolution
1. Custody seals present / intact?		✓			
2. Chain of Custody present in cooler?	✓				
3. Chain of Custody signed by client?	✓				
4. Chain of Custody matches samples?	✓				
5. Temperature Blanks present? If not, take temperature of any sample w/ IR gun.		✓			Temp (°C): 2.5 — Thermometer ID: IR-1
Samples received at <6 °C w/o freezing?	✓				Note: Not required for metals (except Hg soil) analysis.
Ice packs or ice present?	✓				The lack of ice or ice packs (i.e. no attempt to begin cooling process) or insufficient ice may not meet certain regulatory requirements and may invalidate certain data.
If yes, was there sufficient ice to meet temperature requirements?	✓				
If temp. out, has the cooling process begun (i.e. ice or packs present) and sample collection times <6hrs., but samples are not yet cool?				✓	Note: No cooling process required for metals (except Hg soil) analysis.
6. Volatiles:					
Aqueous: No bubble larger than a pea?				✓	
Soil/Sediment:					
Received in airtight container?				✓	
Received in methanol?				✓	
Methanol covering soil?				✓	
D.I. Water - Received within 48 hour HT?				✓	
Air: Refer to KAS COC for canister/flow controller requirements.	√ if air included				
7. Trip Blank present in cooler?				✓	
8. Proper sample containers and volume?	✓				
9. Samples within hold time upon receipt?	✓				
10. Aqueous samples properly preserved? Metals, COD, NH3, TKN, O/G, phenol, TPO4, N+N, TOC, DRO, TPH – pH <2	✓				
Sulfide - >9				✓	
Cyanide – pH >12				✓	
11. Bottleware Prepped on:					

* Log-In Notes to Exceptions: document any problems with samples or discrepancies or pH adjustments.

Katahdin ANALYTICAL SERVICES

600 Technology Way
Scarborough, ME 04074
Tel: (207) 874-2400
Fax: (207) 775-4029

CHAIN of CUSTODY

PLEASE BEAR DOWN AND PRINT LEGIBLY IN PEN

Page 1 of 1

Client	Contact	Phone #	Fax #
Normandeau Associates	Mike Polchlopek	(978) 895-5359	( )

Address	City	State	Zip Code
25 Nashua Rd.	Bedford	NH	03110

Purchase Order # 24411.000 T2 Proj. Name / No. Katahdin Quote # 10179gd1

Bill (if different than above) Address

Sampler (Print / Sign) Michael Polchlopek / Michael Polchlopek II Copies To:

LAB USE ONLY WORK ORDER #: SN4805

KATAHDIN PROJECT NUMBER

REMARKS:

SHIPPING INFO: ☐ FED EX ☐ UPS ☐ CLIENT

AIRBILL NO:

TEMP°C ☐ TEMP BLANK ☐ INTACT ☐ NOT INTACT

ANALYSIS AND CONTAINER TYPE PRESERVATIVES

★	Sample Description	Date / Time coll'd	Matrix	No. of Cntrs.	Filt. Y N Chlorophyll a 1L Amber Foil	Filt. Y N Total Phosphorus 250mL - H_2SO_4	Filt. Y N Color, Alkalinity, pH 250 mL	Filt. Y N	Filt. Y N	Filt. Y N	Filt. Y N	Filt. Y N	Filt. Y N	Filt. Y N
1	Rumford Upper Impoundment	6/16/20/ 10:20		1	X									
2	Rumford Upper Impoundment	6/16/20/ 10:20		1		X								
3	Rumford Upper Impoundment	6/16/20/ 10:20		1			X							
4	Rumford Middle Impoundment	6/16/20/ 13:20		1	X									
5	Rumford Middle Impoundment	6/16/20/ 13:20		1		X								
6	Rumford Middle Impoundment	6/16/20/ 13:20		1			X							
		/												
		/												
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		/												
		/												

COMMENTS

Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)
Michael Polchlopek	6/16/20 1550				
Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)

Login Number: SN4805

Account: NORMAN001
Normandeau Corp.

Project:

NoWeb

Primary Report Address:
Michael Polchlopek
Normandeau Assoc., Inc.
25 Nashua Rd

Bedford,NH 03110
mpolchlopek@normandeau.com

Primary Invoice Address:
Accounts Payable
Normandeau Assoc., Inc.
550 Forest Avenue
Ste 201
Portland,ME 04101

Report CC Addresses:

Invoice CC Addresses:

Quote/Incoming:

Login Information:

ANALYSIS INSTRUCTIONS	:	
CHECK NO.	:	
CLIENT PO#	:	24411.000
CLIENT PROJECT MANAGE	:	
CONTRACT	:	
COOLER TEMPERATURE	:	2.5
DELIVERY SERVICES	:	Client
EDD FORMAT	:	KAS064QC-XLS
LOGIN INITIALS	:	JCB
PM	:	SJC
PROJECT NAME	:	Maine Hydroelectric
QC LEVEL	:	II
REPORT INSTRUCTIONS	:	report and EDD to mpolchlopek@normandeau.com. Invoice to abogart@normandeau.com
SDG ID	:	
SDG STATUS	:	
VERBAL TAT	:	

Login Number: SN4805

Quote/Incoming:

Account: NORMAN001 NoWeb

Normandeau Corp.

Project:

Laboratory Sample ID	Client Sample Number	Collect Date/Time	Receive Date	PR	Verbal Date	Due Date	Mailed
SN4805-1	RUMFORD UPPER IMPOUNDMENT	16-JUN-20 10:20	16-JUN-20			28-JUN-20	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Aqueous	S	E365.4-TOTAL-PHOS	14-JUL-20	125mL Plastic+H2SO4		
Aqueous	S	SM10200-CHLOROPH-SUB	17-JUN-20	1000mL Plastic		
Aqueous	S	SM2120-APP-COLOR	18-JUN-20	125mL Plastic		
Aqueous	S	SM2320B-ALKALINITY	30-JUN-20			
Aqueous	S	SM4500HB-PH	17-JUN-20	125mL Plastic		

Laboratory Sample ID	Client Sample Number	Collect Date/Time	Receive Date	PR	Verbal Date	Due Date	Mailed
SN4805-2	RUMFORD MIDDLE IMPOUNDMENT	16-JUN-20 13:20	16-JUN-20			28-JUN-20	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Aqueous	S	E365.4-TOTAL-PHOS	14-JUL-20	125mL Plastic+H2SO4		
Aqueous	S	SM10200-CHLOROPH-SUB	17-JUN-20	1000mL Plastic		
Aqueous	S	SM2120-APP-COLOR	18-JUN-20	125mL Plastic		
Aqueous	S	SM2320B-ALKALINITY	30-JUN-20			
Aqueous	S	SM4500HB-PH	17-JUN-20	125mL Plastic		

Total Samples: 2 ***Total Analyses: 10***

Katahdin
ANALYTICAL SERVICES

NH ELAP Lab ID 2001 (DW, NPW, SCM)
NYSDOH ELAP Lab ID 11121 (AE - T015)

July 14, 2020

Mr. Michael Polchlopek
Normandeau Assoc., Inc.
25 Nashua Rd
Bedford,NH 03110

RE: Katahdin Lab Number: SN5232
Project ID: Maine Hydroelectric
Project Manager: Ms. Sara Colby
Sample Receipt Date(s): June 29, 2020

Dear Mr. Polchlopek:

Please find enclosed the following information:

* Report of Analysis (Analytical and/or Field)
* Laboratory results from subcontracted analysis (es)
* Quality Control Data Summary
* Chain of Custody (COC)
* Login Report

A copy of the Chain of Custody is included in the paginated report. If requested, the original COC is attached as an addendum to this report.

Should you have any questions or comments concerning this Report of Analysis, please do not hesitate to contact the project manager listed above. The results contained in this report relate only to the submitted samples. This cover letter is an integral part of the ROA.

We certify that the test results provided in this report meet all the requirements of the NELAC standards unless otherwise noted in an attached technical narrative or in the Report of Analysis.

We appreciate your continued use of our laboratory and look forward to working with you in the future. The following signature indicates technical review and acceptance of the data.

Please go to http://www.katahdinlab.com/cert for copies of Katahdin Analytical Services Inc. current certificates and analyte lists.

Sincerely,
KATAHDIN ANALYTICAL SERVICES

Leslie Dimond

Leslie Dimond - Quality Assurance Officer

07/14/2020

Date

KATAHDIN ANALYTICAL SERVICES – INORGANIC DATA QUALIFIERS

The sampled date indicated on the attached Report(s) of Analysis (ROA) is the date for which a grab sample was collected or the date for which a composite sample was completed. Beginning and start times for composite samples can be found on the Chain-of-Custody.

U Indicates the compound was analyzed for but not detected above the specified level. This level may be the Practical Quantitation Level (PQL) (also called Limit of Quantitation (LOQ)), the Limit of Detection (LOD) or Method Detection Limit (MDL) as required by the client.

Note: All results reported as "U" MDL have a 50% rate for false negatives compared to those results reported as "U" PQL "U" LOQ or "U" LOD, where the rate of false negatives is <1%.

E Estimated value. This flag identifies compounds whose concentrations exceed the upper level of the calibration range of the instrument for that specific analysis.

J Estimated value. The analyte was detected in the sample at a concentration less than the laboratory Practical Quantitation Level (PQL) (also called Limit of Quantitation (LOQ)), but above the Method Detection Limit (MDL).

I-7 The laboratory's Practical Quantitation Level (PQL) or LOQ could not be achieved for this parameter due to sample composition, matrix effects, sample volume, or quantity used for analysis.

A-4 Please refer to cover letter or narrative for further information.

H_ Please note that the regulatory holding time for _____ is "analyze immediately". Ideally, this analysis must be performed in the field at the time of sample collection. _____ for this sample was not performed at the time of sample collection. The analysis was performed as soon as possible after receipt by the laboratory.

H1 - pH H2 - DO H3 - sulfite H4 - residual chlorine

T1 The client did not provide the full volume of at least one liter for analysis of TSS. Therefore, the PQL of 2.5 mg/L could not be achieved.

T2 The client provided the required volume of at least one liter for analysis of TSS, but the laboratory could not filter the full one liter volume due to the sample matrix. Therefore, the PQL of 2.5 mg/L could not be achieved.

M1 The matrix spike and/or matrix spike duplicate recovery performed on this sample was outside of the laboratory acceptance criteria. Sample matrix is suspected. The laboratory criteria was met for the Laboratory Control Sample (LCS) analyzed concurrently with this sample.

M2 The matrix spike and/or matrix spike duplicate recovery was outside of the laboratory acceptance criteria. The native sample concentration is greater than four times the spike added concentration so the spike added could not be distinguished from the native sample concentration.

R1 The relative percent difference (RPD) between the duplicate analyses performed on this sample was outside of the laboratory acceptance criteria (when both values are greater than ten times the PQL).

MCL	Maximum Contaminant Level	NL	No limit
NFL	No Free Liquid Present	FLP	Free Liquid Present
NOD	No Odor Detected	TON	Threshold Odor Number

D-1 As required by Method 5210B, APHA Standard Methods for the Examination of Water and Wastewater (21st edition), the BOD value reported for this sample is 'qualified' because the check standard run concurrently with the sample analysis did not meet the criteria specified in the method (198 +/- 30.5 mg/L). These results may not be reportable for compliance purposes.

D-2 The measured final dissolved oxygen concentrations of all dilutions were less than the method-specified limit of 1 mg/L. The reported BOD result was calculated assuming a final oxygen concentration equal to 1 mg/L. The reported value should be considered a minimum value.

D-3 The dilution water used to prepare this sample did not meet the method and/or regulatory criteria of less than 0.2 or 0.4 mg/L dissolved oxygen (DO) uptake over the five day period of incubation. These results may not be reportable for compliance purposes.

Report of Analytical Results

Client: Michael Polchlopek
Normandeau Assoc., Inc.
25 Nashua Rd
Bedford,NH 03110

Lab Sample ID: SN5232-1
Report Date: 07-JUL-20
Project: Maine Hydroelectric
SDG: SN5232

Sample Description	Matrix	Date Sampled	Date Received
RUMFORD MIDDLE IMPOUNDMENT	AQ	29-JUN-20 08:50:00	29-JUN-20

Parameter	Result	Adj PQL	Adj MDL	Anal. Method	QC Batch	Analysis Date	Prep. Method	Prep. Date	Analyst	Footnotes	RPD/RSD
Alkalinity	10. mg/L	5.0	0.23	STDM 2320B	WG281097	01-JUL-20 14:45:14	N/A	N/A	ES		
Apparent Color	25. PTCO	5.0	5.0	SM2120B	WG281013	30-JUN-20 16:56:00	N/A	N/A	ZF		
Phosphorus, Total As P	U0.10 mg/L	0.10	.0461	EPA 365.4	WG281316	06-JUL-20 11:42:34	EPA 365.4	02-JUN-20	SS/ZF		
pH(Laboratory)	6.2 pH	0.10	0.10	SM 4500H-B	WG280979	30-JUN-20 07:31:07	N/A	N/A	ES	H1	

Report of Analytical Results

Client: Michael Polchlopek
Normandeau Assoc., Inc.
25 Nashua Rd
Bedford,NH 03110

Lab Sample ID: SN5232-2
Report Date: 07-JUL-20
Project: Maine Hydroelectric
SDG: SN5232

Sample Description	Matrix	Date Sampled	Date Received
RUMFORD UPPER IMPOUNDMENT	AQ	29-JUN-20 11:32:00	29-JUN-20

Parameter	Result	Adj PQL	Adj MDL	Anal. Method	QC Batch	Analysis Date	Prep. Method	Prep. Date	Analyst	Footnotes	RPD/RSD
Alkalinity	10. mg/L	5.0	0.23	STDM 2320B	WG281097	01-JUL-20 14:47:27	N/A	N/A	ES		
Apparent Color	20. PTCO	5.0	5.0	SM2120B	WG281013	30-JUN-20 16:56:00	N/A	N/A	ZF		
Phosphorus, Total As P	U0.10 mg/L	0.10	.0461	EPA 365.4	WG281316	06-JUL-20 11:43:39	EPA 365.4	02-JUN-20	SS/ZF		
pH(Laboratory)	6.5 pH	0.10	0.10	SM 4500H-B	WG280979	30-JUN-20 07:40:01	N/A	N/A	ES	H1	

Quality Control Report

Blank Sample Summary Report

Alkalinity

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL
MBLANK	WG281097	SM2320B	01-JUL-20	N/A	U 5.0 mg/L	5.0 mg/L

Apparent Color

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL
MBLANK	WG281013	SM2120B	30-JUN-20	N/A	U 5.0 PTCO	5.0 PTCO

Phosphorus, Total As P

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL
MBLANK	WG281316	EPA 365.4	06-JUL-20	02-JUN-20	U 0.10 mg/L	0.10 mg/L

Quality Control Report

Laboratory Control Sample Summary Report

Alkalinity

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG281097-2	LCS	WG281097	01-JUL-20	N/A	mg/L	120	120	98	80-120	

Apparent Color

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG281013-2	LCS	WG281013	30-JUN-20	N/A	PTCO	50	50.	100	80-120	
WG281013-3	LCSD	WG281013	30-JUN-20	N/A	PTCO	50	50.	100	80-120	0

Phosphorus, Total As P

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG281316-2	LCS	WG281316	06-JUL-20	02-JUN-20	mg/L	.5	0.51	103	80-120	

pH(Laboratory)

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG280979-1	LCS	WG280979	30-JUN-20	N/A	pH	7	7.0	100	90-110	

Quality Control Report

Duplicate Sample Summary Report

pH(Laboratory)

Duplicate Sample ID	Original Sample ID	QC Batch	Analysis Date	Result Units	Sample Result	Duplicate Result	RPD(%)	RPD Limit
WG280979-2	SN5232-1	WG280979	30-JUN-20	pH	6.2	6.4	3	20

7/13/2020

Ms. Sara Colby
Katahdin Analytical Services
P.O. Box 540
Scarborough, ME 04074

Dear Sara

Please find enclosed the results of your sample analysis. Below you will find any comments related to your sample results. We appreciate the opportunity to provide you with our analytical services. Please do not hesitate to contact our office if you have any questions or comments regarding these results.

Sincerely,
ClearWater Laboratory

Marc H. Hein (signature)

Marc H. Hein
Laboratory Manager

Enclosure

2020-06-488.2	Chlorophyll sample was extracted on 07/12/20 and analyzed on 07/13/20.
2020-06-488.1	Chlorophyll sample was extracted on 07/12/20 and analyzed on 07/13/20.

153 Main Street • Newport, ME 04953 • Phone: 207.368.5700 • Fax: 207.368.5120 • E-mail: MHein@ClearWaterLab.com

ClearWater Laboratory
The Premier Water Testing Lab in Maine

Client: Katahdin Analytical Services
Ms. Sara Colby
P.O. Box 540
Scarborough, ME 04074

Report Date: 07/13/2020

REPORT OF LABORATORY ANALYSIS

Sample Description	Result	Units	Reporting Limit	Method	Date / Time Sampled	Date / Time Analyzed
Chlorophyll-A (Corrected)	**3.4**	ug/L	1.0	EPA 445	06/29/20 0850	07/13/20 0945
2020-06-488.1 Rumford Middle Impoundment - Grab					Lab: CWL	Analyst: nj

* Comments: Chlorophyll sample filtered and frozen upon arrival at lab - see cover page for extraction info.

Chlorophyll-A (Corrected)	**2.7**	ug/L	1.0	EPA 445	06/29/20 1132	07/13/20 0945
2020-06-488.2 Rumford Upper Impoundment - Grab					Lab: CWL	Analyst: nj

* Comments: Chlorophyll sample filtered and frozen upon arrival at lab - see cover page for extraction info.

Katahdin
ANALYTICAL SERVICES

Sub-contract Laboratory Chain of Custody

Client:	Contact:	Email:		Phone #:
Katahdin Analytical Services	SJC	scolby@katahdinlab.com		(207) 874-2400
Address:	**City:**	**State:**	**Zip:**	**Project Name:**
600 Technology Way	Scarborough	Maine	04074	
KAS WO #:	**Quote #:**	**Purchase Order #:**		**TAT:** Standard
SN5232				**Verbal TAT:**
RPT Level: II	**Reporting Format:** Standard	**EDD:** None		**Analysis:** chlorophyll A

Sample ID:	Collect Date and Time:	Matrix:	No. of Containers	Pres.	MS/MSD Dup.	Filtered? Y / N	Analysis: Filtered? Y / N	Analysis: Filtered? Y / N
01 RUMFORD MIDDLE IMPOUNDMEN	29-JUN-20 08:50	AQ	1	Ice	N	X		
02 RUMFORD UPPER IMPOUNDMENT	29-JUN-20 11:32	AQ	1	Ice	N	X		

Reqlinquished By:	Date/Time:	Received By:	
	6/30/20 930		6/30/20 10:30

Comments:

6/30/20 12:35

6/30/2020 1235

CWL Sample Number 2020-06-488
Temp Rec'd 3.4°C on Ice

Katahdin Analytical Services, LLC. — Sample Receipt Condition Report

Client: Normandeau	KAS PM: ~~GV~~ SJC	Sampled By: Client
Project:	KIMS Entry By: GV	Delivered By: Client
KAS Work Order#: SN5232	KIMS Review By: SR	Received By: G. Brewer
SDG #:	Cooler: 1 of 1	Date/Time Rec.: 06/29/26

Receipt Criteria	Y	N	EX*	NA	Comments and/or Resolution
1. Custody seals present / intact?		✓			
2. Chain of Custody present in cooler?	✓				
3. Chain of Custody signed by client?	✓				
4. Chain of Custody matches samples?	✓				
5. Temperature Blanks present? If not, take temperature of any sample w/ IR gun.	✓				Temp (°C): 1.9 — Thermometer ID: IR-1
Samples received at <6 °C w/o freezing?	✓				Note: Not required for metals (except Hg soil) analysis.
Ice packs or ice present?	✓				The lack of ice or ice packs (i.e. no attempt to begin cooling process) or insufficient ice may not meet certain regulatory requirements and may invalidate certain data.
If yes, was there sufficient ice to meet temperature requirements?	✓				
If temp. out, has the cooling process begun (i.e. ice or packs present) and sample collection times <6hrs., but samples are not yet cool?				✓	Note: No cooling process required for metals (except Hg soil) analysis.
6. Volatiles:				✓	
Aqueous: No bubble larger than a pea?				✓	
Soil/Sediment:				✓	
Received in airtight container?				✓	
Received in methanol?				✓	
Methanol covering soil?				✓	
D.I. Water - Received within 48 hour HT?				✓	
Air: Refer to KAS COC for canister/flow controller requirements.	√ if air included				
7. Trip Blank present in cooler?				✓	
8. Proper sample containers and volume?	✓				
9. Samples within hold time upon receipt?	✓				
10. Aqueous samples properly preserved? Metals, COD, NH3, TKN, O/G, phenol, TPO4, N+N, TOC, DRO, TPH – pH <2	✓				
Sulfide - >9				✓	
Cyanide – pH >12				✓	
11. Bottleware Prepped on:					

* Log-In Notes to Exceptions: document any problems with samples or discrepancies or pH adjustments.

Katahdin ANALYTICAL SERVICES

600 Technology Way
Scarborough, ME 04074
Tel: (207) 874-2400
Fax: (207) 775-4029

CHAIN of CUSTODY

PLEASE BEAR DOWN AND PRINT LEGIBLY IN PEN

Page 1 of 1

Client	Contact	Phone #	Fax #
Normandeau Associates	Mike Polchlopek	(978) 895-5359	( )

Address	City	State	Zip Code
25 Nashua Rd.	Bedford	NH	03110

Purchase Order #	Proj. Name / No.	Katahdin Quote #
24411.000 T2		10179qd1

Bill (if different than above) | Address

Sampler (Print / Sign) Tyler Parent

Copies To:

LAB USE ONLY

WORK ORDER #: SN5232

KATAHDIN PROJECT NUMBER

REMARKS:

SHIPPING INFO: ☐ FED EX ☐ UPS ☐ CLIENT

AIRBILL NO:

TEMP°C ☐ TEMP BLANK ☐ INTACT ☐ NOT INTACT

★	Sample Description	Date / Time coll'd	Matrix	No. of Cntrs.	ANALYSIS AND CONTAINER TYPE PRESERVATIVES: Filt. Y/N — Chlorophyll A	1 L Amber Foil	Total Phosphorus 250 mL - H_2SO_4	Nitrate, Alkalinity 250 mL
1	Rumford middle Impoundment	6/29/20 / 08:50			X			
2	Rumford middle Impoundment	6/29/20 / 08:50					X	
3	Rumford middle Impoundment	6/29/20 / 08:50						X
4	Rumford upper Impoundment	6/29/20 / 11:32			X			
5	Rumford upper Impoundment	6/29/20 / 11:30					X	
6	Rumford upper Impoundment	6/29/20 / 11:32						X
		/						
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		/						

COMMENTS

Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)
	6/29/20 14:40				
Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)

Katahdin
ANALYTICAL SERVICES

Katahdin Analytical Services

Login Chain of Custody Report (lno1)

Jun. 30, 2020
11:48 AM

Quote/Incoming:

Login Number: SN5232

Account: NORMAN001
Normandeau Corp.

NoWeb

Project:

Primary Report Address:
Michael Polchlopek
Normandeau Assoc., Inc.
25 Nashua Rd

Bedford,NH 03110
mpolchlopek@normandeau.com

Primary Invoice Address:
Accounts Payable
Normandeau Assoc., Inc.
550 Forest Avenue
Ste 201
Portland,ME 04101

Report CC Addresses:
Invoice CC Addresses:

Login Information:

ANALYSIS INSTRUCTIONS	:	Chlorophyll subbed to Clearwater
CHECK NO.	:	
CLIENT PO#	:	24411.000 T2
CLIENT PROJECT MANAGE	:	
CONTRACT	:	
COOLER TEMPERATURE	:	1.9
DELIVERY SERVICES	:	Client
EDD FORMAT	:	KAS064QC-XLS
LOGIN INITIALS	:	GN
PM	:	SJC
PROJECT NAME	:	Maine Hydroelectric
QC LEVEL	:	II+
REPORT INSTRUCTIONS	:	report and EDD to mpolchlopek@normandeau.com. Invoice to abogart@normandeau.com
SDG ID	:	
SDG STATUS	:	
VERBAL TAT	:	

Login Number: SN5232

Quote/Incoming:

Account: NORMAN001 NoWeb

Normandeau Corp.

Project:

Laboratory Sample ID	Client Sample Number	Collect Date/Time	Receive Date	PR	Verbal Date	Due Date	Mailed
SN5232-1	RUMFORD MIDDLE IMPOUNDMENT	29-JUN-20 08:50	29-JUN-20			11-JUL-20	

Matrix		*Product*	*Hold Date (shortest)*	*Bottle Type*	*Bottle Count*	*Comments*
Aqueous	S	COURIER-BILLING				
Aqueous	S	E365.4-TOTAL-PHOS	27-JUL-20	125mL Plastic+H2SO4		
Aqueous	S	SM10200-CHLOROPH-SUB	30-JUN-20	1000mL Plastic		
Aqueous	S	SM2120-APP-COLOR	01-JUL-20	125mL Plastic		
Aqueous	S	SM2320B-ALKALINITY	13-JUL-20			
Aqueous	S	SM4500HB-PH	30-JUN-20	125mL Plastic		

SN5232-2	RUMFORD UPPER IMPOUNDMENT	29-JUN-20 11:32	29-JUN-20			11-JUL-20	

Matrix		*Product*	*Hold Date (shortest)*	*Bottle Type*	*Bottle Count*	*Comments*
Aqueous	S	E365.4-TOTAL-PHOS	27-JUL-20	125mL Plastic+H2SO4		
Aqueous	S	SM10200-CHLOROPH-SUB	30-JUN-20	1000mL Plastic		
Aqueous	S	SM2120-APP-COLOR	01-JUL-20	125mL Plastic		
Aqueous	S	SM2320B-ALKALINITY	13-JUL-20			
Aqueous	S	SM4500HB-PH	30-JUN-20	125mL Plastic		

Total Samples: 2 ***Total Analyses: 11***

Katahdin
ANALYTICAL SERVICES

NH ELAP Lab ID 2001 (DW, NPW, SCM)
NYSDOH ELAP Lab ID 11121 (AE - T015)

August 14, 2020

Mr. Michael Polchlopek
Normandeau Assoc., Inc.
25 Nashua Rd
Bedford,NH 03110

RE: Katahdin Lab Number: SN6135
Project ID: Rumford
Project Manager: Ms. Sara Colby
Sample Receipt Date(s): July 23, 2020

Dear Mr. Polchlopek:

Please find enclosed the following information:

* Report of Analysis (Analytical and/or Field)
* Laboratory results from subcontracted analysis (es)
* Quality Control Data Summary
* Chain of Custody (COC)
* Login Report

A copy of the Chain of Custody is included in the paginated report. If requested, the original COC is attached as an addendum to this report.

Should you have any questions or comments concerning this Report of Analysis, please do not hesitate to contact the project manager listed above. The results contained in this report relate only to the submitted samples. This cover letter is an integral part of the ROA.

We certify that the test results provided in this report meet all the requirements of the NELAC standards unless otherwise noted in an attached technical narrative or in the Report of Analysis.

We appreciate your continued use of our laboratory and look forward to working with you in the future. The following signature indicates technical review and acceptance of the data.

Please go to http://www.katahdinlab.com/cert for copies of Katahdin Analytical Services Inc. current certificates and analyte lists.

Sincerely,
KATAHDIN ANALYTICAL SERVICES

Leslie Dimond

Leslie Dimond - Quality Assurance Officer

08/14/2020

Date

KATAHDIN ANALYTICAL SERVICES – INORGANIC DATA QUALIFIERS

The sampled date indicated on the attached Report(s) of Analysis (ROA) is the date for which a grab sample was collected or the date for which a composite sample was completed. Beginning and start times for composite samples can be found on the Chain-of-Custody.

U Indicates the compound was analyzed for but not detected above the specified level. This level may be the Practical Quantitation Level (PQL) (also called Limit of Quantitation (LOQ)), the Limit of Detection (LOD) or Method Detection Limit (MDL) as required by the client.

Note: All results reported as "U" MDL have a 50% rate for false negatives compared to those results reported as "U" PQL "U" LOQ or "U" LOD, where the rate of false negatives is <1%.

E Estimated value. This flag identifies compounds whose concentrations exceed the upper level of the calibration range of the instrument for that specific analysis.

J Estimated value. The analyte was detected in the sample at a concentration less than the laboratory Practical Quantitation Level (PQL) (also called Limit of Quantitation (LOQ)), but above the Method Detection Limit (MDL).

I-7 The laboratory's Practical Quantitation Level (PQL) or LOQ could not be achieved for this parameter due to sample composition, matrix effects, sample volume, or quantity used for analysis.

A-4 Please refer to cover letter or narrative for further information.

H_ Please note that the regulatory holding time for _____ is "analyze immediately". Ideally, this analysis must be performed in the field at the time of sample collection. _____ for this sample was not performed at the time of sample collection. The analysis was performed as soon as possible after receipt by the laboratory.

H1 - pH H2 - DO H3 - sulfite H4 - residual chlorine

T1 The client did not provide the full volume of at least one liter for analysis of TSS. Therefore, the PQL of 2.5 mg/L could not be achieved.

T2 The client provided the required volume of at least one liter for analysis of TSS, but the laboratory could not filter the full one liter volume due to the sample matrix. Therefore, the PQL of 2.5 mg/L could not be achieved.

M1 The matrix spike and/or matrix spike duplicate recovery performed on this sample was outside of the laboratory acceptance criteria. Sample matrix is suspected. The laboratory criteria was met for the Laboratory Control Sample (LCS) analyzed concurrently with this sample.

M2 The matrix spike and/or matrix spike duplicate recovery was outside of the laboratory acceptance criteria. The native sample concentration is greater than four times the spike added concentration so the spike added could not be distinguished from the native sample concentration.

R1 The relative percent difference (RPD) between the duplicate analyses performed on this sample was outside of the laboratory acceptance criteria (when both values are greater than ten times the PQL).

MCL	Maximum Contaminant Level	NL	No limit
NFL	No Free Liquid Present	FLP	Free Liquid Present
NOD	No Odor Detected	TON	Threshold Odor Number

D-1 As required by Method 5210B, APHA Standard Methods for the Examination of Water and Wastewater (21st edition), the BOD value reported for this sample is 'qualified' because the check standard run concurrently with the sample analysis did not meet the criteria specified in the method (198 +/- 30.5 mg/L). These results may not be reportable for compliance purposes.

D-2 The measured final dissolved oxygen concentrations of all dilutions were less than the method-specified limit of 1 mg/L. The reported BOD result was calculated assuming a final oxygen concentration equal to 1 mg/L. The reported value should be considered a minimum value.

D-3 The dilution water used to prepare this sample did not meet the method and/or regulatory criteria of less than 0.2 or 0.4 mg/L dissolved oxygen (DO) uptake over the five day period of incubation. These results may not be reportable for compliance purposes.

Katahdin
ANALYTICAL SERVICES

Report of Analytical Results

Client: Michael Polchlopek
Normandeau Assoc., Inc.
25 Nashua Rd
Bedford,NH 03110

Lab Sample ID: SN6135-1
Report Date: 05-AUG-20
Project: Rumford
SDG: SN6135

Sample Description	Matrix	Date Sampled	Date Received
RUMFORD MIDDLE IMPOUNDMENT	AQ	23-JUL-20 07:27:00	23-JUL-20

Parameter	Result	Adj PQL	Adj MDL	Anal. Method	QC Batch	Analysis Date	Prep. Method	Prep. Date	Analyst	Footnotes	RPD/RSD
Alkalinity	8.7 mg/L	5.0	0.23	STDM 2320B	WG283023	28-JUL-20 15:28:54	N/A	N/A	ZL		
Apparent Color	35. PTCO	5.0	5.0	SM2120B	WG282677	24-JUL-20 10:35:00	N/A	N/A	KD		
Phosphorus, Total As P	U0.10 mg/L	0.10	.0262	EPA 365.4	WG282997	28-JUL-20 12:37:27	EPA 365.4	27-JUL-20	SS		
pH(Laboratory)	6.4 pH	0.10	0.10	SM 4500H-B	WG282847	24-JUL-20 13:56:58	N/A	N/A	ZL	H1	

Katahdin
ANALYTICAL SERVICES

Report of Analytical Results

Client: Michael Polchlopek
Normandeau Assoc., Inc.
25 Nashua Rd
Bedford,NH 03110

Lab Sample ID: SN6135-2
Report Date: 05-AUG-20
Project: Rumford
SDG: SN6135

Sample Description	Matrix	Date Sampled	Date Received
RUMFORD UPPER IMPOUNDMENT	AQ	23-JUL-20 11:50:00	23-JUL-20

Parameter	Result	Adj PQL	Adj MDL	Anal. Method	QC Batch	Analysis Date	Prep. Method	Prep. Date	Analyst	Footnotes	RPD/RSD
Alkalinity	8.8 mg/L	5.0	0.23	STDM 2320B	WG283023	28-JUL-20 15:30:56	N/A	N/A	ZL		
Apparent Color	30. PTCO	5.0	5.0	SM2120B	WG282677	24-JUL-20 10:35:00	N/A	N/A	KD		
Phosphorus, Total As P	U0.10 mg/L	0.10	.0262	EPA 365.4	WG282997	28-JUL-20 12:40:44	EPA 365.4	27-JUL-20	SS		
pH(Laboratory)	6.7 pH	0.10	0.10	SM 4500H-B	WG282847	24-JUL-20 14:01:28	N/A	N/A	ZL	H1	

Quality Control Report

Blank Sample Summary Report

Alkalinity

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL
MBLANK	WG283023	SM2320B	28-JUL-20	N/A	U 5.0 mg/L	5.0 mg/L

Apparent Color

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL
MBLANK	WG282677	SM2120B	24-JUL-20	N/A	U 5.0 PTCO	5.0 PTCO

Phosphorus, Total As P

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL
MBLANK	WG282997	EPA 365.4	28-JUL-20	27-JUL-20	U 0.10 mg/L	0.10 mg/L

Quality Control Report

Laboratory Control Sample Summary Report

Alkalinity

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG283023-2	LCS	WG283023	28-JUL-20	N/A	mg/L	120	120	100	80-120	

Apparent Color

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG282677-2	LCS	WG282677	24-JUL-20	N/A	PTCO	50	50.	100	80-120	

Phosphorus, Total As P

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG282997-2	LCS	WG282997	28-JUL-20	27-JUL-20	mg/L	.5	0.52	103	80-120	

pH(Laboratory)

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG282847-1	LCS	WG282847	24-JUL-20	N/A	pH	7	7.0	99	90-110	

Quality Control Report

Duplicate Sample Summary Report

Alkalinity

Duplicate Sample ID	Original Sample ID	QC Batch	Analysis Date	Result Units	Sample Result	Duplicate Result	RPD(%)	RPD Limit
WG283023-4	SN6135-2	WG283023	28-JUL-20	mg/L	8.8	6.5	29*	20

Phosphorus, Total As P

Duplicate Sample ID	Original Sample ID	QC Batch	Analysis Date	Result Units	Sample Result	Duplicate Result	RPD(%)	RPD Limit
WG282997-3	SN6135-1	WG282997	28-JUL-20	mg/L	U 0.10	U 0.10	NC	30

Quality Control Report

Matrix Spike Sample Summary Report

Phosphorus, Total As P

Matrix Spike Sample ID	Sample Type	Original Sample ID	QC Batch	Analysis Date	Result Units	Spike Amount	Sample Result	MS Result	Recovery (%)	Recovery Limit
WG282997-4	MS	SN6135-1	WG282997	28-JUL-20	mg/L	0.5	U 0.10	.492	98	75 - 125

600 Technology Way
P.O. Box 540, Scarborough, ME 04070
Tel:(207) 874-2400 Fax:(207) 775-4029

http://katahdinlab.com
sales@katahdinlab.com

ClearWater Laboratory
The Premier Water Testing Lab in Maine

8/12/2020

Ms. Sara Colby
Katahdin Analytical Services
P.O. Box 540
Scarborough, ME 04074

Dear Sara

Please find enclosed the results of your sample analysis. Below you will find any comments related to your sample results. We appreciate the opportunity to provide you with our analytical services. Please do not hesitate to contact our office if you have any questions or comments regarding these results.

Sincerely,
ClearWater Laboratory

Marc H. Hein (signature)

Marc H. Hein
Laboratory Manager

Enclosure

2020-07-429.2	Chlorophyll sample was extracted on 08/05/20 and analyzed on 08/06/20.
2020-07-429.1	Chlorophyll sample was extracted on 08/05/20 and analyzed on 08/06/20.

153 Main Street • Newport, ME 04953 • Phone: 207.368.5700 • Fax: 207.368.5120 • E-mail: MHein@ClearWaterLab.com

ClearWater Laboratory
The Premier Water Testing Lab in Maine

Client: Katahdin Analytical Services
Ms. Sara Colby
P.O. Box 540
Scarborough, ME 04074

Report Date: 08/12/2020

REPORT OF LABORATORY ANALYSIS

Sample Description	Result	Units	Reporting Limit	Method	Date / Time Sampled	Date / Time Analyzed
Chlorophyll-A (Corrected)	**1.4**	ug/L	1.0	EPA 445	07/23/20	08/06/20
2020-07-429.1 Rumford Middle Impoundment - Grab					0727	1100
					Lab: CWL	Analyst: nj
* Comments: Chlorophyll sample filtered and frozen upon arrival at lab - see cover page for extraction info.						
Chlorophyll-A (Corrected)	**1.7**	ug/L	1.0	EPA 445	07/23/20	08/06/20
2020-07-429.2 Rumford Upper Impoundment - Grab					1150	1100
					Lab: CWL	Analyst: nj
* Comments: Chlorophyll sample filtered and frozen upon arrival at lab - see cover page for extraction info.						

Clearwater

Katahdin
ANALYTICAL SERVICES

Sub-contract Laboratory Chain of Custody

Client:	Contact:	Email:		Phone #:
Katahdin Analytical Services	SJC	scolby@katahdinlab.com		(207) 874-2400
Address:	**City:**	**State:**	**Zip:**	**Project Name:**
600 Technology Way	Scarborough	Maine	04074	
KAS WO #:	**Quote #:**	**Purchase Order #:**		**TAT:**
SN6135				**Verbal TAT:**
RPT Level:	**Reporting Format:**	**EDD:**		**Analysis:** Chlorophyll-a

Sample ID:	Collect Date and Time:	Matrix:	No. of Containers	Pres.	MS/MSD Dup.	Filtered? Y / N	Filtered? Y / N	Filtered? Y / N
RUMFORD MIDDLE IMPOUNDMEN .01	23-JUL-20 07:27	AQ	1	none	no	X		
RUMFORD UPPER IMPOUNDMENT .02	23-JUL-20 11:50	AQ	1	none	no	X		

Relinquished By:	Date/Time:	Received By:
	7.23.20 1630	

Comments:

Rec'd: Diane Curtis 7/24/2020 12:00
Temp Rec: 10.4°C

2020-07-429.01
.02

Katahdin Analytical Services, LLC.

Sample Receipt Condition Report

Client: Normandeau	KAS PM: SR	Sampled By: Client
Project:	KIMS Entry By: SUB	Delivered By: Client
KAS Work Order#: SN6135	KIMS Review By: SR	Received By: JCB
SDG #:	Cooler: 1 of 1	Date/Time Rec.: 7/23/20 1555

Receipt Criteria	Y	N	EX*	NA	Comments and/or Resolution
1. Custody seals present / intact?		✓			
2. Chain of Custody present in cooler?	✓				
3. Chain of Custody signed by client?	✓				
4. Chain of Custody matches samples?	✓				
5. Temperature Blanks present? If not, take temperature of any sample w/ IR gun.	✓				Temp (°C): 1.2 — Thermometer ID: IR-1
Samples received at <6 °C w/o freezing?	✓				Note: Not required for metals (except Hg soil) analysis.
Ice packs or ice present?	✓				The lack of ice or ice packs (i.e. no attempt to begin cooling process) or insufficient ice may not meet certain regulatory requirements and may invalidate certain data.
If yes, was there sufficient ice to meet temperature requirements?	✓				
If temp. out, has the cooling process begun (i.e. ice or packs present) and sample collection times <6hrs., but samples are not yet cool?				✓	Note: No cooling process required for metals (except Hg soil) analysis.
6. Volatiles:					
Aqueous: No bubble larger than a pea?				✓	
Soil/Sediment:					
Received in airtight container?				✓	
Received in methanol?				✓	
Methanol covering soil?				✓	
D.I. Water - Received within 48 hour HT?				✓	
Air: Refer to KAS COC for canister/flow controller requirements.	√ if air included				
7. Trip Blank present in cooler?				✓	
8. Proper sample containers and volume?	✓				
9. Samples within hold time upon receipt?	✓				
10. Aqueous samples properly preserved? Metals, COD, NH3, TKN, O/G, phenol, TPO4, N+N, TOC, DRO, TPH – pH <2	✓				
Sulfide - >9				✓	
Cyanide – pH >12				✓	
11. Bottleware Prepped on:					

* Log-In Notes to Exceptions: document any problems with samples or discrepancies or pH adjustments.

Katahdin ANALYTICAL SERVICES
600 Technology Way
Scarborough, ME 04074
Tel: (207) 874-2400
Fax: (207) 775-4029

CHAIN of CUSTODY

PLEASE BEAR DOWN AND PRINT LEGIBLY IN PEN

Client	Contact	Phone #	Fax #
Normandeau Associates	Mike Polchlopek	(978) 895-5359	( )

Address	City	State	Zip Code
25 Nashua Rd	Bedford	NH	03110

Purchase Order # 24411.000 T2 Proj. Name / No. Katahdin Quote # 10179qd1

Bill (if different than above) Address

Sampler (Print / Sign) Michael Polchlopek Michael Polchlopek

Copies To:

LAB USE ONLY WORK ORDER #: SN6135

KATAHDIN PROJECT NUMBER

REMARKS:

SHIPPING INFO: ☐ FED EX ☐ UPS ☐ CLIENT

AIRBILL NO:

TEMP°C ☐ TEMP BLANK ☐ INTACT ☐ NOT INTACT

★	Sample Description	Date / Time coll'd	Matrix	No. of Cntrs.	ANALYSIS AND CONTAINER TYPE PRESERVATIVES: Filt. Y/N — Chlorophyll-a 1L Amber Foil	Filt. Y/N — Total Phos 250mL - H_2SO_4	Filt. Y/N — Color Alkalinity, pH 250 mL	Filt. Y/N	Filt. Y/N	Filt. Y/N	Filt. Y/N	Filt. Y/N	Filt. Y/N	Filt. Y/N
1	Rumford Middle Impoundment	07/23/20 07:27		3	X	X	X							
2	Rumford Upper Impoundment	07/23/20 11:50		3	X	X	X							
		/												
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COMMENTS

Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)
Michael Polchlopek II	7/23/20 16:00				
Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)

Katahdin
ANALYTICAL SERVICES

Katahdin Analytical Services

Login Chain of Custody Report (lno1)

Jul. 24, 2020
07:14 AM

Quote/Incoming:

Login Number: SN6135

Account: NORMAN001
Normandeau Corp.

Project:

NoWeb

Primary Report Address:
Michael Polchlopek
Normandeau Assoc., Inc.
25 Nashua Rd

Bedford,NH 03110
mpolchlopek@normandeau.com

Primary Invoice Address:
Accounts Payable
Normandeau Assoc., Inc.
550 Forest Avenue
Ste 201
Portland,ME 04101

Report CC Addresses:
Invoice CC Addresses:

Login Information:

ANALYSIS INSTRUCTIONS	:	Chlorophyll subbed to Clearwater
CHECK NO.	:	
CLIENT PO#	:	24411.000 T2
CLIENT PROJECT MANAGE	:	
CONTRACT	:	
COOLER TEMPERATURE	:	1.2
DELIVERY SERVICES	:	Client
EDD FORMAT	:	KAS064QC-XLS
LOGIN INITIALS	:	JCB
PM	:	SJC
PROJECT NAME	:	Rumford
QC LEVEL	:	II+
REPORT INSTRUCTIONS	:	report and EDD to mpolchlopek@normandeau.com. Invoice to abogart@normandeau.com
SDG ID	:	
SDG STATUS	:	
VERBAL TAT	:	

Katahdin
ANALYTICAL SERVICES

Katahdin Analytical Services

Login Chain of Custody Report (lno1)

Jul. 24, 2020
07:14 AM

Login Number: SN6135

Quote/Incoming:

Account: NORMAN001 NoWeb
Normandeau Corp.

Project:

Laboratory Sample ID	Client Sample Number	Collect Date/Time	Receive Date	PR	Verbal Date	Due Date	Mailed
SN6135-1	RUMFORD MIDDLE IMPOUNDMENT	23-JUL-20 07:27	23-JUL-20			04-AUG-20	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Aqueous	S	E365.4-TOTAL-PHOS	20-AUG-20	125mL Plastic+H2SO4		
Aqueous	S	SM10200-CHLOROPH-SUB	24-JUL-20	1000mL Plastic		
Aqueous	S	SM2120-APP-COLOR	25-JUL-20	125mL Plastic		
Aqueous	S	SM2320B-ALKALINITY	06-AUG-20			
Aqueous	S	SM4500HB-PH	24-JUL-20	125mL Plastic		

Laboratory Sample ID	Client Sample Number	Collect Date/Time	Receive Date	PR	Verbal Date	Due Date	Mailed
SN6135-2	RUMFORD UPPER IMPOUNDMENT	23-JUL-20 11:50	23-JUL-20			04-AUG-20	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Aqueous	S	E365.4-TOTAL-PHOS	20-AUG-20	125mL Plastic+H2SO4		
Aqueous	S	SM10200-CHLOROPH-SUB	24-JUL-20	1000mL Plastic		
Aqueous	S	SM2120-APP-COLOR	25-JUL-20	125mL Plastic		
Aqueous	S	SM2320B-ALKALINITY	06-AUG-20			
Aqueous	S	SM4500HB-PH	24-JUL-20	125mL Plastic		

Total Samples: *2* ***Total Analyses:*** *10*

Katahdin
ANALYTICAL SERVICES

NH ELAP Lab ID 2001 (DW, NPW, SCM)
NYSDOH ELAP Lab ID 11121 (AE - T015)

August 14, 2020

Mr. Michael Polchlopek
Normandeau Assoc., Inc.
25 Nashua Rd
Bedford,NH 03110

RE: Katahdin Lab Number: SN6343
Project ID:
Project Manager: Ms. Sara Colby
Sample Receipt Date(s): July 30, 2020

Dear Mr. Polchlopek:

Please find enclosed the following information:

* Report of Analysis (Analytical and/or Field)
* Laboratory results from subcontracted analysis (es)
* Quality Control Data Summary
* Chain of Custody (COC)
* Login Report

A copy of the Chain of Custody is included in the paginated report. If requested, the original COC is attached as an addendum to this report.

Should you have any questions or comments concerning this Report of Analysis, please do not hesitate to contact the project manager listed above. The results contained in this report relate only to the submitted samples. This cover letter is an integral part of the ROA.

We certify that the test results provided in this report meet all the requirements of the NELAC standards unless otherwise noted in an attached technical narrative or in the Report of Analysis.

We appreciate your continued use of our laboratory and look forward to working with you in the future. The following signature indicates technical review and acceptance of the data.

Please go to http://www.katahdinlab.com/cert for copies of Katahdin Analytical Services Inc. current certificates and analyte lists.

Sincerely,
KATAHDIN ANALYTICAL SERVICES

Leslie Dimond

Leslie Dimond - Quality Assurance Officer

08/14/2020

Date

KATAHDIN ANALYTICAL SERVICES – INORGANIC DATA QUALIFIERS

The sampled date indicated on the attached Report(s) of Analysis (ROA) is the date for which a grab sample was collected or the date for which a composite sample was completed. Beginning and start times for composite samples can be found on the Chain-of-Custody.

U Indicates the compound was analyzed for but not detected above the specified level. This level may be the Practical Quantitation Level (PQL) (also called Limit of Quantitation (LOQ)), the Limit of Detection (LOD) or Method Detection Limit (MDL) as required by the client.

Note: All results reported as "U" MDL have a 50% rate for false negatives compared to those results reported as "U" PQL "U" LOQ or "U" LOD, where the rate of false negatives is <1%.

E Estimated value. This flag identifies compounds whose concentrations exceed the upper level of the calibration range of the instrument for that specific analysis.

J Estimated value. The analyte was detected in the sample at a concentration less than the laboratory Practical Quantitation Level (PQL) (also called Limit of Quantitation (LOQ)), but above the Method Detection Limit (MDL).

I-7 The laboratory's Practical Quantitation Level (PQL) or LOQ could not be achieved for this parameter due to sample composition, matrix effects, sample volume, or quantity used for analysis.

A-4 Please refer to cover letter or narrative for further information.

H_ Please note that the regulatory holding time for _____ is "analyze immediately". Ideally, this analysis must be performed in the field at the time of sample collection. _____ for this sample was not performed at the time of sample collection. The analysis was performed as soon as possible after receipt by the laboratory.

H1 - pH H2 - DO H3 - sulfite H4 - residual chlorine

T1 The client did not provide the full volume of at least one liter for analysis of TSS. Therefore, the PQL of 2.5 mg/L could not be achieved.

T2 The client provided the required volume of at least one liter for analysis of TSS, but the laboratory could not filter the full one liter volume due to the sample matrix. Therefore, the PQL of 2.5 mg/L could not be achieved.

M1 The matrix spike and/or matrix spike duplicate recovery performed on this sample was outside of the laboratory acceptance criteria. Sample matrix is suspected. The laboratory criteria was met for the Laboratory Control Sample (LCS) analyzed concurrently with this sample.

M2 The matrix spike and/or matrix spike duplicate recovery was outside of the laboratory acceptance criteria. The native sample concentration is greater than four times the spike added concentration so the spike added could not be distinguished from the native sample concentration.

R1 The relative percent difference (RPD) between the duplicate analyses performed on this sample was outside of the laboratory acceptance criteria (when both values are greater than ten times the PQL).

MCL	Maximum Contaminant Level	NL	No limit
NFL	No Free Liquid Present	FLP	Free Liquid Present
NOD	No Odor Detected	TON	Threshold Odor Number

D-1 As required by Method 5210B, APHA Standard Methods for the Examination of Water and Wastewater (21st edition), the BOD value reported for this sample is 'qualified' because the check standard run concurrently with the sample analysis did not meet the criteria specified in the method (198 +/- 30.5 mg/L). These results may not be reportable for compliance purposes.

D-2 The measured final dissolved oxygen concentrations of all dilutions were less than the method-specified limit of 1 mg/L. The reported BOD result was calculated assuming a final oxygen concentration equal to 1 mg/L. The reported value should be considered a minimum value.

D-3 The dilution water used to prepare this sample did not meet the method and/or regulatory criteria of less than 0.2 or 0.4 mg/L dissolved oxygen (DO) uptake over the five day period of incubation. These results may not be reportable for compliance purposes.

Report of Analytical Results

Client: Michael Polchlopek
Normandeau Assoc., Inc.
25 Nashua Rd
Bedford,NH 03110

Lab Sample ID: SN6343-1
Report Date: 11-AUG-20
Project:
SDG: SN6343

Sample Description	Matrix	Date Sampled	Date Received
RUMFORD MIDDLE IMPOUNDMENT	AQ	30-JUL-20 07:55:00	30-JUL-20

Parameter	Result	Adj PQL	Adj MDL	Anal. Method	QC Batch	Analysis Date	Prep. Method	Prep. Date	Analyst	Footnotes	RPD/RSD
Alkalinity	10. mg/L	5.0	0.23	STDM 2320B	WG283696	06-AUG-20 15:56:53	N/A	N/A	ZL		
Apparent Color	30. PTCO	5.0	5.0	SM2120B	WG283206	31-JUL-20 13:44:00	N/A	N/A	ES		
Phosphorus, Total As P	U0.10 mg/L	0.10	.0262	EPA 365.4	WG283717	07-AUG-20 10:52:33	EPA 365.4	06-AUG-20	SS		
pH(Laboratory)	7.0 pH	0.10	0.10	SM 4500H-B	WG283365	31-JUL-20 10:11:57	N/A	N/A	ZL	H1	

Katahdin
ANALYTICAL SERVICES

Report of Analytical Results

Client: Michael Polchlopek
Normandeau Assoc., Inc.
25 Nashua Rd
Bedford,NH 03110

Lab Sample ID: SN6343-2
Report Date: 11-AUG-20
Project:
SDG: SN6343

Sample Description	Matrix	Date Sampled	Date Received
RUMFORD UPPER IMPOUNDMENT	AQ	30-JUL-20 11:50:00	30-JUL-20

Parameter	Result	Adj PQL	Adj MDL	Anal. Method	QC Batch	Analysis Date	Prep. Method	Prep. Date	Analyst	Footnotes	RPD/RSD
Alkalinity	U5.0 mg/L	5.0	0.23	STDM 2320B	WG283696	06-AUG-20 15:59:19	N/A	N/A	ZL		
Apparent Color	30. PTCO	5.0	5.0	SM2120B	WG283206	31-JUL-20 13:44:00	N/A	N/A	ES		
Phosphorus, Total As P	U0.10 mg/L	0.10	.0262	EPA 365.4	WG283717	07-AUG-20 10:53:38	EPA 365.4	06-AUG-20	SS		
pH(Laboratory)	7.1 pH	0.10	0.10	SM 4500H-B	WG283365	31-JUL-20 10:16:24	N/A	N/A	ZL	H1	

Quality Control Report

Blank Sample Summary Report

Alkalinity

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL
MBLANK	WG283696	SM2320B	06-AUG-20	N/A	U 5.0 mg/L	5.0 mg/L

Apparent Color

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL
MBLANK	WG283206	SM2120B	31-JUL-20	N/A	U 5.0 PTCO	5.0 PTCO

Phosphorus, Total As P

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL
MBLANK	WG283717	EPA 365.4	07-AUG-20	06-AUG-20	U 0.10 mg/L	0.10 mg/L

600 Technology Way
P.O. Box 540, Scarborough, ME 04070
Tel:(207) 874-2400 Fax:(207) 775-4029

http://katahdinlab.com
sales@katahdinlab.com

Quality Control Report

Laboratory Control Sample Summary Report

Alkalinity

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG283696-2	LCS	WG283696	06-AUG-20	N/A	mg/L	120	120	104	80-120	

Apparent Color

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG283206-2	LCS	WG283206	31-JUL-20	N/A	PTCO	50	50.	100	80-120	

Phosphorus, Total As P

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG283717-2	LCS	WG283717	07-AUG-20	06-AUG-20	mg/L	.5	0.49	98	80-120	

pH(Laboratory)

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG283365-1	LCS	WG283365	31-JUL-20	N/A	pH	7	7.0	100	90-110	

600 Technology Way
P.O. Box 540, Scarborough, ME 04070
Tel:(207) 874-2400 Fax:(207) 775-4029

http://katahdinlab.com
sales@katahdinlab.com

ClearWater Laboratory
The Premier Water Testing Lab in Maine

8/12/2020

Ms. Sara Colby
Katahdin Analytical Services
P.O. Box 540
Scarborough, ME 04074

Dear Sara

Please find enclosed the results of your sample analysis. Below you will find any comments related to your sample results. We appreciate the opportunity to provide you with our analytical services. Please do not hesitate to contact our office if you have any questions or comments regarding these results.

Sincerely,
ClearWater Laboratory

Marc H. Hein (signature)

Marc H. Hein
Laboratory Manager

Enclosure

2020-07-552.2	Chlorophyll sample was extracted on 08/05/20 and analyzed on 08/06/20.
2020-07-552.1	Chlorophyll sample was extracted on 08/05/20 and analyzed on 08/06/20.

153 Main Street • Newport, ME 04953 • Phone: 207.368.5700 • Fax: 207.368.5120 • E-mail: MHein@ClearWaterLab.com

ClearWater Laboratory
The Premier Water Testing Lab in Maine

Client: Katahdin Analytical Services
Ms. Sara Colby
P.O. Box 540
Scarborough, ME 04074

Report Date: 08/12/2020

REPORT OF LABORATORY ANALYSIS

Sample Description	Result	Units	Reporting Limit	Method	Date / Time Sampled	Date / Time Analyzed
Chlorophyll-A (Corrected)	**1.4**	ug/L	1.0	EPA 445	07/30/20	08/06/20
2020-07-552.1 Rumford Middle Impoundment - Grab					0755	1100
					Lab: CWL	Analyst: nj
* Comments: Chlorophyll sample filtered and frozen upon arrival at lab - see cover page for extraction info.						
Chlorophyll-A (Corrected)	**1.5**	ug/L	1.0	EPA 445	07/30/20	08/06/20
2020-07-552.2 Rumford Upper Impoundment - Grab					1150	1100
					Lab: CWL	Analyst: nj
* Comments: Chlorophyll sample filtered and frozen upon arrival at lab - see cover page for extraction info.						

Clearwater

Katahdin
ANALYTICAL SERVICES

Sub-contract Laboratory Chain of Custody

Client:	Contact:	Email:		Phone #:
Katahdin Analytical Services	SJC	scolby@katahdinlab.com		(207) 874-2400
Address:	**City:**	**State:**	**Zip:**	**Project Name:**
600 Technology Way	Scarborough	Maine	04074	
KAS WO #:	**Quote #:**	**Purchase Order #:**		**TAT:** Std
SN6343				**Verbal TAT:**
RPT Level: II	**Reporting Format:** Std	**EDD:** ME EGAD		**Analysis:** Chlorophyll A

Sample ID:	Collect Date and Time:	Matrix:	No. of Containers	Pres.	MS/MSD Dup.	Analysis: Filtered? Y / N	Analysis: Filtered? Y / N	Analysis: Filtered? Y / N
01 RUMFORD MIDDLE IMPOUNDMEN	30-JUL-20 07:55	AQ	1	none	no	X		
02 RUMFORD UPPER IMPOUNDMENT	30-JUL-20 11:50	AQ	1	none	no	X		

Relinquished By:	Date/Time:	Received By:
	7.31.20 0930	

Comments:

Rec'd
Diane Curtis 7/31/2020 1124
Temp @ 5.9°C

2020-07-552

Katahdin Analytical Services, LLC.

Sample Receipt Condition Report

Client: Normandeau	KAS PM: SC	Sampled By: Client
Project:	KIMS Entry By: JCB	Delivered By: Client
KAS Work Order#: SN6343	KIMS Review By: SC	Received By: JCB
SDG #:	Cooler: 1 of 1	Date/Time Rec.: 7/30/20 1570

Receipt Criteria	Y	N	EX*	NA	Comments and/or Resolution
1. Custody seals present / intact?		✓			
2. Chain of Custody present in cooler?	✓				
3. Chain of Custody signed by client?	✓				
4. Chain of Custody matches samples?	✓				
5. Temperature Blanks present? If not, take temperature of any sample w/ IR gun.	✓				Temp (°C): 1, 2 — Thermometer ID: IR-1
Samples received at <6 °C w/o freezing?	✓				Note: Not required for metals (except Hg soil) analysis.
Ice packs or ice present?	✓				The lack of ice or ice packs (i.e. no attempt to begin cooling process) or insufficient ice may not meet certain regulatory requirements and may invalidate certain data.
If yes, was there sufficient ice to meet temperature requirements?	✓				
If temp. out, has the cooling process begun (i.e. ice or packs present) and sample collection times <6hrs., but samples are not yet cool?				✓	Note: No cooling process required for metals (except Hg soil) analysis.
6. Volatiles:					
Aqueous: No bubble larger than a pea?				✓	
Soil/Sediment:					
Received in airtight container?				✓	
Received in methanol?				✓	
Methanol covering soil?				✓	
D.I. Water - Received within 48 hour HT?				✓	
Air: Refer to KAS COC for canister/flow controller requirements.	√ if air included				
7. Trip Blank present in cooler?				✓	
8. Proper sample containers and volume?	✓				
9. Samples within hold time upon receipt?	✓				
10. Aqueous samples properly preserved? Metals, COD, NH3, TKN, O/G, phenol, TPO4, N+N, TOC, DRO, TPH – pH <2	✓				
Sulfide - >9				✓	
Cyanide – pH >12				✓	
11. Bottleware Prepped on:					

* Log-In Notes to Exceptions: document any problems with samples or discrepancies or pH adjustments.

Katahdin ANALYTICAL SERVICES

600 Technology Way
Scarborough, ME 04074
Tel: (207) 874-2400
Fax: (207) 775-4029

CHAIN of CUSTODY

PLEASE BEAR DOWN AND PRINT LEGIBLY IN PEN

Page 1 of 1

Client	Contact	Phone #	Fax #
Normandeau Associates	Mike Polchlopek	(978) 895-5359	( )

Address: 25 Nashua Rd. City: Bedford State: NH Zip Code: 03110

Purchase Order #: 24411.000 T2 Proj. Name / No.: Katahdin Quote #: 10179qd1

Bill (if different than above): Address:

Sampler (Print / Sign): Tyler Parent / Copies To:

LAB USE ONLY

WORK ORDER #: SN6343

KATAHDIN PROJECT NUMBER:

REMARKS:

SHIPPING INFO: ☐ FED EX ☐ UPS ☐ CLIENT

AIRBILL NO:

TEMP°C ☐ TEMP BLANK ☐ INTACT ☐ NOT INTACT

★	Sample Description	Date / Time coll'd	Matrix	No. of Cntrs.	ANALYSIS AND CONTAINER TYPE PRESERVATIVES: Filt. Y/N — Chlorophyll-a 1L Amber Foil	Filt. Y/N — Total Phos 250mL - H2SO4	Filt. Y/N — Color, Alkalinity, pH 250mL - Plastic	Filt. Y/N	Filt. Y/N	Filt. Y/N	Filt. Y/N	Filt. Y/N	Filt. Y/N	Filt. Y/N
1	Rumford Middle Impoundment	7/30/20 7:55		3	X	X	X							
2	Rumford Upper Impoundment	7/30/20 11:50		3	X	X	X							
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COMMENTS

Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)
Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)
	7.30.20 1510				

Katahdin
ANALYTICAL SERVICES

Katahdin Analytical Services

Login Chain of Custody Report (lno1)

Jul. 31, 2020
06:57 AM

Login Number: SN6343

Account: NORMAN001
Normandeau Corp.

Project:

Primary Report Address:
Michael Polchlopek
Normandeau Assoc., Inc.
25 Nashua Rd

Bedford,NH 03110
mpolchlopek@normandeau.com

Primary Invoice Address:
Accounts Payable
Normandeau Assoc., Inc.
550 Forest Avenue
Ste 201
Portland,ME 04101

Report CC Addresses:
Invoice CC Addresses:

Quote/Incoming:

NoWeb

Login Information:

ANALYSIS INSTRUCTIONS	:	
CHECK NO.	:	
CLIENT PO#	:	24411.000 T2
CLIENT PROJECT MANAGE	:	
CONTRACT	:	
COOLER TEMPERATURE	:	1.2
DELIVERY SERVICES	:	Client
EDD FORMAT	:	KAS064QC-XLS
LOGIN INITIALS	:	JCB
PM	:	SJC
PROJECT NAME	:	
QC LEVEL	:	II+
REPORT INSTRUCTIONS	:	report and EDD to mpolchlopek@normandeau.com. Invoice to abogart@normandeau.com
SDG ID	:	
SDG STATUS	:	
VERBAL TAT	:	

Login Number: SN6343

Quote/Incoming:

Account: NORMAN001 NoWeb

Normandeau Corp.

Project:

Laboratory Sample ID	Client Sample Number	Collect Date/Time	Receive Date	PR	Verbal Date	Due Date	Mailed
SN6343-1	RUMFORD MIDDLE IMPOUNDMENT	30-JUL-20 07:55	30-JUL-20			11-AUG-20	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Aqueous	S	COURIER-BILLING				
Aqueous	S	E365.4-TOTAL-PHOS	27-AUG-20	125mL Plastic+H2SO4		
Aqueous	S	SM10200-CHLOROPH-SUB	31-JUL-20	1000mL Plastic		
Aqueous	S	SM2120-APP-COLOR	01-AUG-20	125mL Plastic		
Aqueous	S	SM2320B-ALKALINITY	13-AUG-20			
Aqueous	S	SM4500HB-PH	31-JUL-20	125mL Plastic		

SN6343-2	RUMFORD UPPER IMPOUNDMENT	30-JUL-20 11:50	30-JUL-20			11-AUG-20	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Aqueous	S	E365.4-TOTAL-PHOS	27-AUG-20	125mL Plastic+H2SO4		
Aqueous	S	SM10200-CHLOROPH-SUB	31-JUL-20	1000mL Plastic		
Aqueous	S	SM2120-APP-COLOR	01-AUG-20	125mL Plastic		
Aqueous	S	SM2320B-ALKALINITY	13-AUG-20			
Aqueous	S	SM4500HB-PH	31-JUL-20	125mL Plastic		

Total Samples: *2* ***Total Analyses:*** *11*

Katahdin
ANALYTICAL SERVICES

NH ELAP Lab ID 2001 (DW, NPW, SCM)
NYSDOH ELAP Lab ID 11121 (AE - T015)

September 11, 2020

Mr. Michael Polchlopek
Normandeau Assoc., Inc.
25 Nashua Rd
Bedford,NH 03110

RE: Katahdin Lab Number: SN6805
Project ID: Rumford Impoundment
Project Manager: Ms. Sara Colby
Sample Receipt Date(s): August 13, 2020

Dear Mr. Polchlopek:

Please find enclosed the following information:

* Report of Analysis (Analytical and/or Field)
* Laboratory results from subcontracted analysis (es)
* Quality Control Data Summary
* Chain of Custody (COC)
* Login Report

A copy of the Chain of Custody is included in the paginated report. If requested, the original COC is attached as an addendum to this report.

Should you have any questions or comments concerning this Report of Analysis, please do not hesitate to contact the project manager listed above. The results contained in this report relate only to the submitted samples. This cover letter is an integral part of the ROA.

We certify that the test results provided in this report meet all the requirements of the NELAC standards unless otherwise noted in an attached technical narrative or in the Report of Analysis.

We appreciate your continued use of our laboratory and look forward to working with you in the future. The following signature indicates technical review and acceptance of the data.

Please go to http://www.katahdinlab.com/cert for copies of Katahdin Analytical Services Inc. current certificates and analyte lists.

Sincerely,
KATAHDIN ANALYTICAL SERVICES

Leslie Dimond

Leslie Dimond - Quality Assurance Officer **Date** 09/11/2020

TECHNICAL NARRATIVE

Katahdin references the following versions of Standard Methods:
Color: SM 2120 B 2011
Turbidity: SM 2130 B 2011
Alkalinity: SM 2320 B 2011
Hardness: SM 2340 B 2011
Residue-total (TS): SM 2540 B 2011
Residue-filterable (TDS): SM 2540C 2011
Residue-nonfilterable (TSS): SM 2540 D 2011
Residue-settleable: SM 2540 F 2011
Total Solids: SM 2540 G 2011
Total Volatile Solids: SM 2540 G 2011
Chromium VI: SM 3500-Cr B 2011
Iron (Ferrous): SM 3500-Fe D 2011
Chloride: SM 4500-Cl^- E 2011
Amenable cyanide: SM 4500-CN G 2011
Fluoride: SM 4500-F^- B 2011
pH: SM 4500-H+ B 2011
Ammonia as N: SM 4500-NH3 H 2011
Orthophosphate as P: SM 4500-P E 2011
Sulfide: SM 4500-$S2^-$ F 2011
Sulfite: SM 4500-$SO3^-$ B 2011
Biochemical oxygen demand: SM 5210 B 2011
Carbonaceous BOD, CBOD: SM 5210 B 2011
Total Organic Carbon: SM 5310 B 2011
Surfactants: SM 5540 C 2011
Fecal coliforms: SM 9222 D (m-FC) 2006
Total Coliforms/ Escherichia coli: SM9223B (Coilert®) 2005
Escherichia coli: SM 9223 B (Colilert® Quanti-Tray®) 2004
Salmonella: SM 9260 D 2007

KATAHDIN ANALYTICAL SERVICES – INORGANIC DATA QUALIFIERS

The sampled date indicated on the attached Report(s) of Analysis (ROA) is the date for which a grab sample was collected or the date for which a composite sample was completed. Beginning and start times for composite samples can be found on the Chain-of-Custody.

U Indicates the compound was analyzed for but not detected above the specified level. This level may be the Practical Quantitation Level (PQL) (also called Limit of Quantitation (LOQ)), the Limit of Detection (LOD) or Method Detection Limit (MDL) as required by the client.

Note: All results reported as "U" MDL have a 50% rate for false negatives compared to those results reported as "U" PQL "U" LOQ or "U" LOD, where the rate of false negatives is <1%.

E Estimated value. This flag identifies compounds whose concentrations exceed the upper level of the calibration range of the instrument for that specific analysis.

J Estimated value. The analyte was detected in the sample at a concentration less than the laboratory Practical Quantitation Level (PQL) (also called Limit of Quantitation (LOQ)), but above the Method Detection Limit (MDL).

I-7 The laboratory's Practical Quantitation Level (PQL) or LOQ could not be achieved for this parameter due to sample composition, matrix effects, sample volume, or quantity used for analysis.

A-4 Please refer to cover letter or narrative for further information.

H_ Please note that the regulatory holding time for _____ is "analyze immediately". Ideally, this analysis must be performed in the field at the time of sample collection. _____ for this sample was not performed at the time of sample collection. The analysis was performed as soon as possible after receipt by the laboratory.

H1 - pH H2 - DO H3 - sulfite H4 - residual chlorine

T1 The client did not provide the full volume of at least one liter for analysis of TSS. Therefore, the PQL of 2.5 mg/L could not be achieved.

T2 The client provided the required volume of at least one liter for analysis of TSS, but the laboratory could not filter the full one liter volume due to the sample matrix. Therefore, the PQL of 2.5 mg/L could not be achieved.

M1 The matrix spike and/or matrix spike duplicate recovery performed on this sample was outside of the laboratory acceptance criteria. Sample matrix is suspected. The laboratory criteria was met for the Laboratory Control Sample (LCS) analyzed concurrently with this sample.

M2 The matrix spike and/or matrix spike duplicate recovery was outside of the laboratory acceptance criteria. The native sample concentration is greater than four times the spike added concentration so the spike added could not be distinguished from the native sample concentration.

R1 The relative percent difference (RPD) between the duplicate analyses performed on this sample was outside of the laboratory acceptance criteria (when both values are greater than ten times the PQL).

MCL	Maximum Contaminant Level	NL	No limit
NFL	No Free Liquid Present	FLP	Free Liquid Present
NOD	No Odor Detected	TON	Threshold Odor Number

D-1 As required by Method 5210B, APHA Standard Methods for the Examination of Water and Wastewater (21st edition), the BOD value reported for this sample is 'qualified' because the check standard run concurrently with the sample analysis did not meet the criteria specified in the method (198 +/- 30.5 mg/L). These results may not be reportable for compliance purposes.

D-2 The measured final dissolved oxygen concentrations of all dilutions were less than the method-specified limit of 1 mg/L. The reported BOD result was calculated assuming a final oxygen concentration equal to 1 mg/L. The reported value should be considered a minimum value.

D-3 The dilution water used to prepare this sample did not meet the method and/or regulatory criteria of less than 0.2 or 0.4 mg/L dissolved oxygen (DO) uptake over the five day period of incubation. These results may not be reportable for compliance purposes.

Katahdin
ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Michael Polchlopek
Normandeau Assoc., Inc.
25 Nashua Rd
Bedford, NH 03110

Lab Sample ID: SN6805-001
Report Date: 9/4/2020
Project: Rumford Impoundment

Sample Description	Matrix	Filtered	Date Sampled	Date Received
RUMFORD MIDDLE IMPOUNDMENT	AQ	No(Total)	08/13/2020	08/13/2020

Parameter	Result	Units	Adjusted PQL	Dilution Factor	PQL	Analytical Method	Analysis Date	By	Prep Method	Prepped Date	By	QC	Notes
ALUMINUM	U 0.30	mg/L	0.30	1	0.3	SW846 6010	8/20/20	EP	SW846 3010	8/18/20	SF	NH18ICW2	
CALCIUM	3.32	mg/L	0.10	1	0.1	SW846 6010	8/20/20	EP	SW846 3010	8/18/20	SF	NH18ICW2	
IRON	0.249	mg/L	0.100	1	0.1	SW846 6010	8/20/20	EP	SW846 3010	8/18/20	SF	NH18ICW2	
MAGNESIUM	0.824	mg/L	0.100	1	0.1	SW846 6010	8/20/20	EP	SW846 3010	8/18/20	SF	NH18ICW2	
POTASSIUM	U 1.00	mg/L	1.00	1	1	SW846 6010	8/20/20	EP	SW846 3010	8/18/20	SF	NH18ICW2	
SILICA	4.38	mg/L	0.43	1	0.43	SW846 6010	8/20/20	EP	SW846 3010	8/18/20	SF	NH18ICW2	
SILICON	2.05	mg/L	0.20	1	0.2	SW846 6010	8/20/20	EP	SW846 3010	8/18/20	SF	NH18ICW2	
SODIUM	3.10	mg/L	1.00	1	1	SW846 6010	8/20/20	EP	SW846 3010	8/18/20	SF	NH18ICW2	

Katahdin
ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Michael Polchlopek
Normandeau Assoc., Inc.
25 Nashua Rd
Bedford, NH 03110

Lab Sample ID: SN6805-002
Report Date: 9/4/2020
Project: Rumford Impoundment

Sample Description	Matrix	Filtered	Date Sampled	Date Received
RUMFORD UPPER IMPOUNDMENT	AQ	No(Total)	08/13/2020	08/13/2020

Parameter	Result	Units	Adjusted PQL	Dilution Factor	PQL	Analytical Method	Analysis Date	By	Prep Method	Prepped Date	By	QC	Notes
ALUMINUM	U 0.30	mg/L	0.30	1	0.3	SW846 6010	8/20/20	EP	SW846 3010	8/18/20	SF	NH18ICW2	
CALCIUM	3.25	mg/L	0.10	1	0.1	SW846 6010	8/20/20	EP	SW846 3010	8/18/20	SF	NH18ICW2	
IRON	0.236	mg/L	0.100	1	0.1	SW846 6010	8/20/20	EP	SW846 3010	8/18/20	SF	NH18ICW2	
MAGNESIUM	0.806	mg/L	0.100	1	0.1	SW846 6010	8/20/20	EP	SW846 3010	8/18/20	SF	NH18ICW2	
POTASSIUM	U 1.00	mg/L	1.00	1	1	SW846 6010	8/20/20	EP	SW846 3010	8/18/20	SF	NH18ICW2	
SILICA	4.39	mg/L	0.43	1	0.43	SW846 6010	8/20/20	EP	SW846 3010	8/18/20	SF	NH18ICW2	
SILICON	2.05	mg/L	0.20	1	0.2	SW846 6010	8/20/20	EP	SW846 3010	8/18/20	SF	NH18ICW2	
SODIUM	2.96	mg/L	1.00	1	1	SW846 6010	8/20/20	EP	SW846 3010	8/18/20	SF	NH18ICW2	

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ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Michael Polchlopek
Normandeau Assoc., Inc.
25 Nashua Rd
Bedford, NH 03110

Lab Sample ID: SN6805-003
Report Date: 9/4/2020
Project: Rumford Impoundment

Sample Description	Matrix	Filtered	Date Sampled	Date Received
RUMFORD MIDDLE IMPOUNDMENT	AQ	Yes(Dissolved)	08/13/2020	08/13/2020

Parameter	Result	Units	Adjusted PQL	Dilution Factor	PQL	Analytical Method	Analysis Date	By	Prep Method	Prepped Date	By	QC	Notes
ALUMINUM	U 0.30	mg/L	0.30	1	0.3	SW846 6010	8/20/20	EP	SW846 3010	8/18/20	SF	NH18ICW2	

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REPORT OF ANALYTICAL RESULTS

Client: Michael Polchlopek
Normandeau Assoc., Inc.
25 Nashua Rd
Bedford, NH 03110

Lab Sample ID: SN6805-004
Report Date: 9/4/2020
Project: Rumford Impoundment

Sample Description	Matrix	Filtered	Date Sampled	Date Received
RUMFORD UPPER IMPOUNDMENT	AQ	Yes(Dissolved)	08/13/2020	08/13/2020

Parameter	Result	Units	Adjusted PQL	Dilution Factor	PQL	Analytical Method	Analysis Date	By	Prep Method	Prepped Date	By	QC	Notes
ALUMINUM	U 0.30	mg/L	0.30	1	0.3	SW846 6010	8/20/20	EP	SW846 3010	8/18/20	SF	NH18ICW2	

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ANALYTICAL SERVICES

REPORT OF ANALYTICAL RESULTS

Client: Michael Polchlopek
Normandeau Assoc., Inc.
25 Nashua Rd
Bedford, NH 03110

Lab Sample ID: SN6805-005
Report Date: 9/4/2020
Project: Rumford Impoundment

Sample Description	Matrix	Filtered	Date Sampled	Date Received
FILTER BLANK	AQ	Yes(Dissolved)	08/14/2020	08/13/2020

Parameter	Result	Units	Adjusted PQL	Dilution Factor	PQL	Analytical Method	Analysis Date	By	Prep Method	Prepped Date	By	QC	Notes
ALUMINUM	U 0.60	mg/L	0.60	1	0.3	SW846 6010	8/28/20	EP	SW846 3010	8/27/20	SF	NH27ICW1	1

1 The laboratory's Practical Quantitation Level could not be achieved for this parameter due to sample composition, matrix effects,sample volume, or quantity used for analysis.

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PREPARATION BLANK REPORT

Sample ID: PBWNH18ICW2 **Batch ID:** NH18ICW2 **Work Order:** SN6805

Element Name	Flag	Result	Units	PQL	MDL	File
ALUMINUM	U	0.30	mg/L	0.30	0.015	INH19A
CALCIUM	U	0.10	mg/L	0.10	0.011	INH19A
IRON	U	0.100	mg/L	0.100	0.0054	INH19A
MAGNESIUM	U	0.100	mg/L	0.100	0.0078	INH19A
POTASSIUM	U	1.00	mg/L	1.00	0.041	INH19A
SILICON	U	0.20	mg/L	0.20	0.030	INH19A
SODIUM	J	0.09	mg/L	1.00	0.024	INH19A

U The analyte was not detected in the sample at a level greater than the method detection limit.

J The analyte was detected in the sample at a concentration greater than the method detection limit, but less than the laboratory's Practical Quantitation Level.

H The analyte was detected in the sample at a concentration greater than the laboratory's acceptance limit.

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ANALYTICAL SERVICES

PREPARATION BLANK REPORT

Sample ID: PBWNH27ICW1 **Batch ID:** NH27ICW1 **Work Order:** SN6805

Element Name	Flag	Result	Units	PQL	MDL	File
ALUMINUM	U	0.30	mg/L	0.60	0.030	INH27B

U The analyte was not detected in the sample at a level greater than the method detection limit.

J The analyte was detected in the sample at a concentration greater than the method detection limit, but less than the laboratory's Practical Quantitation Level.

H The analyte was detected in the sample at a concentration greater than the laboratory's acceptance limit.

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ANALYTICAL SERVICES

LABORATORY CONTROL SAMPLE REPORT

Sample ID: LCSWNH18ICW2 **Batch ID:** NH18ICW2 **Work Order:** SN6805

Element Name	True Value	Result	Units	Recovery(%)	Flag	Limits (%)		File
ALUMINUM	4.00	4.20	mg/L	105.0		80	120	INH19A
CALCIUM	2.50	2.64	mg/L	105.6		80	120	INH19A
IRON	2.00	2.11	mg/L	105.5		80	120	INH19A
MAGNESIUM	5.00	5.20	mg/L	104.0		80	120	INH19A
POTASSIUM	10.0	10.2	mg/L	102.0		80	120	INH19A
SODIUM	7.50	7.84	mg/L	104.5		80	120	INH19A

H Laboratory control sample recovery is greater than the laboratory's acceptance limit.

L Laboratory control sample recovery is less than the laboratory's acceptance limit.

LABORATORY CONTROL SAMPLE REPORT

Sample ID: LCSWNH27ICW1 **Batch ID:** NH27ICW1 **Work Order:** SN6805

Element Name	True Value	Result	Units	Recovery(%)	Flag	Limits (%)		File
ALUMINUM	4.00	4.22	mg/L	105.5		80	120	INH27B

H Laboratory control sample recovery is greater than the laboratory's acceptance limit.

L Laboratory control sample recovery is less than the laboratory's acceptance limit.

Report of Analytical Results

Client: Michael Polchlopek
Normandeau Assoc., Inc.
25 Nashua Rd
Bedford,NH 03110

Lab Sample ID: SN6805-1
Report Date: 09-SEP-20
Project: Rumford Impoundment
SDG: SN6805

Sample Description	Matrix	Date Sampled	Date Received
RUMFORD MIDDLE IMPOUNDMENT	AQ	13-AUG-20 07:35:00	13-AUG-20

Parameter	Result	Adj PQL	Adj MDL	Anal. Method	QC Batch	Analysis Date	Prep. Method	Prep. Date	Analyst	Footnotes	RPD/RSD
Alkalinity	U5.0 mg/L	5.0	0.23	STDM 2320B	WG284648	19-AUG-20 15:48:21	N/A	N/A	ZL		
Apparent Color	30. PTCO	5.0	5.0	SM2120B	WG284167	14-AUG-20 15:04:00	N/A	N/A	ZF		
Chloride	3.1 mg/L	2.0	0.99	EPA 325.2	WG284176	14-AUG-20 11:16:48	N/A	N/A	ES		
Nitrate As N	U0.050 mg/L	0.050	.0152	EPA 353.2	WG284143	13-AUG-20 16:42:14	N/A	N/A	SS		
Phosphorus, Total As P	U0.10 mg/L	0.10	.0262	EPA 365.4	WG284413	17-AUG-20 12:17:41	EPA 365.4	14-AUG-20	SS		
Sulfate-Turbidimetric	15. mg/L	1.0	0.29	EPA 375.4	WG284161	14-AUG-20 11:02:24	N/A	N/A	ES		
pH(Laboratory)	7.0 pH	0.10	0.10	SM 4500H-B	WG284148	13-AUG-20 15:54:08	N/A	N/A	ES	H1	

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ANALYTICAL SERVICES

Report of Analytical Results

Client: Michael Polchlopek
Normandeau Assoc., Inc.
25 Nashua Rd
Bedford,NH 03110

Lab Sample ID: SN6805-2
Report Date: 09-SEP-20
Project: Rumford Impoundment
SDG: SN6805

Sample Description	Matrix	Date Sampled	Date Received
RUMFORD UPPER IMPOUNDMENT	AQ	13-AUG-20 10:45:00	13-AUG-20

Parameter	Result	Adj PQL	Adj MDL	Anal. Method	QC Batch	Analysis Date	Prep. Method	Prep. Date	Analyst	Footnotes	RPD/RSD
Alkalinity	9.8 mg/L	5.0	0.23	STDM 2320B	WG284648	19-AUG-20 15:49:51	N/A	N/A	ZL		
Apparent Color	25. PTCO	5.0	5.0	SM2120B	WG284167	14-AUG-20 15:04:00	N/A	N/A	ZF		
Chloride	3.1 mg/L	2.0	0.99	EPA 325.2	WG284176	14-AUG-20 11:16:48	N/A	N/A	ES		
Nitrate As N	U0.050 mg/L	0.050	.0152	EPA 353.2	WG284143	13-AUG-20 16:43:24	N/A	N/A	SS		
Phosphorus, Total As P	U0.10 mg/L	0.10	.0262	EPA 365.4	WG284413	17-AUG-20 12:25:22	EPA 365.4	14-AUG-20	SS		
Sulfate-Turbidimetric	1.9 mg/L	1.0	0.29	EPA 375.4	WG284161	14-AUG-20 11:02:24	N/A	N/A	ES		
pH(Laboratory)	7.0 pH	0.10	0.10	SM 4500H-B	WG284148	13-AUG-20 15:58:38	N/A	N/A	ES	H1	

Report of Analytical Results

Client: Michael Polchlopek
Normandeau Assoc., Inc.
25 Nashua Rd
Bedford,NH 03110

Lab Sample ID: SN6805-3
Report Date: 09-SEP-20
Project: Rumford Impoundment
SDG: SN6805

Sample Description	Matrix	Date Sampled	Date Received
RUMFORD MIDDLE IMPOUNDMENT	AQ	13-AUG-20 07:35:00	13-AUG-20

Parameter	Result	Adj PQL	Adj MDL	Anal. Method	QC Batch	Analysis Date	Prep. Method	Prep. Date	Analyst	Footnotes	RPD/RSD
Dissolved Organic Carbon	4.3 mg/L	1.0	.1023	SM5310B	WG284729	18-AUG-20 15:50:02	N/A	N/A	KD		

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ANALYTICAL SERVICES

Report of Analytical Results

Client: Michael Polchlopek
Normandeau Assoc., Inc.
25 Nashua Rd
Bedford,NH 03110

Lab Sample ID: SN6805-4
Report Date: 09-SEP-20
Project: Rumford Impoundment
SDG: SN6805

Sample Description	Matrix	Date Sampled	Date Received
RUMFORD UPPER IMPOUNDMENT	AQ	13-AUG-20 10:45:00	13-AUG-20

Parameter	Result	Adj PQL	Adj MDL	Anal. Method	QC Batch	Analysis Date	Prep. Method	Prep. Date	Analyst	Footnotes	RPD/RSD
Dissolved Organic Carbon	3.7 mg/L	1.0	.1023	SM5310B	WG284729	18-AUG-20 16:02:28	N/A	N/A	KD		

Quality Control Report

Blank Sample Summary Report

Alkalinity

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL
MBLANK	WG284648	SM2320B	19-AUG-20	N/A	U 5.0 mg/L	5.0 mg/L

Apparent Color

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL
MBLANK	WG284167	SM2120B	14-AUG-20	N/A	U 5.0 PTCO	5.0 PTCO

Chloride

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL
MBLANK	WG284176	EPA 325.2	14-AUG-20	N/A	U 2.0 mg/L	2.0 mg/L

Dissolved Organic Carbon

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL
MBLANK	WG284729	SM5310B	18-AUG-20	N/A	U 1.0 mg/L	1.0 mg/L

Nitrate As N

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL
MBLANK	WG284143	EPA 353.2	13-AUG-20	N/A	U 0.050 mg/L	0.050 mg/L

Nitrite As N

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL
MBLANK	WG284143	EPA 353.2	13-AUG-20	N/A	U 0.050 mg/L	0.050 mg/L

Phosphorus, Total As P

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL
MBLANK	WG284413	EPA 365.4	17-AUG-20	14-AUG-20	U 0.10 mg/L	0.10 mg/L

Sulfate-Turbidimetric

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL
MBLANK	WG284161	EPA 375.4	14-AUG-20	N/A	U 1.0 mg/L	1.0 mg/L

Quality Control Report

Laboratory Control Sample Summary Report

Alkalinity

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG284648-2	LCS	WG284648	19-AUG-20	N/A	mg/L	120	120	104	80-120	

Apparent Color

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG284167-2	LCS	WG284167	14-AUG-20	N/A	PTCO	50	50.	100	80-120	

Chloride

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG284176-2	LCS	WG284176	14-AUG-20	N/A	mg/L	35	37.	105	80-120	

Dissolved Organic Carbon

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG284729-2	LCS	WG284729	18-AUG-20	N/A	mg/L	50	50.	99	80-120	

Nitrate As N

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG284143-2	LCS	WG284143	13-AUG-20	N/A	mg/L	1	0.98	98	90-110	

Nitrite As N

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG284143-3	LCS	WG284143	13-AUG-20	N/A	mg/L	1	0.98	98	90-110	

Phosphorus, Total As P

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG284413-2	LCS	WG284413	17-AUG-20	14-AUG-20	mg/L	.5	0.50	100	80-120	

Sulfate-Turbidimetric

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG284161-2	LCS	WG284161	14-AUG-20	N/A	mg/L	15	12.	81	80-120	

pH(Laboratory)

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG284148-1	LCS	WG284148	13-AUG-20	N/A	pH	7	7.0	100	90-110	

Quality Control Report

Duplicate Sample Summary Report

Apparent Color

Duplicate Sample ID	Original Sample ID	QC Batch	Analysis Date	Result Units	Sample Result	Duplicate Result	RPD(%)	RPD Limit
WG284167-3	SN6805-2	WG284167	14-AUG-20	PTCO	25.	25.	0	20

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P.O. Box 540, Scarborough, ME 04070
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http://katahdinlab.com
sales@katahdinlab.com

Quality Control Report

Matrix Spike Sample Summary Report

Chloride

Matrix Spike Sample ID	Sample Type	Original Sample ID	QC Batch	Analysis Date	Result Units	Spike Amount	Sample Result	MS Result	Recovery (%)	Recovery Limit
WG284176-4	MS	SN6805-2	WG284176	14-AUG-20	mg/L	50	3.14	48.3	90	75 - 125
WG284176-3	MS	SN6805-1	WG284176	14-AUG-20	mg/L	50	3.06	47.4	89	75 - 125

Phosphorus, Total As P

Matrix Spike Sample ID	Sample Type	Original Sample ID	QC Batch	Analysis Date	Result Units	Spike Amount	Sample Result	MS Result	Recovery (%)	Recovery Limit
WG284413-5	MS	SN6805-1	WG284413	17-AUG-20	mg/L	0.5	U 0.10	.496	99	75 - 125

ClearWater Laboratory
The Premier Water Testing Lab in Maine

9/10/2020

Ms. Sara Colby
Katahdin Analytical Services
P.O. Box 540
Scarborough, ME 04074

Dear Sara

Please find enclosed the results of your sample analysis. Below you will find any comments related to your sample results. We appreciate the opportunity to provide you with our analytical services. Please do not hesitate to contact our office if you have any questions or comments regarding these results.

Sincerely,
ClearWater Laboratory

Marc H. Hein (signature)

Marc H. Hein
Laboratory Manager

Enclosure

2020-08-209.2	Chlorophyll sample was extracted on 08/29/20 and analyzed on 08/30/20.
2020-08-209.1	Chlorophyll sample was extracted on 08/29/20 and analyzed on 08/30/20.

153 Main Street • Newport, ME 04953 • Phone: 207.368.5700 • Fax: 207.368.5120 • E-mail: MHein@ClearWaterLab.com

ClearWater Laboratory
The Premier Water Testing Lab in Maine

Client: Katahdin Analytical Services
Ms. Sara Colby
P.O. Box 540
Scarborough, ME 04074

Report Date: 09/10/2020

REPORT OF LABORATORY ANALYSIS

Sample Description	Result	Units	Reporting Limit	Method	Date / Time Sampled	Date / Time Analyzed
Chlorophyll-A (Corrected)	**<1.0**	ug/L	1.0	EPA 445	08/13/20	08/30/20
2020-08-209.1 Rumford Middle Impoundment - Grab					0735	1130
					Lab: CWL	Analyst: nj
* Comments: Chlorophyll sample filtered and frozen upon arrival at lab - see cover page for extraction info.						
Chlorophyll-A (Corrected)	**1.6**	ug/L	1.0	EPA 445	08/13/20	08/30/20
2020-08-209.2 Rumford Upper Impoundment - Grab					1045	1130
					Lab: CWL	Analyst: nj
* Comments: Chlorophyll sample filtered and frozen upon arrival at lab - see cover page for extraction info.						

CAW Clearwater

Katahdin
ANALYTICAL SERVICES

Sub-contract Laboratory Chain of Custody

Client:	Contact:	Email:		Phone #:
Katahdin Analytical Services	SJC	scolby@katahdinlab.com		(207) 874-2400
Address:	**City:**	**State:**	**Zip:**	**Project Name:**
600 Technology Way	Scarborough	Maine	04074	
KAS WO #:	**Quote #:**	**Purchase Order #:**		**TAT:** 2 week
SN6805				**Verbal TAT:**
RPT Level: Std	**Reporting Format:** Std	**EDD:**		

Sample ID:	Collect Date and Time:	Matrix:	No. of Containers	Pres.	MS/MSD Dup.	Analysis: Chlorophyll Filtered? Y / N	Analysis: Filtered? Y / N	Analysis: Filtered? Y / N
.01 RUMFORD MIDDLE IMPOUNDMEN	13-AUG-20 07:35	AQ	1		no	X		
.02 RUMFORD UPPER IMPOUNDMENT	13-AUG-20 10:45	AQ	1		no	X		

Relinquished By:	Date/Time:	Received By:
	8/13/20 1505	

Comments: will need to be filtered

Rec'd 8/14/2020 1235 5.0°C

Diane Curtis

2020-08-209

Katahdin Analytical Services, LLC. — Sample Receipt Condition Report

Client:	Normandeau	KAS PM:	SM	Sampled By:	Client
Project:		KIMS Entry By:	JCB	Delivered By:	Client
KAS Work Order#:	SN6805	KIMS Review By:	SM	Received By:	JCB
SDG #:		Cooler: 1 of 1		Date/Time Rec.:	8/13/20 1355

Receipt Criteria	Y	N	EX*	NA	Comments and/or Resolution
1. Custody seals present / intact?		/			
2. Chain of Custody present in cooler?	/				
3. Chain of Custody signed by client?	/				
4. Chain of Custody matches samples?	✓				
5. Temperature Blanks present? If not, take temperature of any sample w/ IR gun.	✓				Temp (°C): 5.6 — Thermometer ID: IR-1
Samples received at <6 °C w/o freezing?	/				Note: Not required for metals (except Hg soil) analysis.
Ice packs or ice present?	/				The lack of ice or ice packs (i.e. no attempt to begin cooling process) or insufficient ice may not meet certain regulatory requirements and may invalidate certain data.
If yes, was there sufficient ice to meet temperature requirements?	/				
If temp. out, has the cooling process begun (i.e. ice or packs present) and sample collection times <6hrs., but samples are not yet cool?				✓	Note: No cooling process required for metals (except Hg soil) analysis.
6. Volatiles: **Aqueous:** No bubble larger than a pea?				✓	
Soil/Sediment: Received in airtight container?				✓	
Received in methanol?				✓	
Methanol covering soil?				✓	
D.I. Water - Received within 48 hour HT?				✓	
Air: Refer to KAS COC for canister/flow controller requirements.	√ if air included				
7. Trip Blank present in cooler?				✓	
8. Proper sample containers and volume?	✓				
9. Samples within hold time upon receipt?	✓				
10. Aqueous samples properly preserved? Metals, COD, NH3, TKN, O/G, phenol, TPO4, N+N, TOC, DRO, TPH – pH <2	✓				Doc/Filt metals filtered and pres. @ login/lab HNO3 MR2731 H2SO4 MR2706
Sulfide - >9				✓	
Cyanide – pH >12				✓	
11. Bottleware Prepped on:					

* Log-In Notes to Exceptions: document any problems with samples or discrepancies or pH adjustments.

Katahdin ANALYTICAL SERVICES
600 Technology Way
Scarborough, ME 04074
Tel: (207) 874-2400
Fax: (207) 775-4029

CHAIN of CUSTODY

PLEASE BEAR DOWN AND PRINT LEGIBLY IN PEN

Client: Normandeau Associates,	Contact: Mike Polchlopek	Phone #: (978) 895-5359	Fax #: ( )
Address: 25 Nashua Rd.	City: Bedford	State: NH	Zip Code: 03110
Purchase Order #: 24411.000 T2	Proj. Name / No.		Katahdin Quote #: 10179gdl
Bill (if different than above)	Address		
Sampler (Print / Sign): Michael Polchlopek	Michael Polchlopek		Copies To:

LAB USE ONLY — WORK ORDER #: SN6805

KATAHDIN PROJECT NUMBER

REMARKS:

SHIPPING INFO: ☐ FED EX ☐ UPS ☐ CLIENT

AIRBILL NO:

TEMP°C ☐ TEMP BLANK ☐ INTACT ☐ NOT INTACT

ANALYSIS AND CONTAINER TYPE PRESERVATIVES

★	Sample Description	Date / Time coll'd	Matrix	No. of Cntrs.	Filt. Y N Chlorophyll-a 1 L Amber Foil	Filt. Y N Total Phos. 250 mL - H_2SO_4	Filt. Y N Color, Alkalinity, pH 250 mL - HDPE	Filt. Y N DOC + Dissolved Metals 500 mL - HDPE	Filt. Y N Total Metals 250mL - HNO_3	Filt. Y N NO_3, Cl, SO_4 250mL - HDPE	Filt. Y N	Filt. Y N	Filt. Y N	Filt. Y N
	Rumford Middle Impoundment	8/13/20 07:35		6	X	X	X	X	X	X				
	Rumford Upper Impoundment	8/13/20 10:45		6	X	X	X	X	X	X				
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COMMENTS

Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)
X Michael Polchlopek	8/13/20 1355				
Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)

Katahdin
ANALYTICAL SERVICES

Katahdin Analytical Services

Login Chain of Custody Report (lno1)

Aug. 14, 2020
04:43 PM

Quote/Incoming:

Login Number: SN6805

Account: NORMAN001
Normandeau Corp.

Project:

NoWeb

Primary Report Address:
Michael Polchlopek
Normandeau Assoc., Inc.
25 Nashua Rd

Bedford,NH 03110
mpolchlopek@normandeau.com

Primary Invoice Address:
Accounts Payable
Normandeau Assoc., Inc.
550 Forest Avenue
Ste 201
Portland,ME 04101

Report CC Addresses:
Invoice CC Addresses:

Login Information:

ANALYSIS INSTRUCTIONS	:	
CHECK NO.	:	
CLIENT PO#	:	24411.000
CLIENT PROJECT MANAGE	:	
CONTRACT	:	
COOLER TEMPERATURE	:	5.6
DELIVERY SERVICES	:	Client
EDD FORMAT	:	KAS064QC-XLS
LOGIN INITIALS	:	JCB
PM	:	SJC
PROJECT NAME	:	Rumford Impoundment
QC LEVEL	:	II+
REPORT INSTRUCTIONS	:	report and EDD to mpolchlopek@normandeau.com. Invoice to abogart@normandeau.com
SDG ID	:	
SDG STATUS	:	
VERBAL TAT	:	

Login Number: SN6805

Account: NORMAN001 NoWeb
Normandeau Corp.

Project:

Quote/Incoming:

Laboratory Sample ID	Client Sample Number	Collect Date/Time	Receive Date	PR	Verbal Date	Due Date	Mailed
SN6805-1	RUMFORD MIDDLE IMPOUNDMENT	13-AUG-20 07:35	13-AUG-20			25-AUG-20	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Aqueous	S	E325.2-CHLORIDE	10-SEP-20	125mL Plastic		
Aqueous	S	E353.2-NITRATE	15-AUG-20	125mL Plastic		
Aqueous	S	E365.4-TOTAL-PHOS	10-SEP-20	125mL Plastic+H2SO4		
Aqueous	S	E375.4-SULFATE	10-SEP-20	250mL Plastic		
Aqueous	S	FILTERING				
Aqueous	S	SM10200-CHLOROPH-SUB	14-AUG-20	1000mL Plastic		
Aqueous	S	SM2120-APP-COLOR	15-AUG-20	125mL Plastic		
Aqueous	S	SM2320B-ALKALINITY	27-AUG-20			
Aqueous	S	SM4500HB-PH	14-AUG-20	125mL Plastic		
Aqueous	S	SW3010-PREP	09-FEB-21	250mL Plastic+HNO3		
Aqueous	S	SW6010-ALUMINUM	09-FEB-21	250mL Plastic+HNO3		
Aqueous	S	SW6010-CALCIUM	09-FEB-21	250mL Plastic+HNO3		
Aqueous	S	SW6010-IRON	09-FEB-21	250mL Plastic+HNO3		
Aqueous	S	SW6010-MAGNESIUM	09-FEB-21	250mL Plastic+HNO3		
Aqueous	S	SW6010-POTASSIUM	09-FEB-21	250mL Plastic+HNO3		
Aqueous	S	SW6010-SILICA-CALC	09-FEB-21	250mL Plastic+HNO3		
Aqueous	S	SW6010-SILICON	09-FEB-21	250mL Plastic+HNO3		
Aqueous	S	SW6010-SODIUM	09-FEB-21	250mL Plastic+HNO3		

SN6805-2	RUMFORD UPPER IMPOUNDMENT	13-AUG-20 10:45	13-AUG-20		25-AUG-20	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Aqueous	S	E325.2-CHLORIDE	10-SEP-20	125mL Plastic		
Aqueous	S	E353.2-NITRATE	15-AUG-20	125mL Plastic		
Aqueous	S	E365.4-TOTAL-PHOS	10-SEP-20	125mL Plastic+H2SO4		
Aqueous	S	E375.4-SULFATE	10-SEP-20	250mL Plastic		
Aqueous	S	FILTERING				
Aqueous	S	SM10200-CHLOROPH-SUB	14-AUG-20	1000mL Plastic		
Aqueous	S	SM2120-APP-COLOR	15-AUG-20	125mL Plastic		
Aqueous	S	SM2320B-ALKALINITY	27-AUG-20			
Aqueous	S	SM4500HB-PH	14-AUG-20	125mL Plastic		
Aqueous	S	SW3010-PREP	09-FEB-21	250mL Plastic+HNO3		
Aqueous	S	SW6010-ALUMINUM	09-FEB-21	250mL Plastic+HNO3		
Aqueous	S	SW6010-CALCIUM	09-FEB-21	250mL Plastic+HNO3		
Aqueous	S	SW6010-IRON	09-FEB-21	250mL Plastic+HNO3		
Aqueous	S	SW6010-MAGNESIUM	09-FEB-21	250mL Plastic+HNO3		
Aqueous	S	SW6010-POTASSIUM	09-FEB-21	250mL Plastic+HNO3		
Aqueous	S	SW6010-SILICA-CALC	09-FEB-21	250mL Plastic+HNO3		
Aqueous	S	SW6010-SILICON	09-FEB-21	250mL Plastic+HNO3		
Aqueous	S	SW6010-SODIUM	09-FEB-21	250mL Plastic+HNO3		

SN6805-3	RUMFORD MIDDLE IMPOUNDMENT	13-AUG-20 07:35	13-AUG-20		25-AUG-20	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Aqueous	S	SM5310B-DOC	10-SEP-20	40 mL Vial+H2SO4		
Aqueous	S	SW3010-PREP	09-FEB-21	250mL Plastic+HNO3		
Aqueous	S	SW6010-ALUMINUM-DIS	09-FEB-21	250mL Plastic+HNO3		

SN6805-4	RUMFORD UPPER IMPOUNDMENT	13-AUG-20 10:45	13-AUG-20		25-AUG-20	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Aqueous	S	SM5310B-DOC	10-SEP-20	40 mL Vial+H2SO4		
Aqueous	S	SW3010-PREP	09-FEB-21	250mL Plastic+HNO3		
Aqueous	S	SW6010-ALUMINUM-DIS	09-FEB-21	250mL Plastic+HNO3		

SN6805-5	FILTER BLANK	14-AUG-20 11:00	13-AUG-20		25-AUG-20	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Aqueous	S	SW3010-PREP	10-FEB-21	250mL Plastic+HNO3		
Aqueous	S	SW6010-ALUMINUM-DIS	10-FEB-21	250mL Plastic+HNO3		

Total Samples: 5 **Total Analyses:** 44

Katahdin
ANALYTICAL SERVICES

NH ELAP Lab ID 2001 (DW, NPW, SCM)
NYSDOH ELAP Lab ID 11121 (AE - T015)

September 11, 2020

Mr. Michael Polchlopek
Normandeau Assoc., Inc.
25 Nashua Rd
Bedford,NH 03110

RE: Katahdin Lab Number: SN7231
Project ID: Rumford Impoundment
Project Manager: Ms. Sara Colby
Sample Receipt Date(s): August 27, 2020

Dear Mr. Polchlopek:

Please find enclosed the following information:

* Report of Analysis (Analytical and/or Field)
* Laboratory results from subcontracted analysis (es)
* Quality Control Data Summary
* Chain of Custody (COC)
* Login Report

A copy of the Chain of Custody is included in the paginated report. If requested, the original COC is attached as an addendum to this report.

Should you have any questions or comments concerning this Report of Analysis, please do not hesitate to contact the project manager listed above. The results contained in this report relate only to the submitted samples. This cover letter is an integral part of the ROA.

We certify that the test results provided in this report meet all the requirements of the NELAC standards unless otherwise noted in an attached technical narrative or in the Report of Analysis.

We appreciate your continued use of our laboratory and look forward to working with you in the future. The following signature indicates technical review and acceptance of the data.

Please go to http://www.katahdinlab.com/cert for copies of Katahdin Analytical Services Inc. current certificates and analyte lists.

Sincerely,
KATAHDIN ANALYTICAL SERVICES

Leslie Dimond

Leslie Dimond - Quality Assurance Officer **Date** 09/11/2020

TECHNICAL NARRATIVE

Katahdin references the following versions of Standard Methods:
Color: SM 2120 B 2011
Turbidity: SM 2130 B 2011
Alkalinity: SM 2320 B 2011
Hardness: SM 2340 B 2011
Residue-total (TS): SM 2540 B 2011
Residue-filterable (TDS): SM 2540C 2011
Residue-nonfilterable (TSS): SM 2540 D 2011
Residue-settleable: SM 2540 F 2011
Total Solids: SM 2540 G 2011
Total Volatile Solids: SM 2540 G 2011
Chromium VI: SM 3500-Cr B 2011
Iron (Ferrous): SM 3500-Fe D 2011
Chloride: SM 4500-Cl^- E 2011
Amenable cyanide: SM 4500-CN G 2011
Fluoride: SM 4500-F^- B 2011
pH: SM 4500-H+ B 2011
Ammonia as N: SM 4500-NH3 H 2011
Orthophosphate as P: SM 4500-P E 2011
Sulfide: SM 4500-$S2^-$ F 2011
Sulfite: SM 4500-$SO3^-$ B 2011
Biochemical oxygen demand: SM 5210 B 2011
Carbonaceous BOD, CBOD: SM 5210 B 2011
Total Organic Carbon: SM 5310 B 2011
Surfactants: SM 5540 C 2011
Fecal coliforms: SM 9222 D (m-FC) 2006
Total Coliforms/ Escherichia coli: SM9223B (Coilert®) 2005
Escherichia coli: SM 9223 B (Colilert® Quanti-Tray®) 2004
Salmonella: SM 9260 D 2007

KATAHDIN ANALYTICAL SERVICES – INORGANIC DATA QUALIFIERS

The sampled date indicated on the attached Report(s) of Analysis (ROA) is the date for which a grab sample was collected or the date for which a composite sample was completed. Beginning and start times for composite samples can be found on the Chain-of-Custody.

U Indicates the compound was analyzed for but not detected above the specified level. This level may be the Practical Quantitation Level (PQL) (also called Limit of Quantitation (LOQ)), the Limit of Detection (LOD) or Method Detection Limit (MDL) as required by the client.

Note: All results reported as "U" MDL have a 50% rate for false negatives compared to those results reported as "U" PQL "U" LOQ or "U" LOD, where the rate of false negatives is <1%.

E Estimated value. This flag identifies compounds whose concentrations exceed the upper level of the calibration range of the instrument for that specific analysis.

J Estimated value. The analyte was detected in the sample at a concentration less than the laboratory Practical Quantitation Level (PQL) (also called Limit of Quantitation (LOQ)), but above the Method Detection Limit (MDL).

I-7 The laboratory's Practical Quantitation Level (PQL) or LOQ could not be achieved for this parameter due to sample composition, matrix effects, sample volume, or quantity used for analysis.

A-4 Please refer to cover letter or narrative for further information.

H_ Please note that the regulatory holding time for _____ is "analyze immediately". Ideally, this analysis must be performed in the field at the time of sample collection. _____ for this sample was not performed at the time of sample collection. The analysis was performed as soon as possible after receipt by the laboratory.

H1 - pH H2 - DO H3 - sulfite H4 - residual chlorine

T1 The client did not provide the full volume of at least one liter for analysis of TSS. Therefore, the PQL of 2.5 mg/L could not be achieved.

T2 The client provided the required volume of at least one liter for analysis of TSS, but the laboratory could not filter the full one liter volume due to the sample matrix. Therefore, the PQL of 2.5 mg/L could not be achieved.

M1 The matrix spike and/or matrix spike duplicate recovery performed on this sample was outside of the laboratory acceptance criteria. Sample matrix is suspected. The laboratory criteria was met for the Laboratory Control Sample (LCS) analyzed concurrently with this sample.

M2 The matrix spike and/or matrix spike duplicate recovery was outside of the laboratory acceptance criteria. The native sample concentration is greater than four times the spike added concentration so the spike added could not be distinguished from the native sample concentration.

R1 The relative percent difference (RPD) between the duplicate analyses performed on this sample was outside of the laboratory acceptance criteria (when both values are greater than ten times the PQL).

MCL	Maximum Contaminant Level	NL	No limit
NFL	No Free Liquid Present	FLP	Free Liquid Present
NOD	No Odor Detected	TON	Threshold Odor Number

D-1 As required by Method 5210B, APHA Standard Methods for the Examination of Water and Wastewater (21st edition), the BOD value reported for this sample is 'qualified' because the check standard run concurrently with the sample analysis did not meet the criteria specified in the method (198 +/- 30.5 mg/L). These results may not be reportable for compliance purposes.

D-2 The measured final dissolved oxygen concentrations of all dilutions were less than the method-specified limit of 1 mg/L. The reported BOD result was calculated assuming a final oxygen concentration equal to 1 mg/L. The reported value should be considered a minimum value.

D-3 The dilution water used to prepare this sample did not meet the method and/or regulatory criteria of less than 0.2 or 0.4 mg/L dissolved oxygen (DO) uptake over the five day period of incubation. These results may not be reportable for compliance purposes.

Katahdin
ANALYTICAL SERVICES

Report of Analytical Results

Client: Michael Polchlopek
Normandeau Assoc., Inc.
25 Nashua Rd
Bedford,NH 03110

Lab Sample ID: SN7231-1
Report Date: 11-SEP-20
Project: Rumford Impoundment
SDG: SN7231

Sample Description	Matrix	Date Sampled	Date Received
RUMFORD MIDDLE IMPOUNDMENT	AQ	27-AUG-20 07:30:00	27-AUG-20

Parameter	Result	Adj PQL	Adj MDL	Anal. Method	QC Batch	Analysis Date	Prep. Method	Prep. Date	Analyst	Footnotes	RPD/RSD
Alkalinity	9.5 mg/L	5.0	0.23	STDM 2320B	WG285824	08-SEP-20 10:31:06	N/A	N/A	ZL		
Apparent Color	20. PTCO	5.0	5.0	SM2120B	WG285397	01-SEP-20 08:30:00	N/A	N/A	ES		
Phosphorus, Total As P	U0.10 mg/L	0.10	.0262	EPA 365.4	WG285408	01-SEP-20 12:23:31	EPA 365.4	31-AUG-20	SS		
pH(Laboratory)	4.6 pH	0.10	0.10	SM 4500H-B	WG285336	28-AUG-20 09:52:57	N/A	N/A	ZL	H1	

Katahdin
ANALYTICAL SERVICES

Report of Analytical Results

Client: Michael Polchlopek
Normandeau Assoc., Inc.
25 Nashua Rd
Bedford,NH 03110

Lab Sample ID: SN7231-2
Report Date: 11-SEP-20
Project: Rumford Impoundment
SDG: SN7231

Sample Description	Matrix	Date Sampled	Date Received
RUMFORD UPPER IMPOUNDMENT	AQ	27-AUG-20 12:30:00	27-AUG-20

Parameter	Result	Adj PQL	Adj MDL	Anal. Method	QC Batch	Analysis Date	Prep. Method	Prep. Date	Analyst	Footnotes	RPD/RSD
Alkalinity	180 mg/L	5.0	0.23	STDM 2320B	WG285824	08-SEP-20 10:05:19	N/A	N/A	ZL		
Apparent Color	20. PTCO	5.0	5.0	SM2120B	WG285397	01-SEP-20 08:30:00	N/A	N/A	ES		
Phosphorus, Total As P	U0.10 mg/L	0.10	.0262	EPA 365.4	WG285408	01-SEP-20 12:24:37	EPA 365.4	31-AUG-20	SS		
pH(Laboratory)	6.7 pH	0.10	0.10	SM 4500H-B	WG285336	28-AUG-20 09:57:27	N/A	N/A	ZL	H1	

Quality Control Report

Blank Sample Summary Report

Alkalinity

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL
MBLANK	WG285824	SM2320B	08-SEP-20	N/A	U 5.0 mg/L	5.0 mg/L

Apparent Color

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL
MBLANK	WG285397	SM2120B	01-SEP-20	N/A	U 5.0 PTCO	5.0 PTCO

Phosphorus, Total As P

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL
MBLANK	WG285408	EPA 365.4	01-SEP-20	31-AUG-20	U 0.10 mg/L	0.10 mg/L

Quality Control Report

Laboratory Control Sample Summary Report

Alkalinity

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG285824-1	LCS	WG285824	08-SEP-20	N/A	mg/L	120	130	106	80-120	

Apparent Color

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG285397-2	LCS	WG285397	01-SEP-20	N/A	PTCO	50	50.	100	80-120	

Phosphorus, Total As P

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG285408-2	LCS	WG285408	01-SEP-20	31-AUG-20	mg/L	.5	0.45	90	80-120	

pH(Laboratory)

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG285336-1	LCS	WG285336	28-AUG-20	N/A	pH	7	7.0	100	90-110	

Quality Control Report

Duplicate Sample Summary Report

Apparent Color

Duplicate Sample ID	Original Sample ID	QC Batch	Analysis Date	Result Units	Sample Result	Duplicate Result	RPD(%)	RPD Limit
WG285397-3	SN7231-1	WG285397	01-SEP-20	PTCO	20.	20.	0	20

Phosphorus, Total As P

Duplicate Sample ID	Original Sample ID	QC Batch	Analysis Date	Result Units	Sample Result	Duplicate Result	RPD(%)	RPD Limit
WG285408-3	SN7231-1	WG285408	01-SEP-20	mg/L	U 0.10	U 0.10	NC	30

pH(Laboratory)

Duplicate Sample ID	Original Sample ID	QC Batch	Analysis Date	Result Units	Sample Result	Duplicate Result	RPD(%)	RPD Limit
WG285336-2	SN7231-2	WG285336	28-AUG-20	pH	6.7	6.9	4	20

Quality Control Report

Matrix Spike Sample Summary Report

Phosphorus, Total As P

Matrix Spike Sample ID	Sample Type	Original Sample ID	QC Batch	Analysis Date	Result Units	Spike Amount	Sample Result	MS Result	Recovery (%)	Recovery Limit
WG285408-4	MS	SN7231-1	WG285408	01-SEP-20	mg/L	0.5	U 0.10	.465	93	75 - 125
WG285408-5	MS	SN7231-2	WG285408	01-SEP-20	mg/L	0.5	U 0.10	.48	96	75 - 125

ClearWater Laboratory
The Premier Water Testing Lab in Maine

9/10/2020

Ms. Sara Colby
Katahdin Analytical Services
P.O. Box 540
Scarborough, ME 04074

Dear Sara

Please find enclosed the results of your sample analysis. Below you will find any comments related to your sample results. We appreciate the opportunity to provide you with our analytical services. Please do not hesitate to contact our office if you have any questions or comments regarding these results.

Sincerely,
ClearWater Laboratory

Marc H. Hein (signature)

Marc H. Hein
Laboratory Manager

Enclosure

2020-08-452.2	Chlorophyll sample was extracted on 08/29/20 and analyzed on 08/30/20.
2020-08-452.1	Chlorophyll sample was extracted on 08/29/20 and analyzed on 08/30/20.

153 Main Street • Newport, ME 04953 • Phone: 207.368.5700 • Fax: 207.368.5120 • E-mail: MHein@ClearWaterLab.com

ClearWater Laboratory
The Premier Water Testing Lab in Maine

Client: Katahdin Analytical Services
Ms. Sara Colby
P.O. Box 540
Scarborough, ME 04074

Report Date: 09/10/2020

REPORT OF LABORATORY ANALYSIS

Sample Description	Result	Units	Reporting Limit	Method	Date / Time Sampled	Date / Time Analyzed
Chlorophyll-A (Corrected)	**2.0**	ug/L	1.0	EPA 445	08/27/20 0730	08/30/20 1130
2020-08-452.1 Rumford Middle Impoundment - Grab					Lab: CWL	Analyst: nj
* Comments: Chlorophyll sample filtered and frozen upon arrival at lab - see cover page for extraction info.						
Chlorophyll-A (Corrected)	**2.3**	ug/L	1.0	EPA 445	08/27/20 1230	08/30/20 1130
2020-08-452.2 Rumford Upper Impoundment - Grab					Lab: CWL	Analyst: nj
* Comments: Chlorophyll sample filtered and frozen upon arrival at lab - see cover page for extraction info.						

Katahdin
ANALYTICAL SERVICES

Sub-contract Laboratory Chain of Custody

Client:	Contact:	Email:		Phone #:
Katahdin Analytical Services	SJC	scolby@katahdinlab.com		(207) 874-2400
Address:	**City:**	**State:**	**Zip:**	**Project Name:**
600 Technology Way	Scarborough	Maine	04074	
KAS WO #:	**Quote #:**	**Purchase Order #:**		**TAT:** STD
SN7231				**Verbal TAT:**
RPT Level: II	**Reporting Format:** STD	**EDD:** ME EGAD		**Analysis:** Chlorophyll-A

Sample ID:	Collect Date and Time:	Matrix:	No. of Containers	Pres.	MS/MSD Dup.	Filtered? Y / N	Filtered? Y / N	Filtered? Y / N
01 RUMFORD MIDDLE IMPOUNDMEN	27-AUG-20 07:30	AQ	1	—	—	X		
02 RUMFORD UPPER IMPOUNDMENT	27-AUG-20 12:30	AQ	1	—	—	X		

Relinquished By:	Date/Time:	Received By:
Kyle Lord	8-27-20 1550	Diane Curtis 8/28/2020

Comments:

2020-08-452.0
08/28/2020 1205 @ 5.9°c

Katahdin Analytical Services, LLC.

Sample Receipt Condition Report

Client: Normandeau	KAS PM: SC	Sampled By: Client
Project:	KIMS Entry By: JLB	Delivered By: Client
KAS Work Order#: SN7231	KIMS Review By: SC	Received By: EC
SDG #:	Cooler: 1 of 1	Date/Time Rec.: 8-27-20 1545

Receipt Criteria	Y	N	EX*	NA	Comments and/or Resolution
1. Custody seals present / intact?				✓	
2. Chain of Custody present in cooler?	✓				
3. Chain of Custody signed by client?	✓				
4. Chain of Custody matches samples?	✓				
5. Temperature Blanks present? If not, take temperature of any sample w/ IR gun.	✓				Temp (°C): 0.8 — Thermometer ID: IR-1
Samples received at <6 °C w/o freezing?	✓				Note: Not required for metals (except Hg soil) analysis.
Ice packs or ice present?	✓				The lack of ice or ice packs (i.e. no attempt to begin cooling process) or insufficient ice may not meet certain regulatory requirements and may invalidate certain data.
If yes, was there sufficient ice to meet temperature requirements?	✓				
If temp. out, has the cooling process begun (i.e. ice or packs present) and sample collection times <6hrs., but samples are not yet cool?				✓	Note: No cooling process required for metals (except Hg soil) analysis.
6. Volatiles:					
Aqueous: No bubble larger than a pea?				✓	
Soil/Sediment:					
Received in airtight container?				✓	
Received in methanol?				✓	
Methanol covering soil?				✓	
D.I. Water - Received within 48 hour HT?				✓	
Air: Refer to KAS COC for canister/flow controller requirements.	√ if air included				
7. Trip Blank present in cooler?				✓	
8. Proper sample containers and volume?	✓				
9. Samples within hold time upon receipt?	✓				
10. Aqueous samples properly preserved? Metals, COD, NH3, TKN, O/G, phenol, TPO4, N+N, TOC, DRO, TPH – pH <2				✓	
Sulfide - >9				✓	
Cyanide – pH >12				✓	
11. Bottleware Prepped on:					

* Log-In Notes to Exceptions: document any problems with samples or discrepancies or pH adjustments.

Katahdin ANALYTICAL SERVICES
600 Technology Way
Scarborough, ME 04074
Tel: (207) 874-2400
Fax: (207) 775-4029

CHAIN of CUSTODY

PLEASE BEAR DOWN AND PRINT LEGIBLY IN PEN

Client	Contact	Phone #	Fax #
Normandeau Associates	Mike Polchlopek	(978) 895-5359	( )

Address	City	State	Zip Code
25 Nashua Road	Bedford	NH	03110

Purchase Order #	Proj. Name / No.	Katahdin Quote #
24411.000 T2		10179 gdl

Bill (if different than above) Address

Sampler (Print / Sign) Michael Polchlopek Michael Polchlopek

Copies To:

LAB USE ONLY

WORK ORDER #: SN7231

KATAHDIN PROJECT NUMBER

REMARKS:

SHIPPING INFO: ☐ FED EX ☐ UPS ☐ CLIENT

AIRBILL NO:

TEMP°C ☐ TEMP BLANK ☐ INTACT ☐ NOT INTACT

★	Sample Description	Date / Time coll'd	Matrix	No. of Cntrs.	ANALYSIS AND CONTAINER TYPE PRESERVATIVES: Filt. Y N — Chlorophyll-a 1L Amber Foil	Filt. Y N — Total Phosphorus 250mL - H2SO4	Filt. Y N — Color, Alkalinity, pH 250mL - Plastic	Filt. Y N	Filt. Y N	Filt. Y N	Filt. Y N	Filt. Y N	Filt. Y N	Filt. Y N
	Rumford Middle Impoundment	8/27/20/07:30		3	X	X	X							
	Rumford Upper Impoundment	8/27/20/12:30		3	X	X	X							
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		/												

COMMENTS

Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)
Michael Polchlopek	8-27-20 1545	Erika Frost			
Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)

Katahdin
ANALYTICAL SERVICES

Katahdin Analytical Services

Login Chain of Custody Report (lno1)

Aug. 27, 2020
04:29 PM

Login Number: SN6805

Account: NORMAN001
Normandeau Corp.

Project:

Primary Report Address:
Michael Polchlopek
Normandeau Assoc., Inc.
25 Nashua Rd

Bedford,NH 03110
mpolchlopek@normandeau.com

Primary Invoice Address:
Accounts Payable
Normandeau Assoc., Inc.
550 Forest Avenue
Ste 201
Portland,ME 04101

Report CC Addresses:
Invoice CC Addresses:

Quote/Incoming:

NoWeb

Login Information:

ANALYSIS INSTRUCTIONS	:	
CHECK NO.	:	
CLIENT PO#	:	24411.000
CLIENT PROJECT MANAGE	:	
CONTRACT	:	
COOLER TEMPERATURE	:	5.6
DELIVERY SERVICES	:	Client
EDD FORMAT	:	KAS064QC-XLS
LOGIN INITIALS	:	JCB
PM	:	SJC
PROJECT NAME	:	Rumford Impoundment
QC LEVEL	:	II+
REPORT INSTRUCTIONS	:	report and EDD to mpolchlopek@normandeau.com. Invoice to abogart@normandeau.com
SDG ID	:	
SDG STATUS	:	
VERBAL TAT	:	

Login Number: SN6805

Quote/Incoming:

Account: NORMAN001 NoWeb

Normandeau Corp.

Project:

Laboratory Sample ID	Client Sample Number	Collect Date/Time	Receive Date	PR	Verbal Date	Due Date	Mailed
SN6805-1	RUMFORD MIDDLE IMPOUNDMENT	13-AUG-20 07:35	13-AUG-20			25-AUG-20	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Aqueous	S	E325.2-CHLORIDE	10-SEP-20	125mL Plastic		
Aqueous	S	E353.2-NITRATE	15-AUG-20	125mL Plastic		
Aqueous	S	E365.4-TOTAL-PHOS	10-SEP-20	125mL Plastic+H2SO4		
Aqueous	S	E375.4-SULFATE	10-SEP-20	250mL Plastic		
Aqueous	S	FILTERING				
Aqueous	S	SM10200-CHLOROPH-SUB	14-AUG-20	1000mL Plastic		
Aqueous	S	SM2120-APP-COLOR	15-AUG-20	125mL Plastic		
Aqueous	S	SM2320B-ALKALINITY	27-AUG-20			
Aqueous	S	SM4500HB-PH	14-AUG-20	125mL Plastic		
Aqueous	S	SW3010-PREP	09-FEB-21	250mL Plastic+HNO3		
Aqueous	S	SW6010-ALUMINUM	09-FEB-21	250mL Plastic+HNO3		
Aqueous	S	SW6010-CALCIUM	09-FEB-21	250mL Plastic+HNO3		
Aqueous	S	SW6010-IRON	09-FEB-21	250mL Plastic+HNO3		
Aqueous	S	SW6010-MAGNESIUM	09-FEB-21	250mL Plastic+HNO3		
Aqueous	S	SW6010-POTASSIUM	09-FEB-21	250mL Plastic+HNO3		
Aqueous	S	SW6010-SILICA-CALC	09-FEB-21	250mL Plastic+HNO3		
Aqueous	S	SW6010-SILICON	09-FEB-21	250mL Plastic+HNO3		
Aqueous	S	SW6010-SODIUM	09-FEB-21	250mL Plastic+HNO3		

SN6805-2	RUMFORD UPPER IMPOUNDMENT	13-AUG-20 10:45	13-AUG-20		25-AUG-20	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Aqueous	S	E325.2-CHLORIDE	10-SEP-20	125mL Plastic		
Aqueous	S	E353.2-NITRATE	15-AUG-20	125mL Plastic		
Aqueous	S	E365.4-TOTAL-PHOS	10-SEP-20	125mL Plastic+H2SO4		
Aqueous	S	E375.4-SULFATE	10-SEP-20	250mL Plastic		
Aqueous	S	FILTERING				
Aqueous	S	SM10200-CHLOROPH-SUB	14-AUG-20	1000mL Plastic		
Aqueous	S	SM2120-APP-COLOR	15-AUG-20	125mL Plastic		
Aqueous	S	SM2320B-ALKALINITY	27-AUG-20			
Aqueous	S	SM4500HB-PH	14-AUG-20	125mL Plastic		
Aqueous	S	SW3010-PREP	09-FEB-21	250mL Plastic+HNO3		
Aqueous	S	SW6010-ALUMINUM	09-FEB-21	250mL Plastic+HNO3		
Aqueous	S	SW6010-CALCIUM	09-FEB-21	250mL Plastic+HNO3		
Aqueous	S	SW6010-IRON	09-FEB-21	250mL Plastic+HNO3		
Aqueous	S	SW6010-MAGNESIUM	09-FEB-21	250mL Plastic+HNO3		
Aqueous	S	SW6010-POTASSIUM	09-FEB-21	250mL Plastic+HNO3		
Aqueous	S	SW6010-SILICA-CALC	09-FEB-21	250mL Plastic+HNO3		
Aqueous	S	SW6010-SILICON	09-FEB-21	250mL Plastic+HNO3		
Aqueous	S	SW6010-SODIUM	09-FEB-21	250mL Plastic+HNO3		

SN6805-3	RUMFORD MIDDLE IMPOUNDMENT	13-AUG-20 07:35	13-AUG-20		25-AUG-20	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Aqueous	S	SM5310B-DOC	10-SEP-20	40 mL Vial+H2SO4		
Aqueous	S	SW3010-PREP	09-FEB-21	250mL Plastic+HNO3		
Aqueous	S	SW6010-ALUMINUM-DIS	09-FEB-21	250mL Plastic+HNO3		

SN6805-4	RUMFORD UPPER IMPOUNDMENT	13-AUG-20 10:45	13-AUG-20		25-AUG-20	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Aqueous	S	SM5310B-DOC	10-SEP-20	40 mL Vial+H2SO4		
Aqueous	S	SW3010-PREP	09-FEB-21	250mL Plastic+HNO3		
Aqueous	S	SW6010-ALUMINUM-DIS	09-FEB-21	250mL Plastic+HNO3		

SN6805-5	FILTER BLANK	14-AUG-20 11:00	13-AUG-20		25-AUG-20	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Aqueous	S	SW3010-PREP	10-FEB-21	250mL Plastic+HNO3		
Aqueous	S	SW6010-ALUMINUM-DIS	10-FEB-21	250mL Plastic+HNO3		

Total Samples: *5* ***Total Analyses:*** *44*

Katahdin
ANALYTICAL SERVICES

NH ELAP Lab ID 2001 (DW, NPW, SCM)
NYSDOH ELAP Lab ID 11121 (AE - T015)

October 2, 2020

Mr. Michael Polchlopek
Normandeau Assoc., Inc.
25 Nashua Rd
Bedford,NH 03110

RE: Katahdin Lab Number: SN7608
Project ID:
Project Manager: Ms. Sara Colby
Sample Receipt Date(s): September 10, 2020

Dear Mr. Polchlopek:

Please find enclosed the following information:

* Report of Analysis (Analytical and/or Field)
* Laboratory results from subcontracted analysis (es)
* Quality Control Data Summary
* Chain of Custody (COC)
* Login Report

A copy of the Chain of Custody is included in the paginated report. If requested, the original COC is attached as an addendum to this report.

Should you have any questions or comments concerning this Report of Analysis, please do not hesitate to contact the project manager listed above. The results contained in this report relate only to the submitted samples. This cover letter is an integral part of the ROA.

We certify that the test results provided in this report meet all the requirements of the NELAC standards unless otherwise noted in an attached technical narrative or in the Report of Analysis.

We appreciate your continued use of our laboratory and look forward to working with you in the future. The following signature indicates technical review and acceptance of the data.

Please go to http://www.katahdinlab.com/cert for copies of Katahdin Analytical Services Inc. current certificates and analyte lists.

Sincerely,
KATAHDIN ANALYTICAL SERVICES

Leslie Dimond

Leslie Dimond - Quality Assurance Officer

10/02/2020

Date

TECHNICAL NARRATIVE

Katahdin references the following versions of Standard Methods:
Color: SM 2120 B 2011
Turbidity: SM 2130 B 2011
Alkalinity: SM 2320 B 2011
Hardness: SM 2340 B 2011
Residue-total (TS): SM 2540 B 2011
Residue-filterable (TDS): SM 2540C 2011
Residue-nonfilterable (TSS): SM 2540 D 2011
Residue-settleable: SM 2540 F 2011
Total Solids: SM 2540 G 2011
Total Volatile Solids: SM 2540 G 2011
Chromium VI: SM 3500-Cr B 2011
Iron (Ferrous): SM 3500-Fe D 2011
Chloride: SM 4500-Cl^- E 2011
Amenable cyanide: SM 4500-CN G 2011
Fluoride: SM 4500-F^- B 2011
pH: SM 4500-H+ B 2011
Ammonia as N: SM 4500-NH3 H 2011
Orthophosphate as P: SM 4500-P E 2011
Sulfide: SM 4500-$S2^-$ F 2011
Sulfite: SM 4500-$SO3^-$ B 2011
Biochemical oxygen demand: SM 5210 B 2011
Carbonaceous BOD, CBOD: SM 5210 B 2011
Total Organic Carbon: SM 5310 B 2011
Surfactants: SM 5540 C 2011
Fecal coliforms: SM 9222 D (m-FC) 2006
Total Coliforms/ Escherichia coli: SM9223B (Coilert®) 2005
Escherichia coli: SM 9223 B (Colilert® Quanti-Tray®) 2004
Salmonella: SM 9260 D 2007

KATAHDIN ANALYTICAL SERVICES – INORGANIC DATA QUALIFIERS

The sampled date indicated on the attached Report(s) of Analysis (ROA) is the date for which a grab sample was collected or the date for which a composite sample was completed. Beginning and start times for composite samples can be found on the Chain-of-Custody.

U Indicates the compound was analyzed for but not detected above the specified level. This level may be the Practical Quantitation Level (PQL) (also called Limit of Quantitation (LOQ)), the Limit of Detection (LOD) or Method Detection Limit (MDL) as required by the client.

Note: All results reported as "U" MDL have a 50% rate for false negatives compared to those results reported as "U" PQL "U" LOQ or "U" LOD, where the rate of false negatives is <1%.

E Estimated value. This flag identifies compounds whose concentrations exceed the upper level of the calibration range of the instrument for that specific analysis.

J Estimated value. The analyte was detected in the sample at a concentration less than the laboratory Practical Quantitation Level (PQL) (also called Limit of Quantitation (LOQ)), but above the Method Detection Limit (MDL).

I-7 The laboratory's Practical Quantitation Level (PQL) or LOQ could not be achieved for this parameter due to sample composition, matrix effects, sample volume, or quantity used for analysis.

A-4 Please refer to cover letter or narrative for further information.

H_ Please note that the regulatory holding time for _____ is "analyze immediately". Ideally, this analysis must be performed in the field at the time of sample collection. _____ for this sample was not performed at the time of sample collection. The analysis was performed as soon as possible after receipt by the laboratory.

H1 - pH H2 - DO H3 - sulfite H4 - residual chlorine

T1 The client did not provide the full volume of at least one liter for analysis of TSS. Therefore, the PQL of 2.5 mg/L could not be achieved.

T2 The client provided the required volume of at least one liter for analysis of TSS, but the laboratory could not filter the full one liter volume due to the sample matrix. Therefore, the PQL of 2.5 mg/L could not be achieved.

M1 The matrix spike and/or matrix spike duplicate recovery performed on this sample was outside of the laboratory acceptance criteria. Sample matrix is suspected. The laboratory criteria was met for the Laboratory Control Sample (LCS) analyzed concurrently with this sample.

M2 The matrix spike and/or matrix spike duplicate recovery was outside of the laboratory acceptance criteria. The native sample concentration is greater than four times the spike added concentration so the spike added could not be distinguished from the native sample concentration.

R1 The relative percent difference (RPD) between the duplicate analyses performed on this sample was outside of the laboratory acceptance criteria (when both values are greater than ten times the PQL).

MCL	Maximum Contaminant Level	NL	No limit
NFL	No Free Liquid Present	FLP	Free Liquid Present
NOD	No Odor Detected	TON	Threshold Odor Number

D-1 As required by Method 5210B, APHA Standard Methods for the Examination of Water and Wastewater (21st edition), the BOD value reported for this sample is 'qualified' because the check standard run concurrently with the sample analysis did not meet the criteria specified in the method (198 +/- 30.5 mg/L). These results may not be reportable for compliance purposes.

D-2 The measured final dissolved oxygen concentrations of all dilutions were less than the method-specified limit of 1 mg/L. The reported BOD result was calculated assuming a final oxygen concentration equal to 1 mg/L. The reported value should be considered a minimum value.

D-3 The dilution water used to prepare this sample did not meet the method and/or regulatory criteria of less than 0.2 or 0.4 mg/L dissolved oxygen (DO) uptake over the five day period of incubation. These results may not be reportable for compliance purposes.

Katahdin
ANALYTICAL SERVICES

Report of Analytical Results

Client: Michael Polchlopek
Normandeau Assoc., Inc.
25 Nashua Rd
Bedford,NH 03110

Lab Sample ID: SN7608-1
Report Date: 17-SEP-20
Project:
SDG: SN7608

Sample Description	Matrix	Date Sampled	Date Received
RUMFORD MIDDLE IMPOUNDMENT	AQ	10-SEP-20 07:30:00	10-SEP-20

Parameter	Result	Adj PQL	Adj MDL	Anal. Method	QC Batch	Analysis Date	Prep. Method	Prep. Date	Analyst	Footnotes	RPD/RSD
Alkalinity	12. mg/L	5.0	0.23	STDM 2320B	WG286336	16-SEP-20 12:38:18	N/A	N/A	ES		
Apparent Color	10. PTCO	5.0	5.0	SM2120B	WG285922	10-SEP-20 12:41:00	N/A	N/A	ES		
Phosphorus, Total As P	U0.10 mg/L	0.10	.0262	EPA 365.4	WG286183	14-SEP-20 13:16:31	EPA 365.4	11-SEP-20	SS		
pH(Laboratory)	6.8 pH	0.10	0.10	SM 4500H-B	WG286037	10-SEP-20 14:05:05	N/A	N/A	ZL	H1	

Report of Analytical Results

Client: Michael Polchlopek
Normandeau Assoc., Inc.
25 Nashua Rd
Bedford,NH 03110

Lab Sample ID: SN7608-2
Report Date: 17-SEP-20
Project:
SDG: SN7608

Sample Description	Matrix	Date Sampled	Date Received
RUMFORD UPPER IMPOUNDMENT	AQ	10-SEP-20 09:55:00	10-SEP-20

Parameter	Result	Adj PQL	Adj MDL	Anal. Method	QC Batch	Analysis Date	Prep. Method	Prep. Date	Analyst	Footnotes	RPD/RSD
Alkalinity	11. mg/L	5.0	0.23	STDM 2320B	WG286336	16-SEP-20 12:42:44	N/A	N/A	ES		
Apparent Color	U5.0 PTCO	5.0	5.0	SM2120B	WG285922	10-SEP-20 12:41:00	N/A	N/A	ES		
Phosphorus, Total As P	U0.10 mg/L	0.10	.0262	EPA 365.4	WG286183	14-SEP-20 13:18:41	EPA 365.4	11-SEP-20	SS		
pH(Laboratory)	6.9 pH	0.10	0.10	SM 4500H-B	WG286037	10-SEP-20 14:09:35	N/A	N/A	ZL	H1	

Quality Control Report

Blank Sample Summary Report

Alkalinity

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL
MBLANK	WG286336	SM2320B	16-SEP-20	N/A	U 5.0 mg/L	5.0 mg/L

Apparent Color

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL
MBLANK	WG285922	SM2120B	10-SEP-20	N/A	U 5.0 PTCO	5.0 PTCO

Phosphorus, Total As P

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL
MBLANK	WG286183	EPA 365.4	14-SEP-20	11-SEP-20	U 0.10 mg/L	0.10 mg/L

600 Technology Way
P.O. Box 540, Scarborough, ME 04070
Tel:(207) 874-2400 Fax:(207) 775-4029

http://katahdinlab.com
sales@katahdinlab.com

Quality Control Report

Laboratory Control Sample Summary Report

Alkalinity

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG286336-2	LCS	WG286336	16-SEP-20	N/A	mg/L	120	120	102	80-120	

Apparent Color

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG285922-2	LCS	WG285922	10-SEP-20	N/A	PTCO	50	50.	100	80-120	

Phosphorus, Total As P

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG286183-2	LCS	WG286183	14-SEP-20	11-SEP-20	mg/L	.5	0.49	97	80-120	

pH(Laboratory)

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG286037-1	LCS	WG286037	10-SEP-20	N/A	pH	7	7.0	100	90-110	

Quality Control Report

Duplicate Sample Summary Report

Alkalinity

Duplicate Sample ID	Original Sample ID	QC Batch	Analysis Date	Result Units	Sample Result	Duplicate Result	RPD(%)	RPD Limit
WG286336-5	SN7608-1	WG286336	16-SEP-20	mg/L	12.	11.	7	20

600 Technology Way
P.O. Box 540, Scarborough, ME 04070
Tel:(207) 874-2400 Fax:(207) 775-4029

http://katahdinlab.com
sales@katahdinlab.com

Quality Control Report

Matrix Spike Sample Summary Report

Phosphorus, Total As P

Matrix Spike Sample ID	Sample Type	Original Sample ID	QC Batch	Analysis Date	Result Units	Spike Amount	Sample Result	MS Result	Recovery (%)	Recovery Limit
WG286183-5	MS	SN7608-1	WG286183	14-SEP-20	mg/L	0.5	U 0.10	.522	104	75 - 125

600 Technology Way
P.O. Box 540, Scarborough, ME 04070
Tel:(207) 874-2400 Fax:(207) 775-4029

http://katahdinlab.com
sales@katahdinlab.com

9/30/2020

Ms. Sara Colby
Katahdin Analytical Services
P.O. Box 540
Scarborough, ME 04074

Dear Sara

Please find enclosed the results of your sample analysis. Below you will find any comments related to your sample results. We appreciate the opportunity to provide you with our analytical services. Please do not hesitate to contact our office if you have any questions or comments regarding these results.

Sincerely,
ClearWater Laboratory

Marc H. Hein (signature)

Marc H. Hein
Laboratory Manager

Enclosure

2020-09-193.2	Chlorophyll sample was extracted on 09/28/20 and analyzed on 09/29/20.
2020-09-193.1	Chlorophyll sample was extracted on 09/28/20 and analyzed on 09/29/20.

153 Main Street • Newport, ME 04953 • Phone: 207.368.5700 • Fax: 207.368.5120 • E-mail: MHein@ClearWaterLab.com

ClearWater Laboratory
The Premier Water Testing Lab in Maine

Client: Katahdin Analytical Services
Ms. Sara Colby
P.O. Box 540
Scarborough, ME 04074

Report Date: 09/30/2020

REPORT OF LABORATORY ANALYSIS

Sample Description	Result	Units	Reporting Limit	Method	Date / Time Sampled	Date / Time Analyzed
Chlorophyll-A (Corrected)	**1.0**	ug/L	1.0	EPA 445	09/10/20	09/29/20
2020-09-193.1 Rumford Middle Impoundment - Grab					0730	1030
					Lab: CWL	Analyst: nj
* Comments: Chlorophyll sample filtered and frozen upon arrival at lab - see cover page for extraction info.						
Chlorophyll-A (Corrected)	**1.1**	ug/L	1.0	EPA 445	09/10/20	09/29/20
2020-09-193.2 Rumford Upper Impoundment - Grab					0955	1030
					Lab: CWL	Analyst: nj
* Comments: Chlorophyll sample filtered and frozen upon arrival at lab - see cover page for extraction info.						

√ no Clearwater

Katahdin
ANALYTICAL SERVICES

Sub-contract Laboratory Chain of Custody

Client:	Contact:	Email:		Phone #:
Katahdin Analytical Services	SJC	scolby@katahdinlab.com		(207) 874-2400
Address:	**City:**	**State:**	**Zip:**	**Project Name:**
600 Technology Way	Scarborough	Maine	04074	
KAS WO #:	**Quote #:**	**Purchase Order #:**		**TAT:** Std
SN7608				**Verbal TAT:**
RPT Level: II	**Reporting Format:** Std	**EDD:** ME		

Sample ID:	Collect Date and Time:	Matrix:	No. of Containers	Pres.	MS/MSD Dup.	Analysis: Chlorophyll A Filtered? Y / N	Analysis: Filtered? Y / N	Analysis: Filtered? Y / N
.01 RUMFORD MIDDLE IMPOUNDMEN	10-SEP-20 07:30	AQ	1	none	no	X		
.02 RUMFORD UPPER IMPOUNDMENT	10-SEP-20 09:55	AQ	1	none	no	X		

Relinquished By:	Date/Time:	Received By:
	9.10.20 1430	Diane Curtis 9/11/2020 1205

Comments:

w/ice @ 4.0°C

2020-09-193

Katahdin Analytical Services, LLC. — Sample Receipt Condition Report

Client:	Normandeau	KAS PM:	SJC	Sampled By:	Client
Project:		KIMS Entry By:	JCB	Delivered By:	Client
KAS Work Order#:	SN7608	KIMS Review By:	SJC	Received By:	JCB
SDG #:		Cooler: 1 of 1		Date/Time Rec.:	9.10.20 1300

Receipt Criteria	Y	N	EX*	NA	Comments and/or Resolution
1. Custody seals present / intact?		✓			
2. Chain of Custody present in cooler?	✓				
3. Chain of Custody signed by client?	✓				
4. Chain of Custody matches samples?	✓				
5. Temperature Blanks present? If not, take temperature of any sample w/ IR gun.	✓				Temp (°C): 1.9 — Thermometer ID: IR-1
Samples received at <6 °C w/o freezing?	✓				Note: Not required for metals (except Hg soil) analysis.
Ice packs or ice present?	✓				The lack of ice or ice packs (i.e. no attempt to begin cooling process) or insufficient ice may not meet certain regulatory requirements and may invalidate certain data.
If yes, was there sufficient ice to meet temperature requirements?	✓				
If temp. out, has the cooling process begun (i.e. ice or packs present) and sample collection times <6hrs., but samples are not yet cool?				✓	Note: No cooling process required for metals (except Hg soil) analysis.
6. Volatiles:					
Aqueous: No bubble larger than a pea?				✓	
Soil/Sediment:					
Received in airtight container?				✓	
Received in methanol?				✓	
Methanol covering soil?				✓	
D.I. Water - Received within 48 hour HT?				✓	
Air: Refer to KAS COC for canister/flow controller requirements.	√ if air included				
7. Trip Blank present in cooler?				✓	
8. Proper sample containers and volume?	✓				
9. Samples within hold time upon receipt?	✓				
10. Aqueous samples properly preserved? Metals, COD, NH3, TKN, O/G, phenol, TPO4, N+N, TOC, DRO, TPH – pH <2	✓				
Sulfide - >9				✓	
Cyanide – pH >12				✓	
11. Bottleware Prepped on:					

* Log-In Notes to Exceptions: document any problems with samples or discrepancies or pH adjustments.

Katahdin ANALYTICAL SERVICES
600 Technology Way
Scarborough, ME 04074
Tel: (207) 874-2400
Fax: (207) 775-4029

CHAIN of CUSTODY

PLEASE BEAR DOWN AND PRINT LEGIBLY IN PEN

Client	Contact	Phone #	Fax #
Normandeau Associates	Mike Polchlopek	978) 895-5359	( )

Address: 25 Nashua Rd. City: Bedford State: NH Zip Code: 03110

Purchase Order #: 24411.000 T2 Proj. Name / No.: Katahdin Quote #: 10179 qd1

Bill (if different than above): Address:

Sampler (Print / Sign): Copies To:

LAB USE ONLY

WORK ORDER #: SN7608

KATAHDIN PROJECT NUMBER:

REMARKS:

SHIPPING INFO: ☐ FED EX ☐ UPS ☐ CLIENT

AIRBILL NO:

TEMP°C: ☐ TEMP BLANK ☐ INTACT ☐ NOT INTACT

★	Sample Description	Date / Time coll'd	Matrix	No. of Cntrs.	ANALYSIS AND CONTAINER TYPE PRESERVATIVES: Filt. Y☒N Chlorophyll-a 1L Amber Foil	Filt. Y☒N Total Phosphorus 250mL H_2SO_4	Filt. Y☒N Color, Alkalinity, pH 250mL plastic	Filt. Y☐N	Filt. Y☐N	Filt. Y☐N	Filt. Y☐N	Filt. Y☐N	Filt. Y☐N	Filt. Y☐N
	Rumford Middle Impoundment	9/10/20 0730		3	✓	✓	✓							
	Rumford Upper Impoundment	9/10/20 0955		3	✓	✓	✓							
		/												
		/												
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		/												

COMMENTS

Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)
	9.10.20 1300				
Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)

Katahdin
ANALYTICAL SERVICES

Katahdin Analytical Services

Login Chain of Custody Report (lno1)

Sep. 11, 2020
09:21 AM

Login Number: SN7608

Account: NORMAN001
Normandeau Corp.

Project:

Primary Report Address:
Michael Polchlopek
Normandeau Assoc., Inc.
25 Nashua Rd

Bedford,NH 03110
mpolchlopek@normandeau.com

Primary Invoice Address:
Accounts Payable
Normandeau Assoc., Inc.
550 Forest Avenue
Ste 201
Portland,ME 04101

Report CC Addresses:
Invoice CC Addresses:

NoWeb

Quote/Incoming:

Login Information:

ANALYSIS INSTRUCTIONS	:	
CHECK NO.	:	
CLIENT PO#	:	24411.000
CLIENT PROJECT MANAGE	:	
CONTRACT	:	
COOLER TEMPERATURE	:	1.9
DELIVERY SERVICES	:	Client
EDD FORMAT	:	KAS064QC-XLS
LOGIN INITIALS	:	JCB
PM	:	SJC
PROJECT NAME	:	
QC LEVEL	:	II+
REPORT INSTRUCTIONS	:	report and EDD to mpolchlopek@normandeau.com. Invoice to abogart@normandeau.com
SDG ID	:	
SDG STATUS	:	
VERBAL TAT	:	

Katahdin
ANALYTICAL SERVICES

Katahdin Analytical Services

Login Chain of Custody Report (lno1)

Sep. 11, 2020
09:21 AM

Login Number: SN7608

Quote/Incoming:

Account: NORMAN001 NoWeb
Normandeau Corp.

Project:

Laboratory Sample ID	Client Sample Number	Collect Date/Time	Receive Date	PR	Verbal Date	Due Date	Mailed
SN7608-1	RUMFORD MIDDLE IMPOUNDMENT	10-SEP-20 07:30	10-SEP-20			22-SEP-20	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Aqueous	S	E365.4-TOTAL-PHOS	08-OCT-20	125mL Plastic+H2SO4		
Aqueous	S	SM10200-CHLOROPH-SUB	11-SEP-20	1000mL Plastic		
Aqueous	S	SM2120-APP-COLOR	12-SEP-20	125mL Plastic		
Aqueous	S	SM2320B-ALKALINITY	24-SEP-20			
Aqueous	S	SM4500HB-PH	11-SEP-20	125mL Plastic		

Laboratory Sample ID	Client Sample Number	Collect Date/Time	Receive Date	PR	Verbal Date	Due Date	Mailed
SN7608-2	RUMFORD UPPER IMPOUNDMENT	10-SEP-20 09:55	10-SEP-20			22-SEP-20	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Aqueous	S	E365.4-TOTAL-PHOS	08-OCT-20	125mL Plastic+H2SO4		
Aqueous	S	SM10200-CHLOROPH-SUB	11-SEP-20	1000mL Plastic		
Aqueous	S	SM2120-APP-COLOR	12-SEP-20	125mL Plastic		
Aqueous	S	SM2320B-ALKALINITY	24-SEP-20			
Aqueous	S	SM4500HB-PH	11-SEP-20	125mL Plastic		

Total Samples: 2 ***Total Analyses: 10***

October 5, 2020

Mr. Michael Polchlopek
Normandeau Assoc., Inc.
25 Nashua Rd
Bedford,NH 03110

RE: Katahdin Lab Number: SN8035
Project ID: Rumford
Project Manager: Ms. Sara Colby
Sample Receipt Date(s): September 24, 2020

Dear Mr. Polchlopek:

Please find enclosed the following information:

* Report of Analysis (Analytical and/or Field)
* Laboratory results from subcontracted analysis (es)
* Quality Control Data Summary
* Chain of Custody (COC)
* Login Report

A copy of the Chain of Custody is included in the paginated report. If requested, the original COC is attached as an addendum to this report.

Should you have any questions or comments concerning this Report of Analysis, please do not hesitate to contact the project manager listed above. The results contained in this report relate only to the submitted samples. This cover letter is an integral part of the ROA.

We certify that the test results provided in this report meet all the requirements of the NELAC standards unless otherwise noted in an attached technical narrative or in the Report of Analysis.

We appreciate your continued use of our laboratory and look forward to working with you in the future. The following signature indicates technical review and acceptance of the data.

Please go to http://www.katahdinlab.com/cert for copies of Katahdin Analytical Services Inc. current certificates and analyte lists.

Sincerely,
KATAHDIN ANALYTICAL SERVICES

Leslie Dimond

Leslie Dimond - Quality Assurance Officer **Date** 10/05/2020

TECHNICAL NARRATIVE

Katahdin references the following versions of Standard Methods:
Color: SM 2120 B 2011
Turbidity: SM 2130 B 2011
Alkalinity: SM 2320 B 2011
Hardness: SM 2340 B 2011
Residue-total (TS): SM 2540 B 2011
Residue-filterable (TDS): SM 2540C 2011
Residue-nonfilterable (TSS): SM 2540 D 2011
Residue-settleable: SM 2540 F 2011
Total Solids: SM 2540 G 2011
Total Volatile Solids: SM 2540 G 2011
Chromium VI: SM 3500-Cr B 2011
Iron (Ferrous): SM 3500-Fe D 2011
Chloride: SM 4500-Cl^- E 2011
Amenable cyanide: SM 4500-CN G 2011
Fluoride: SM 4500-F^- B 2011
pH: SM 4500-H+ B 2011
Ammonia as N: SM 4500-NH3 H 2011
Orthophosphate as P: SM 4500-P E 2011
Sulfide: SM 4500-$S2^-$ F 2011
Sulfite: SM 4500-$SO3^-$ B 2011
Biochemical oxygen demand: SM 5210 B 2011
Carbonaceous BOD, CBOD: SM 5210 B 2011
Total Organic Carbon: SM 5310 B 2011
Surfactants: SM 5540 C 2011
Fecal coliforms: SM 9222 D (m-FC) 2006
Total Coliforms/ Escherichia coli: SM9223B (Coilert®) 2005
Escherichia coli: SM 9223 B (Colilert® Quanti-Tray®) 2004
Salmonella: SM 9260 D 2007

KATAHDIN ANALYTICAL SERVICES – INORGANIC DATA QUALIFIERS

The sampled date indicated on the attached Report(s) of Analysis (ROA) is the date for which a grab sample was collected or the date for which a composite sample was completed. Beginning and start times for composite samples can be found on the Chain-of-Custody.

U Indicates the compound was analyzed for but not detected above the specified level. This level may be the Practical Quantitation Level (PQL) (also called Limit of Quantitation (LOQ)), the Limit of Detection (LOD) or Method Detection Limit (MDL) as required by the client.

Note: All results reported as "U" MDL have a 50% rate for false negatives compared to those results reported as "U" PQL "U" LOQ or "U" LOD, where the rate of false negatives is <1%.

E Estimated value. This flag identifies compounds whose concentrations exceed the upper level of the calibration range of the instrument for that specific analysis.

J Estimated value. The analyte was detected in the sample at a concentration less than the laboratory Practical Quantitation Level (PQL) (also called Limit of Quantitation (LOQ)), but above the Method Detection Limit (MDL).

I-7 The laboratory's Practical Quantitation Level (PQL) or LOQ could not be achieved for this parameter due to sample composition, matrix effects, sample volume, or quantity used for analysis.

A-4 Please refer to cover letter or narrative for further information.

H_ Please note that the regulatory holding time for _____ is "analyze immediately". Ideally, this analysis must be performed in the field at the time of sample collection. _____ for this sample was not performed at the time of sample collection. The analysis was performed as soon as possible after receipt by the laboratory.

H1 - pH H2 - DO H3 - sulfite H4 - residual chlorine

T1 The client did not provide the full volume of at least one liter for analysis of TSS. Therefore, the PQL of 2.5 mg/L could not be achieved.

T2 The client provided the required volume of at least one liter for analysis of TSS, but the laboratory could not filter the full one liter volume due to the sample matrix. Therefore, the PQL of 2.5 mg/L could not be achieved.

M1 The matrix spike and/or matrix spike duplicate recovery performed on this sample was outside of the laboratory acceptance criteria. Sample matrix is suspected. The laboratory criteria was met for the Laboratory Control Sample (LCS) analyzed concurrently with this sample.

M2 The matrix spike and/or matrix spike duplicate recovery was outside of the laboratory acceptance criteria. The native sample concentration is greater than four times the spike added concentration so the spike added could not be distinguished from the native sample concentration.

R1 The relative percent difference (RPD) between the duplicate analyses performed on this sample was outside of the laboratory acceptance criteria (when both values are greater than ten times the PQL).

MCL	Maximum Contaminant Level	NL	No limit
NFL	No Free Liquid Present	FLP	Free Liquid Present
NOD	No Odor Detected	TON	Threshold Odor Number

D-1 As required by Method 5210B, APHA Standard Methods for the Examination of Water and Wastewater (21st edition), the BOD value reported for this sample is 'qualified' because the check standard run concurrently with the sample analysis did not meet the criteria specified in the method (198 +/- 30.5 mg/L). These results may not be reportable for compliance purposes.

D-2 The measured final dissolved oxygen concentrations of all dilutions were less than the method-specified limit of 1 mg/L. The reported BOD result was calculated assuming a final oxygen concentration equal to 1 mg/L. The reported value should be considered a minimum value.

D-3 The dilution water used to prepare this sample did not meet the method and/or regulatory criteria of less than 0.2 or 0.4 mg/L dissolved oxygen (DO) uptake over the five day period of incubation. These results may not be reportable for compliance purposes.

Katahdin
ANALYTICAL SERVICES

Report of Analytical Results

Client: Michael Polchlopek
Normandeau Assoc., Inc.
25 Nashua Rd
Bedford,NH 03110

Lab Sample ID: SN8035-1
Report Date: 02-OCT-20
Project: Rumford
SDG: SN8035

Sample Description	Matrix	Date Sampled	Date Received
RUMFORD MIDDLE IMPOUNDMENT	AQ	24-SEP-20 08:40:00	24-SEP-20

Parameter	Result	Adj PQL	Adj MDL	Anal. Method	QC Batch	Analysis Date	Prep. Method	Prep. Date	Analyst	Footnotes	RPD/RSD
Alkalinity	11. mg/L	5.0	0.23	STDM 2320B	WG287190	27-SEP-20 13:20:23	N/A	N/A	ES		
Apparent Color	20. PTCO	5.0	5.0	SM2120B	WG286987	24-SEP-20 13:32:00	N/A	N/A	KD		
Phosphorus, Total As P	U0.10 mg/L	0.10	.0262	EPA 365.4	WG287311	29-SEP-20 11:18:13	EPA 365.4	28-SEP-20	SS		
pH(Laboratory)	7.1 pH	0.10	0.10	SM 4500H-B	WG287004	24-SEP-20 12:52:30	N/A	N/A	ES/SS	H1	

Katahdin
ANALYTICAL SERVICES

Report of Analytical Results

Client: Michael Polchlopek
Normandeau Assoc., Inc.
25 Nashua Rd
Bedford,NH 03110

Lab Sample ID: SN8035-2
Report Date: 02-OCT-20
Project: Rumford
SDG: SN8035

Sample Description	Matrix	Date Sampled	Date Received
RUMFORD UPPER IMPOUNDMENT	AQ	24-SEP-20 09:45:00	24-SEP-20

Parameter	Result	Adj PQL	Adj MDL	Anal. Method	QC Batch	Analysis Date	Prep. Method	Prep. Date	Analyst	Footnotes	RPD/RSD
Alkalinity	11. mg/L	5.0	0.23	STDM 2320B	WG287190	27-SEP-20 14:33:06	N/A	N/A	ES		
Apparent Color	25. PTCO	5.0	5.0	SM2120B	WG286987	24-SEP-20 13:32:00	N/A	N/A	KD		
Phosphorus, Total As P	U0.10 mg/L	0.10	.0262	EPA 365.4	WG287311	29-SEP-20 11:25:51	EPA 365.4	28-SEP-20	SS		
pH(Laboratory)	7.0 pH	0.10	0.10	SM 4500H-B	WG287004	24-SEP-20 12:57:00	N/A	N/A	ES/SS	H1	

Quality Control Report

Blank Sample Summary Report

Alkalinity

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL
MBLANK	WG287190	SM2320B	27-SEP-20	N/A	J 1.3 mg/L	5.0 mg/L

Apparent Color

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL
MBLANK	WG286987	SM2120B	24-SEP-20	N/A	U 5.0 PTCO	5.0 PTCO

Phosphorus, Total As P

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL
MBLANK	WG287311	EPA 365.4	29-SEP-20	28-SEP-20	U 0.080 mg/L	0.10 mg/L

Quality Control Report

Laboratory Control Sample Summary Report

Alkalinity

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG287190-2	LCS	WG287190	27-SEP-20	N/A	mg/L	120	130	107	80-120	

Apparent Color

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG286987-2	LCS	WG286987	24-SEP-20	N/A	PTCO	50	50.	100	80-120	

Phosphorus, Total As P

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG287311-2	LCS	WG287311	29-SEP-20	28-SEP-20	mg/L	.5	0.50	99	80-120	

pH(Laboratory)

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG287004-1	LCS	WG287004	24-SEP-20	N/A	pH	4	4.0	100	90-110	

ClearWater Laboratory
The Premier Water Testing Lab in Maine

9/30/2020

Ms. Sara Colby
Katahdin Analytical Services
P.O. Box 540
Scarborough, ME 04074

Dear Sara

Please find enclosed the results of your sample analysis. Below you will find any comments related to your sample results. We appreciate the opportunity to provide you with our analytical services. Please do not hesitate to contact our office if you have any questions or comments regarding these results.

Sincerely,
ClearWater Laboratory

Marc H. Hein (signature)

Marc H. Hein
Laboratory Manager

Enclosure

2020-09-415.2	Chlorophyll sample was extracted on 09/28/20 and analyzed on 09/29/20.
2020-09-415.1	Chlorophyll sample was extracted on 09/28/20 and analyzed on 09/29/20.

153 Main Street • Newport, ME 04953 • Phone: 207.368.5700 • Fax: 207.368.5120 • E-mail: MHein@ClearWaterLab.com

ClearWater Laboratory
The Premier Water Testing Lab in Maine

Client: Katahdin Analytical Services
Ms. Sara Colby
P.O. Box 540
Scarborough, ME 04074

Report Date: 09/30/2020

REPORT OF LABORATORY ANALYSIS

Sample Description	Result	Units	Reporting Limit	Method	Date / Time Sampled	Date / Time Analyzed
Chlorophyll-A (Corrected)	**<1.0**	ug/L	1.0	EPA 445	09/24/20 0840	09/29/20 1030
2020-09-415.1 Rumford Middle Impoundment - Grab					Lab: CWL	Analyst: nj

* Comments: Chlorophyll sample filtered and frozen upon arrival at lab - see cover page for extraction info.

Chlorophyll-A (Corrected)	**<1.0**	ug/L	1.0	EPA 445	09/24/20 0945	09/29/20 1030
2020-09-415.2 Rumford Upper Impoundment - Grab					Lab: CWL	Analyst: nj

* Comments: Chlorophyll sample filtered and frozen upon arrival at lab - see cover page for extraction info.

Katahdin
ANALYTICAL SERVICES

Sub-contract Laboratory Chain of Custody

~~Chloro~~ Clearwater

Client:	Contact:	Email:		Phone #:
Katahdin Analytical Services	SJC	scolby@katahdinlab.com		(207) 874-2400
Address:	**City:**	**State:**	**Zip:**	**Project Name:**
600 Technology Way	Scarborough	Maine	04074	
KAS WO #:	**Quote #:**	**Purchase Order #:**		**TAT:** Std
SN8035				**Verbal TAT:**
RPT Level: II	**Reporting Format:** Std	**EDD:** ME		**Analysis:** Chlorophyll A

Sample ID:	Collect Date and Time:	Matrix:	No. of Containers	Pres.	MS/MSD Dup.	Analysis: Filtered? Y / N	Analysis: Filtered? Y / N	Analysis: Filtered? Y / N
01 RUMFORD MIDDLE IMPOUNDMEN	24-SEP-20 08:40	AQ	1	none	no	X		
02 RUMFORD UPPER IMPOUNDMENT	24-SEP-20 09:45	AQ	1	none	no	X		

Relinquished By:	Date/Time:	Received By:
[signature]	9/24/20 1300	Diane Curtis 9/25/2020 1210

Comments:

Rec'd w/ice @ 4.6°C

2020-09-415

Katahdin Analytical Services, LLC. — Sample Receipt Condition Report

Client: Normandeau	KAS PM: SM	Sampled By: Client
Project:	KIMS Entry By: JCB	Delivered By: Client
KAS Work Order#: SN8035	KIMS Review By: SM	Received By: ED
	Labeled By: JCB	
SDG #:	Cooler: 1 of 1	Date/Time Rec.: 9-24-20 1230

Receipt Criteria	Y	N	EX*	NA	Comments and/or Resolution
1. Custody seals present / intact?				✓	
2. Chain of Custody present in cooler?	✓				
3. Chain of Custody signed by client?	✓				
4. Chain of Custody matches samples?			X		Below
5. Temperature Blanks present? If not, take temperature of any sample w/ IR gun.	✓				Temp (°C): 2.4 — Thermometer ID: IR-1
Samples received at <6 °C w/o freezing?	✓				Note: Not required for metals (except Hg soil) analysis.
Ice packs or ice present?	✓				The lack of ice or ice packs (i.e. no attempt to begin cooling process) or insufficient ice may not meet certain regulatory requirements and may invalidate certain data.
If yes, was there sufficient ice to meet temperature requirements?	✓				
If temp. out, has the cooling process begun (i.e. ice or packs present) and sample collection times <6hrs., but samples are not yet cool?				✓	Note: No cooling process required for metals (except Hg soil) analysis.
6. Volatiles: **Aqueous:** No bubble larger than a pea?				✓	
Soil/Sediment: Received in airtight container?				✓	
Received in methanol?				✓	
Methanol covering soil?				✓	
D.I. Water - Received within 48 hour HT?				✓	
7. Trip Blank present in cooler?				✓	
8. Proper sample containers and volume?	✓				
9. Samples within hold time upon receipt?	✓				
10. Aqueous samples properly preserved? Metals, COD, NH3, TKN, O/G, phenol, TPO4, N+N, TOC, DRO, TPH – pH <2	✓				
Sulfide - >9				✓	
Cyanide – pH >12				✓	
11. Bottleware Prepped on:					

* Log-In Notes to Exceptions: document any problems with samples or discrepancies or pH adjustments.

Sample containers from 9/24 @ 09:45 read UPPER Impoundment

COC lists middle impoundment twice

Katahdin ANALYTICAL SERVICES
600 Technology Way
Scarborough, ME 04074
Tel: (207) 874-2400
Fax: (207) 775-4029

CHAIN of CUSTODY

PLEASE BEAR DOWN AND PRINT LEGIBLY IN PEN

Client	Contact	Phone #	Fax #
Normandeau Associates	Mike Polchlopek	(978) 895-5359	( )

Address	City	State	Zip Code
25 Nashua Rd	Bedford	NH	03110

Purchase Order # 24411.000 T2 Proj. Name / No. Katahdin Quote # 10179gd1

Bill (if different than above) Address

Sampler (Print / Sign) Copies To:

LAB USE ONLY WORK ORDER #: SN8035

KATAHDIN PROJECT NUMBER

REMARKS:

SHIPPING INFO: ☐ FED EX ☐ UPS ☐ CLIENT

AIRBILL NO:

TEMP°C ☐ TEMP BLANK ☐ INTACT ☐ NOT INTACT

★	Sample Description	Date / Time coll'd	Matrix	No. of Cntrs.	ANALYSIS AND CONTAINER TYPE PRESERVATIVES: Filt. Y ☑ N — Chlorophyll - A	Filt. Y ☑ N — 1L Amber Foil	Filt. Y ☑ N — Total Phosphorus 250 mL H_2SO_4	Filt. Y ☑ N — Color, Alkalinity, pH 250 mL Plastic	Filt. Y ☐ N	Filt. Y ☐ N	Filt. Y ☐ N	Filt. Y ☐ N	Filt. Y ☐ N	Filt. Y ☐ N	Filt. Y ☐ N	Filt. Y ☐ N
	Rumford Middle Impoundment	9/24/20 0840		3	✓		✓	✓								
	Rumford Middle Impoundment	9/24/20 0945		3	✓		✓	✓								
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COMMENTS

Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)
Relinquished By: (Signature)	9:24:20 1220	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)

Katahdin
ANALYTICAL SERVICES

Katahdin Analytical Services

Login Chain of Custody Report (lno1)

Sep. 24, 2020
03:37 PM

Quote/Incoming:

Login Number: SN8035

Account: NORMAN001
Normandeau Corp.

Project:

NoWeb

Primary Report Address:
Michael Polchlopek
Normandeau Assoc., Inc.
25 Nashua Rd

Bedford,NH 03110
mpolchlopek@normandeau.com

Primary Invoice Address:
Accounts Payable
Normandeau Assoc., Inc.
550 Forest Avenue
Ste 201
Portland,ME 04101

Report CC Addresses:
Invoice CC Addresses:

Login Information:

ANALYSIS INSTRUCTIONS	:	
CHECK NO.	:	
CLIENT PO#	:	24411.000
CLIENT PROJECT MANAGE	:	
CONTRACT	:	
COOLER TEMPERATURE	:	2.4
DELIVERY SERVICES	:	Client
EDD FORMAT	:	KAS064QC-XLS
LOGIN INITIALS	:	JCB
PM	:	SJC
PROJECT NAME	:	Rumford
QC LEVEL	:	II
REPORT INSTRUCTIONS	:	report and EDD to mpolchlopek@normandeau.com. Invoice to abogart@normandeau.com
SDG ID	:	
SDG STATUS	:	
VERBAL TAT	:	

Login Number: SN8035

Quote/Incoming:

Account: NORMAN001 NoWeb

Normandeau Corp.

Project:

Laboratory Sample ID	Client Sample Number	Collect Date/Time	Receive Date	PR	Verbal Date	Due Date	Mailed
SN8035-1	RUMFORD MIDDLE IMPOUNDMENT	24-SEP-20 08:40	24-SEP-20			06-OCT-20	

Matrix		*Product*	*Hold Date (shortest)*	*Bottle Type*	*Bottle Count*	*Comments*
Aqueous	S	E365.4-TOTAL-PHOS	22-OCT-20	125mL Plastic+H2SO4		
Service	S	SHIPPING				
Aqueous	S	SM10200-CHLOROPH-SUB	25-SEP-20	1000mL Plastic		
Aqueous	S	SM2120-APP-COLOR	26-SEP-20	125mL Plastic		
Aqueous	S	SM2320B-ALKALINITY	08-OCT-20			
Aqueous	S	SM4500HB-PH	25-SEP-20	125mL Plastic		

Laboratory Sample ID	Client Sample Number	Collect Date/Time	Receive Date	PR	Verbal Date	Due Date	Mailed
SN8035-2	RUMFORD UPPER IMPOUNDMENT	24-SEP-20 09:45	24-SEP-20			06-OCT-20	

Matrix		*Product*	*Hold Date (shortest)*	*Bottle Type*	*Bottle Count*	*Comments*
Aqueous	S	E365.4-TOTAL-PHOS	22-OCT-20	125mL Plastic+H2SO4		
Aqueous	S	SM10200-CHLOROPH-SUB	25-SEP-20	1000mL Plastic		
Aqueous	S	SM2120-APP-COLOR	26-SEP-20	125mL Plastic		
Aqueous	S	SM2320B-ALKALINITY	08-OCT-20			
Aqueous	S	SM4500HB-PH	25-SEP-20	125mL Plastic		

Total Samples: 2 ***Total Analyses: 11***

Katahdin
ANALYTICAL SERVICES

NH ELAP Lab ID 2001 (DW, NPW, SCM)
NYSDOH ELAP Lab ID 11121 (AE - T015)

November 5, 2020

Mr. Michael Polchlopek
Normandeau Assoc., Inc.
25 Nashua Rd
Bedford,NH 03110

RE: Katahdin Lab Number: SN8528
Project ID: Rumford
Project Manager: Ms. Sara Colby
Sample Receipt Date(s): October 13, 2020

Dear Mr. Polchlopek:

Please find enclosed the following information:

* Report of Analysis (Analytical and/or Field)
* Laboratory results from subcontracted analysis (es)
* Quality Control Data Summary
* Chain of Custody (COC)
* Login Report

A copy of the Chain of Custody is included in the paginated report. If requested, the original COC is attached as an addendum to this report.

Should you have any questions or comments concerning this Report of Analysis, please do not hesitate to contact the project manager listed above. The results contained in this report relate only to the submitted samples. This cover letter is an integral part of the ROA.

We certify that the test results provided in this report meet all the requirements of the NELAC standards unless otherwise noted in an attached technical narrative or in the Report of Analysis.

We appreciate your continued use of our laboratory and look forward to working with you in the future. The following signature indicates technical review and acceptance of the data.

Please go to http://www.katahdinlab.com/cert for copies of Katahdin Analytical Services Inc. current certificates and analyte lists.

Sincerely,
KATAHDIN ANALYTICAL SERVICES

Leslie Dimond

Leslie Dimond - Quality Assurance Officer

11/05/2020

Date

TECHNICAL NARRATIVE

Katahdin references the following versions of Standard Methods:
Color: SM 2120 B 2011
Turbidity: SM 2130 B 2011
Alkalinity: SM 2320 B 2011
Hardness: SM 2340 B 2011
Residue-total (TS): SM 2540 B 2011
Residue-filterable (TDS): SM 2540C 2011
Residue-nonfilterable (TSS): SM 2540 D 2011
Residue-settleable: SM 2540 F 2011
Total Solids: SM 2540 G 2011
Total Volatile Solids: SM 2540 G 2011
Chromium VI: SM 3500-Cr B 2011
Iron (Ferrous): SM 3500-Fe D 2011
Chloride: SM 4500-Cl^- E 2011
Amenable cyanide: SM 4500-CN G 2011
Fluoride: SM 4500-F^- B 2011
pH: SM 4500-H+ B 2011
Ammonia as N: SM 4500-NH3 H 2011
Orthophosphate as P: SM 4500-P E 2011
Sulfide: SM 4500-$S2^-$ F 2011
Sulfite: SM 4500-$SO3^-$ B 2011
Biochemical oxygen demand: SM 5210 B 2011
Carbonaceous BOD, CBOD: SM 5210 B 2011
Total Organic Carbon: SM 5310 B 2011
Surfactants: SM 5540 C 2011
Fecal coliforms: SM 9222 D (m-FC) 2006
Total Coliforms/ Escherichia coli: SM9223B (Coilert®) 2005
Escherichia coli: SM 9223 B (Colilert® Quanti-Tray®) 2004
Salmonella: SM 9260 D 2007

KATAHDIN ANALYTICAL SERVICES – INORGANIC DATA QUALIFIERS

The sampled date indicated on the attached Report(s) of Analysis (ROA) is the date for which a grab sample was collected or the date for which a composite sample was completed. Beginning and start times for composite samples can be found on the Chain-of-Custody.

U Indicates the compound was analyzed for but not detected above the specified level. This level may be the Practical Quantitation Level (PQL) (also called Limit of Quantitation (LOQ)), the Limit of Detection (LOD) or Method Detection Limit (MDL) as required by the client.

Note: All results reported as "U" MDL have a 50% rate for false negatives compared to those results reported as "U" PQL "U" LOQ or "U" LOD, where the rate of false negatives is <1%.

E Estimated value. This flag identifies compounds whose concentrations exceed the upper level of the calibration range of the instrument for that specific analysis.

J Estimated value. The analyte was detected in the sample at a concentration less than the laboratory Practical Quantitation Level (PQL) (also called Limit of Quantitation (LOQ)), but above the Method Detection Limit (MDL).

I-7 The laboratory's Practical Quantitation Level (PQL) or LOQ could not be achieved for this parameter due to sample composition, matrix effects, sample volume, or quantity used for analysis.

A-4 Please refer to cover letter or narrative for further information.

H_ Please note that the regulatory holding time for _____ is "analyze immediately". Ideally, this analysis must be performed in the field at the time of sample collection. _____ for this sample was not performed at the time of sample collection. The analysis was performed as soon as possible after receipt by the laboratory.

H1 - pH H2 - DO H3 - sulfite H4 - residual chlorine

T1 The client did not provide the full volume of at least one liter for analysis of TSS. Therefore, the PQL of 2.5 mg/L could not be achieved.

T2 The client provided the required volume of at least one liter for analysis of TSS, but the laboratory could not filter the full one liter volume due to the sample matrix. Therefore, the PQL of 2.5 mg/L could not be achieved.

M1 The matrix spike and/or matrix spike duplicate recovery performed on this sample was outside of the laboratory acceptance criteria. Sample matrix is suspected. The laboratory criteria was met for the Laboratory Control Sample (LCS) analyzed concurrently with this sample.

M2 The matrix spike and/or matrix spike duplicate recovery was outside of the laboratory acceptance criteria. The native sample concentration is greater than four times the spike added concentration so the spike added could not be distinguished from the native sample concentration.

R1 The relative percent difference (RPD) between the duplicate analyses performed on this sample was outside of the laboratory acceptance criteria (when both values are greater than ten times the PQL).

MCL	Maximum Contaminant Level	NL	No limit
NFL	No Free Liquid Present	FLP	Free Liquid Present
NOD	No Odor Detected	TON	Threshold Odor Number

D-1 As required by Method 5210B, APHA Standard Methods for the Examination of Water and Wastewater (21st edition), the BOD value reported for this sample is 'qualified' because the check standard run concurrently with the sample analysis did not meet the criteria specified in the method (198 +/- 30.5 mg/L). These results may not be reportable for compliance purposes.

D-2 The measured final dissolved oxygen concentrations of all dilutions were less than the method-specified limit of 1 mg/L. The reported BOD result was calculated assuming a final oxygen concentration equal to 1 mg/L. The reported value should be considered a minimum value.

D-3 The dilution water used to prepare this sample did not meet the method and/or regulatory criteria of less than 0.2 or 0.4 mg/L dissolved oxygen (DO) uptake over the five day period of incubation. These results may not be reportable for compliance purposes.

Report of Analytical Results

Client: Michael Polchlopek
Normandeau Assoc., Inc.
25 Nashua Rd
Bedford,NH 03110

Lab Sample ID: SN8528-1
Report Date: 23-OCT-20
Project: Rumford
SDG: SN8528

Sample Description	Matrix	Date Sampled	Date Received
RUMFORD MIDDLE IMPOUNDMENT	AQ	13-OCT-20 08:42:00	13-OCT-20

Parameter	Result	Adj PQL	Adj MDL	Anal. Method	QC Batch	Analysis Date	Prep. Method	Prep. Date	Analyst	Footnotes	RPD/RSD
Alkalinity	10. mg/L	5.0	0.23	STDM 2320B	WG288154	13-OCT-20 13:57:19	N/A	N/A	ES		
Apparent Color	25. PTCO	5.0	5.0	SM2120B	WG288148	13-OCT-20 13:34:00	N/A	N/A	ES/JG		
Phosphorus, Total As P	U0.10 mg/L	0.10	.0262	EPA 365.4	WG288705	22-OCT-20 10:09:24	EPA 365.4	20-OCT-20	SS		
pH(Laboratory)	6.7 pH	0.10	0.10	SM 4500H-B	WG288324	13-OCT-20 13:57:19	N/A	N/A	ES	H1	

Report of Analytical Results

Client: Michael Polchlopek
Normandeau Assoc., Inc.
25 Nashua Rd
Bedford,NH 03110

Lab Sample ID: SN8528-2
Report Date: 23-OCT-20
Project: Rumford
SDG: SN8528

Sample Description	Matrix	Date Sampled	Date Received
RUMFORD UPPER IMPOUNDMENT	AQ	13-OCT-20 09:55:00	13-OCT-20

Parameter	Result	Adj PQL	Adj MDL	Anal. Method	QC Batch	Analysis Date	Prep. Method	Prep. Date	Analyst	Footnotes	RPD/RSD
Alkalinity	10. mg/L	5.0	0.23	STDM 2320B	WG288154	13-OCT-20 14:06:14	N/A	N/A	ES		
Apparent Color	30. PTCO	5.0	5.0	SM2120B	WG288148	13-OCT-20 13:34:00	N/A	N/A	ES/JG		
Phosphorus, Total As P	U0.10 mg/L	0.10	.0262	EPA 365.4	WG288705	22-OCT-20 10:00:35	EPA 365.4	20-OCT-20	SS		
pH(Laboratory)	7.0 pH	0.10	0.10	SM 4500H-B	WG288324	13-OCT-20 14:06:14	N/A	N/A	ES	H1	

Quality Control Report

Blank Sample Summary Report

Alkalinity

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL
MBLANK	WG288154	SM2320B	13-OCT-20	N/A	U 5.0 mg/L	5.0 mg/L

Apparent Color

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL
MBLANK	WG288148	SM2120B	13-OCT-20	N/A	U 5.0 PTCO	5.0 PTCO

Phosphorus, Total As P

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL
MBLANK	WG288705	EPA 365.4	22-OCT-20	20-OCT-20	U 0.10 mg/L	0.10 mg/L

600 Technology Way
P.O. Box 540, Scarborough, ME 04070
Tel:(207) 874-2400 Fax:(207) 775-4029

http://katahdinlab.com
sales@katahdinlab.com

Quality Control Report

Laboratory Control Sample Summary Report

Alkalinity

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG288154-2	LCS	WG288154	13-OCT-20	N/A	mg/L	120	120	102	80-120	
WG288154-3	LCSD	WG288154	13-OCT-20	N/A	mg/L	120	130	105	80-120	3

Apparent Color

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG288148-2	LCS	WG288148	13-OCT-20	N/A	PTCO	50	50.	100	80-120	

Phosphorus, Total As P

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG288705-2	LCS	WG288705	22-OCT-20	20-OCT-20	mg/L	.5	0.49	98	80-120	

pH(Laboratory)

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG288324-1	LCS	WG288324	13-OCT-20	N/A	pH	7	7.0	100	90-110	
WG288324-2	LCSD	WG288324	13-OCT-20	N/A	pH	7	7.0	100	90-110	0

ClearWater Laboratory
The Premier Water Testing Lab in Maine

11/4/2020

Ms. Sara Colby
Katahdin Analytical Services
P.O. Box 540
Scarborough, ME 04074

Dear Sara

Please find enclosed the results of your sample analysis. Below you will find any comments related to your sample results. We appreciate the opportunity to provide you with our analytical services. Please do not hesitate to contact our office if you have any questions or comments regarding these results.

Sincerely,
ClearWater Laboratory

Marc H. Hein (signature)

Marc H. Hein
Laboratory Manager

Enclosure

2020-10-179.1	Chlorophyll sample was extracted on 11/03/20 and analyzed on 11/04/20.
2020-10-179.2	Chlorophyll sample was extracted on 11/03/20 and analyzed on 11/04/20.

153 Main Street • Newport, ME 04953 • Phone: 207.368.5700 • Fax: 207.368.5120 • E-mail: MHein@ClearWaterLab.com

ClearWater Laboratory
The Premier Water Testing Lab in Maine

Client: Katahdin Analytical Services
Ms. Sara Colby
P.O. Box 540
Scarborough, ME 04074

Report Date: 11/04/2020

REPORT OF LABORATORY ANALYSIS

Sample Description	Result	Units	Reporting Limit	Method	Date / Time Sampled	Date / Time Analyzed
Chlorophyll-A (Corrected)	**<1.0**	ug/L	1.0	EPA 445	10/13/20 0842	11/04/20 1130
2020-10-179.1 Rumford Middle Impoundment - Grab					Lab: CWL	Analyst: nj

* Comments: Chlorophyll sample filtered and frozen upon arrival at lab - see cover page for extraction info.

Chlorophyll-A (Corrected)	**<1.0**	ug/L	1.0	EPA 445	10/13/20 0955	11/04/20 1130
2020-10-179.2 Rumford Upper Impoundment - Grab					Lab: CWL	Analyst: nj

* Comments: Chlorophyll sample filtered and frozen upon arrival at lab - see cover page for extraction info.

Clearwater

Katahdin
ANALYTICAL SERVICES

Sub-contract Laboratory Chain of Custody

Client:	Contact:	Email:		Phone #:
Katahdin Analytical Services	SJC	scolby@katahdinlab.com		(207) 874-2400
Address:	**City:**	**State:**	**Zip:**	**Project Name:**
600 Technology Way	Scarborough	Maine	04074	
KAS WO #:	**Quote #:**	**Purchase Order #:**		**TAT:** Std
SN8528				**Verbal TAT:**
RPT Level: II	**Reporting Format:** Std	**EDD:** ME		**Analysis:** Chlorophyll A

Sample ID:	Collect Date and Time:	Matrix:	No. of Containers	Pres.	MS/MSD Dup.	Analysis: Filtered? Y / N	Analysis: Filtered? Y / N	Analysis: Filtered? Y / N
.01 RUMFORD MIDDLE IMPOUNDMEN	13-OCT-20 08:42	AQ	1	none	no	X		
.02 RUMFORD UPPER IMPOUNDMENT	13-OCT-20 09:55	AQ	1	none	no	X		

Relinquished By: [signature] **Date/Time:** 10/14/20 0945 **Received By:** [signature] 10/14/2020 1205

Comments:

Temp: 1.6°C

Sample #: 2020-10-179

Katahdin Analytical Services, LLC. — Sample Receipt Condition Report

Client: Normandeau Assoc.	KAS PM: SC	Sampled By: Client	
Project:	KIMS Entry By: JCB	Delivered By: Client	
KAS Work Order#: SN8528	KIMS Review By: SC	Received By: JCB	
	Labeled By: JCB		
SDG #:	Cooler: 1 of 1	Date/Time Rec.: 10/13/20 1220	

Receipt Criteria	Y	N	EX*	NA	Comments and/or Resolution
1. Custody seals present / intact?		✓			
2. Chain of Custody present in cooler?	✓				
3. Chain of Custody signed by client?	✓				
4. Chain of Custody matches samples?	✓				
5. Temperature Blanks present? If not, take temperature of any sample w/ IR gun.		✓			Temp (°C): 3.3 — Thermometer ID: IR-1
Samples received at <6 °C w/o freezing?	✓				Note: Not required for metals (except Hg soil) analysis.
Ice packs or ice present?	✓				The lack of ice or ice packs (i.e. no attempt to begin cooling process) or insufficient ice may not meet certain regulatory requirements and may invalidate certain data.
If yes, was there sufficient ice to meet temperature requirements?	✓				
If temp. out, has the cooling process begun (i.e. ice or packs present) and sample collection times <6hrs., but samples are not yet cool?				✓	Note: No cooling process required for metals (except Hg soil) analysis.
6. Volatiles: **Aqueous:** No bubble larger than a pea?				✓	
Soil/Sediment: Received in airtight container?				✓	
Received in methanol?				✓	
Methanol covering soil?				✓	
D.I. Water - Received within 48 hour HT?				✓	
7. Trip Blank present in cooler?				✓	
8. Proper sample containers and volume?	✓				
9. Samples within hold time upon receipt?	✓				
10. Aqueous samples properly preserved? Metals, COD, NH3, TKN, O/G, phenol, TPO4, N+N, TOC, DRO, TPH – pH <2	✓				
Sulfide - >9				✓	
Cyanide – pH >12				✓	
11. Bottleware Prepped on:					

* Log-In Notes to Exceptions: document any problems with samples or discrepancies or pH adjustments.

Katahdin ANALYTICAL SERVICES
600 Technology Way
Scarborough, ME 04074
Tel: (207) 874-2400
Fax: (207) 775-4029

CHAIN of CUSTODY

PLEASE BEAR DOWN AND PRINT LEGIBLY IN PEN

Client	Contact	Phone #	Fax #
Normandeau Associates, Inc.	Mike Polchlopek	(978) 895-5359	( )

Address	City	State	Zip Code
25 Nashua Rd.	Bedford	NH	03110

Purchase Order # 24411.000 T2 Proj. Name / No. Katahdin Quote # 10179gd1

Bill (if different than above) Address

Sampler (Print / Sign) Michael Polchlopek Michael Polchlopek

Copies To:

LAB USE ONLY WORK ORDER #: SN8528

KATAHDIN PROJECT NUMBER

REMARKS:

SHIPPING INFO: ☐ FED EX ☐ UPS ☐ CLIENT

AIRBILL NO:

TEMP°C ☐ TEMP BLANK ☐ INTACT ☐ NOT INTACT

★	Sample Description	Date / Time coll'd	Matrix	No. of Cntrs.	ANALYSIS AND CONTAINER TYPE PRESERVATIVES: Chlorophyll-a, 1L Amber Foil, Filt. Y ☒ N	Total Phosphorus, 250mL - H_2SO_4, Filt. Y ☒ N	Color, Alkalinity, pH, 250 mL - Plastic, Filt. Y ☒ N	Filt. Y ☐ N	Filt. Y ☐ N	Filt. Y ☐ N	Filt. Y ☐ N	Filt. Y ☐ N	Filt. Y ☐ N	Filt. Y ☐ N
	Rumford Middle Impoundment	10/13/20 08:42		3	X	X	X							
	Rumford Upper Impoundment	10/13/20 09:55		3	X	X	X							
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COMMENTS

Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)
Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)
	10/13/20 1220				
	10/				

Katahdin
ANALYTICAL SERVICES

Katahdin Analytical Services

Login Chain of Custody Report (lno1)

Oct. 14, 2020
09:09 AM

Quote/Incoming:

Login Number: SN8528

Account: NORMAN001
Normandeau Corp.

Project:

NoWeb

Primary Report Address:
Michael Polchlopek
Normandeau Assoc., Inc.
25 Nashua Rd

Bedford,NH 03110
mpolchlopek@normandeau.com

Primary Invoice Address:
Accounts Payable
Normandeau Assoc., Inc.
25 Nashua Road

Bedford,NH 03110

Report CC Addresses:
Invoice CC Addresses:

Login Information:

ANALYSIS INSTRUCTIONS	:	
CHECK NO.	:	
CLIENT PO#	:	24411.000 T2
CLIENT PROJECT MANAGE	:	
CONTRACT	:	
COOLER TEMPERATURE	:	3.3
DELIVERY SERVICES	:	Client
EDD FORMAT	:	KAS064QC-XLS
LOGIN INITIALS	:	JCB
PM	:	SJC
PROJECT NAME	:	Rumford
QC LEVEL	:	II
REPORT INSTRUCTIONS	:	report and EDD to mpolchlopek@normandeau.com. Invoice to abogart@normandeau.com
SDG ID	:	
SDG STATUS	:	
VERBAL TAT	:	

Katahdin
ANALYTICAL SERVICES

Katahdin Analytical Services

Login Chain of Custody Report (lno1)

Oct. 14, 2020
09:09 AM

Login Number: SN8528

Quote/Incoming:

Account: NORMAN001 NoWeb
Normandeau Corp.

Project:

Laboratory Sample ID	Client Sample Number	Collect Date/Time	Receive Date	PR	Verbal Date	Due Date	Mailed
SN8528-1	RUMFORD MIDDLE IMPOUNDMENT	13-OCT-20 08:42	13-OCT-20			25-OCT-20	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Aqueous	S	E365.4-TOTAL-PHOS	10-NOV-20	125mL Plastic+H2SO4		
Aqueous	S	SM10200-CHLOROPH-SUB	14-OCT-20	1000mL Plastic		
Aqueous	S	SM2120-APP-COLOR	15-OCT-20	125mL Plastic		
Aqueous	S	SM2320B-ALKALINITY	27-OCT-20			
Aqueous	S	SM4500HB-PH	14-OCT-20	125mL Plastic		

Laboratory Sample ID	Client Sample Number	Collect Date/Time	Receive Date	PR	Verbal Date	Due Date	Mailed
SN8528-2	RUMFORD UPPER IMPOUNDMENT	13-OCT-20 09:55	13-OCT-20			25-OCT-20	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Aqueous	S	E365.4-TOTAL-PHOS	10-NOV-20	125mL Plastic+H2SO4		
Aqueous	S	SM10200-CHLOROPH-SUB	14-OCT-20	1000mL Plastic		
Aqueous	S	SM2120-APP-COLOR	15-OCT-20	125mL Plastic		
Aqueous	S	SM2320B-ALKALINITY	27-OCT-20			
Aqueous	S	SM4500HB-PH	14-OCT-20	125mL Plastic		

Total Samples: 2 ***Total Analyses: 10***

November 10, 2020

Mr. Michael Polchlopek
Normandeau Assoc., Inc.
25 Nashua Rd
Bedford,NH 03110

RE: Katahdin Lab Number: SN8943
Project ID: Rumford Upper Impoundment
Project Manager: Ms. Sara Colby
Sample Receipt Date(s): October 27, 2020

Dear Mr. Polchlopek:

Please find enclosed the following information:

* Report of Analysis (Analytical and/or Field)
* Laboratory results from subcontracted analysis (es)
* Quality Control Data Summary
* Chain of Custody (COC)
* Login Report

A copy of the Chain of Custody is included in the paginated report. If requested, the original COC is attached as an addendum to this report.

Should you have any questions or comments concerning this Report of Analysis, please do not hesitate to contact the project manager listed above. The results contained in this report relate only to the submitted samples. This cover letter is an integral part of the ROA.

We certify that the test results provided in this report meet all the requirements of the NELAC standards unless otherwise noted in an attached technical narrative or in the Report of Analysis.

We appreciate your continued use of our laboratory and look forward to working with you in the future. The following signature indicates technical review and acceptance of the data.

Please go to http://www.katahdinlab.com/cert for copies of Katahdin Analytical Services Inc. current certificates and analyte lists.

Sincerely,
KATAHDIN ANALYTICAL SERVICES

Leslie Dimond

Leslie Dimond - Quality Assurance Officer

11/10/2020

Date

TECHNICAL NARRATIVE

Katahdin references the following versions of Standard Methods:
Color: SM 2120 B 2011
Turbidity: SM 2130 B 2011
Alkalinity: SM 2320 B 2011
Hardness: SM 2340 B 2011
Residue-total (TS): SM 2540 B 2011
Residue-filterable (TDS): SM 2540C 2011
Residue-nonfilterable (TSS): SM 2540 D 2011
Residue-settleable: SM 2540 F 2011
Total Solids: SM 2540 G 2011
Total Volatile Solids: SM 2540 G 2011
Chromium VI: SM 3500-Cr B 2011
Iron (Ferrous): SM 3500-Fe D 2011
Chloride: SM 4500-Cl^- E 2011
Amenable cyanide: SM 4500-CN G 2011
Fluoride: SM 4500-F^- B 2011
pH: SM 4500-H+ B 2011
Ammonia as N: SM 4500-NH3 H 2011
Orthophosphate as P: SM 4500-P E 2011
Sulfide: SM 4500-$S2^-$ F 2011
Sulfite: SM 4500-$SO3^-$ B 2011
Biochemical oxygen demand: SM 5210 B 2011
Carbonaceous BOD, CBOD: SM 5210 B 2011
Total Organic Carbon: SM 5310 B 2011
Surfactants: SM 5540 C 2011
Fecal coliforms: SM 9222 D (m-FC) 2006
Total Coliforms/ Escherichia coli: SM9223B (Coilert®) 2005
Escherichia coli: SM 9223 B (Colilert® Quanti-Tray®) 2004
Salmonella: SM 9260 D 2007

KATAHDIN ANALYTICAL SERVICES – INORGANIC DATA QUALIFIERS

The sampled date indicated on the attached Report(s) of Analysis (ROA) is the date for which a grab sample was collected or the date for which a composite sample was completed. Beginning and start times for composite samples can be found on the Chain-of-Custody.

U Indicates the compound was analyzed for but not detected above the specified level. This level may be the Practical Quantitation Level (PQL) (also called Limit of Quantitation (LOQ)), the Limit of Detection (LOD) or Method Detection Limit (MDL) as required by the client.

Note: All results reported as "U" MDL have a 50% rate for false negatives compared to those results reported as "U" PQL "U" LOQ or "U" LOD, where the rate of false negatives is <1%.

E Estimated value. This flag identifies compounds whose concentrations exceed the upper level of the calibration range of the instrument for that specific analysis.

J Estimated value. The analyte was detected in the sample at a concentration less than the laboratory Practical Quantitation Level (PQL) (also called Limit of Quantitation (LOQ)), but above the Method Detection Limit (MDL).

I-7 The laboratory's Practical Quantitation Level (PQL) or LOQ could not be achieved for this parameter due to sample composition, matrix effects, sample volume, or quantity used for analysis.

A-4 Please refer to cover letter or narrative for further information.

H_ Please note that the regulatory holding time for _____ is "analyze immediately". Ideally, this analysis must be performed in the field at the time of sample collection. _____ for this sample was not performed at the time of sample collection. The analysis was performed as soon as possible after receipt by the laboratory.

H1 - pH H2 - DO H3 - sulfite H4 - residual chlorine

T1 The client did not provide the full volume of at least one liter for analysis of TSS. Therefore, the PQL of 2.5 mg/L could not be achieved.

T2 The client provided the required volume of at least one liter for analysis of TSS, but the laboratory could not filter the full one liter volume due to the sample matrix. Therefore, the PQL of 2.5 mg/L could not be achieved.

M1 The matrix spike and/or matrix spike duplicate recovery performed on this sample was outside of the laboratory acceptance criteria. Sample matrix is suspected. The laboratory criteria was met for the Laboratory Control Sample (LCS) analyzed concurrently with this sample.

M2 The matrix spike and/or matrix spike duplicate recovery was outside of the laboratory acceptance criteria. The native sample concentration is greater than four times the spike added concentration so the spike added could not be distinguished from the native sample concentration.

R1 The relative percent difference (RPD) between the duplicate analyses performed on this sample was outside of the laboratory acceptance criteria (when both values are greater than ten times the PQL).

MCL	Maximum Contaminant Level	NL	No limit
NFL	No Free Liquid Present	FLP	Free Liquid Present
NOD	No Odor Detected	TON	Threshold Odor Number

D-1 As required by Method 5210B, APHA Standard Methods for the Examination of Water and Wastewater (21st edition), the BOD value reported for this sample is 'qualified' because the check standard run concurrently with the sample analysis did not meet the criteria specified in the method (198 +/- 30.5 mg/L). These results may not be reportable for compliance purposes.

D-2 The measured final dissolved oxygen concentrations of all dilutions were less than the method-specified limit of 1 mg/L. The reported BOD result was calculated assuming a final oxygen concentration equal to 1 mg/L. The reported value should be considered a minimum value.

D-3 The dilution water used to prepare this sample did not meet the method and/or regulatory criteria of less than 0.2 or 0.4 mg/L dissolved oxygen (DO) uptake over the five day period of incubation. These results may not be reportable for compliance purposes.

Katahdin
ANALYTICAL SERVICES

Report of Analytical Results

Client: Michael Polchlopek
Normandeau Assoc., Inc.
25 Nashua Rd
Bedford,NH 03110

Lab Sample ID: SN8943-1
Report Date: 10-NOV-20
Project: Rumford Upper Impoundment
SDG: SN8943

Sample Description	Matrix	Date Sampled	Date Received
RUMFORD UPPER IMPOUNDMENT	AQ	27-OCT-20 09:20:00	27-OCT-20

Parameter	Result	Adj PQL	Adj MDL	Anal. Method	QC Batch	Analysis Date	Prep. Method	Prep. Date	Analyst	Footnotes	RPD/RSD
Alkalinity	10. mg/L	5.0	0.23	STDM 2320B	WG289154	27-OCT-20 13:38:02	N/A	N/A	ES		
Apparent Color	35. PTCO	5.0	5.0	SM2120B	WG289070	28-OCT-20 08:52:00	N/A	N/A	ES		
Phosphorus, Total As P	U0.10 mg/L	0.10	.0262	EPA 365.4	WG289370	02-NOV-20 12:04:44	EPA 365.4	29-OCT-20	SS		
pH(Laboratory)	7.0 pH	0.10	0.10	SM 4500H-B	WG289287	27-OCT-20 13:38:02	N/A	N/A	ZL	H1	

Quality Control Report

Blank Sample Summary Report

Alkalinity

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL
MBLANK	WG289154	SM2320B	28-OCT-20	N/A	U 5.0 mg/L	5.0 mg/L

Apparent Color

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL
MBLANK	WG289070	SM2120B	28-OCT-20	N/A	U 5.0 PTCO	5.0 PTCO

Phosphorus, Total As P

Samp Type	QC Batch	Anal. Method	Anal. Date	Prep. Date	Result	PQL
MBLANK	WG289370	EPA 365.4	02-NOV-20	29-OCT-20	U 0.10 mg/L	0.10 mg/L

600 Technology Way
P.O. Box 540, Scarborough, ME 04070
Tel:(207) 874-2400 Fax:(207) 775-4029

http://katahdinlab.com
sales@katahdinlab.com

Quality Control Report

Laboratory Control Sample Summary Report

Alkalinity

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG289154-6	LCS	WG289154	28-OCT-20	N/A	mg/L	120	130	108	80-120	

Apparent Color

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG289070-2	LCS	WG289070	28-OCT-20	N/A	PTCO	50	50.	100	80-120	

Phosphorus, Total As P

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG289370-2	LCS	WG289370	02-NOV-20	29-OCT-20	mg/L	.5	0.47	93	80-120	

pH(Laboratory)

Lab Sample Id	Samp Type	QC Batch	Analysis Date	Prep Date	Units	Spike Amt.	Result	Recovery	Acceptance Range	RPD
WG289287-1	LCS	WG289287	27-OCT-20	N/A	pH	7	7.0	100	90-110	

ClearWater Laboratory
The Premier Water Testing Lab in Maine

11/4/2020

Ms. Sara Colby
Katahdin Analytical Services
P.O. Box 540
Scarborough, ME 04074

Dear Sara

Please find enclosed the results of your sample analysis. Below you will find any comments related to your sample results. We appreciate the opportunity to provide you with our analytical services. Please do not hesitate to contact our office if you have any questions or comments regarding these results.

Sincerely,
ClearWater Laboratory

Marc H. Hein (signature)

Marc H. Hein
Laboratory Manager

Enclosure

2020-10-354.1 Chlorophyll sample was extracted on 11/03/20 and analyzed on 11/04/20.

153 Main Street • Newport, ME 04953 • Phone: 207.368.5700 • Fax: 207.368.5120 • E-mail: MHein@ClearWaterLab.com

ClearWater Laboratory
The Premier Water Testing Lab in Maine

Client: Katahdin Analytical Services
Ms. Sara Colby
P.O. Box 540
Scarborough, ME 04074

Report Date: 11/04/2020

REPORT OF LABORATORY ANALYSIS

Sample Description	Result	Units	Reporting Limit	Method	Date / Time Sampled	Date / Time Analyzed
Chlorophyll-A (Corrected)	**1.0**	ug/L	1.0	EPA 445	10/27/20 0920	11/04/20 1130
2020-10-354.1 Rumford Upper Impoundment - Grab					Lab: CWL	Analyst: nj

* Comments: Chlorophyll sample filtered and frozen upon arrival at lab - see cover page for extraction info.

Clearwater

Katahdin
ANALYTICAL SERVICES

Sub-contract Laboratory Chain of Custody

Client:	Contact:	Email:		Phone #:
Katahdin Analytical Services	SJC	scolby@katahdinlab.com		(207) 874-2400
Address:	**City:**	**State:**	**Zip:**	**Project Name:**
600 Technology Way	Scarborough	Maine	04074	
KAS WO #:	**Quote #:**	**Purchase Order #:**		**TAT:** Std
SN8943				**Verbal TAT:**
RPT Level: II	**Reporting Format:** Std	**EDD:** ME		**Analysis:** Chlorophyll A

Sample ID:	Collect Date and Time:	Matrix:	No. of Containers	Pres.	MS/MSD Dup.	Analysis: Chlorophyll A Filtered? Y / N	Analysis: Filtered? Y / N	Analysis: Filtered? Y / N
RUMFORD UPPER IMPOUNDMENT	27-OCT-20 09:20	AQ	1	none	NO	X		

Relinquished By: [signature] **Date/Time:** 10/27/20 0810 / 10-28-20 / 11:55 **Received By:** [signature] Diane Curtis 10/28/20 1155

Comments: Rec'd w/ice @ 2.1°C

2020-10-354

Katahdin Analytical Services, LLC. **Sample Receipt Condition Report**

Client: Normandeau	KAS PM: SC	Sampled By: Client
Project:	KIMS Entry By: JCB	Delivered By: Client
KAS Work Order#: SN8943	KIMS Review By: SC	Received By: JCB
	Labeled By: GM	
SDG #:	Cooler: 1 of 1	Date/Time Rec.: 10/27/20 1215

Receipt Criteria	Y	N	EX*	NA	Comments and/or Resolution
1. Custody seals present / intact?		/			
2. Chain of Custody present in cooler?	/				
3. Chain of Custody signed by client?	/				
4. Chain of Custody matches samples?	/				
5. Temperature Blanks present? If not, take temperature of any sample w/ IR gun.		/			Temp (°C): 3.1 — Thermometer ID: IR-1
Samples received at <6 °C w/o freezing?	/				Note: Not required for metals (except Hg soil) analysis.
Ice packs or ice present?	/				The lack of ice or ice packs (i.e. no attempt to begin cooling process) or insufficient ice may not meet certain regulatory requirements and may invalidate certain data.
If yes, was there sufficient ice to meet temperature requirements?	/				
If temp. out, has the cooling process begun (i.e. ice or packs present) and sample collection times <6hrs., but samples are not yet cool?				/	Note: No cooling process required for metals (except Hg soil) analysis.
6. Volatiles: **Aqueous:** No bubble larger than a pea?				/	
Soil/Sediment: Received in airtight container?				/	
Received in methanol?				/	
Methanol covering soil?				/	
D.I. Water - Received within 48 hour HT?				/	
7. Trip Blank present in cooler?				/	
8. Proper sample containers and volume?	/				
9. Samples within hold time upon receipt?	/				
10. Aqueous samples properly preserved? Metals, COD, NH3, TKN, O/G, phenol, TPO4, N+N, TOC, DRO, TPH – pH <2	/				
Sulfide - >9				/	
Cyanide – pH >12				/	
11. Bottleware Prepped on:					

* Log-In Notes to Exceptions: document any problems with samples or discrepancies or pH adjustments.

Katahdin ANALYTICAL SERVICES
600 Technology Way
Scarborough, ME 04074
Tel: (207) 874-2400
Fax: (207) 775-4029

CHAIN of CUSTODY

PLEASE BEAR DOWN AND PRINT LEGIBLY IN PEN

Client: Normandeau Associates Inc
Contact: Tyler Parent
Phone #: (805) 708 6472
Fax #: ( )
Address: 25 Nashua Road
City: Bedford
State: NH
Zip Code: 03110
Purchase Order #: 24411 000 T2
Proj. Name / No.:
Katahdin Quote #: 10179 gdl
Bill (if different than above):
Address:
Sampler (Print / Sign): Abigail Hayne [signature]
Copies To:

LAB USE ONLY
WORK ORDER #: SN8943
KATAHDIN PROJECT NUMBER:
REMARKS:
SHIPPING INFO: ☐ FED EX ☐ UPS ☐ CLIENT
AIRBILL NO:
TEMP°C: ☐ TEMP BLANK ☐ INTACT ☐ NOT INTACT

ANALYSIS AND CONTAINER TYPE PRESERVATIVES

*	Sample Description	Date / Time coll'd	Matrix	No. of Cntrs.	Chlorophyll A / 1L Amber Foil (Filt. N)	Total Phosphorous / Plastic 250mL-H_2SO_4 (Filt. N)	Color, Alkalinity, pH / 250mL plastic (Filt. N)	Filt. ☐Y☐N	Filt. ☐Y☐N	Filt. ☐Y☐N	Filt. ☐Y☐N	Filt. ☐Y☐N	Filt. ☐Y☐N	Filt. ☐Y☐N
	Rumford Upper Impoundment	10/27/20 / 0920	Aq	3	X	X	X							
		/												
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		/												

COMMENTS

Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)
[signature]	10/27/20 1200	[signature]			
Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)

THE TERMS AND CONDITIONS ON THE REVERSE SIDE HEREOF SHALL GOVERN SERVICES, EXCEPT WHEN A SIGNED CONTRACTUAL AGREEMENT EXISTS.

Katahdin
ANALYTICAL SERVICES

Katahdin Analytical Services

Login Chain of Custody Report (lno1)

Oct. 27, 2020
04:22 PM

Login Number: SN8943

Account: NORMAN001
Normandeau Corp.

Project:

Primary Report Address:
Michael Polchlopek
Normandeau Assoc., Inc.
25 Nashua Rd

Bedford,NH 03110
mpolchlopek@normandeau.com

Primary Invoice Address:
Accounts Payable
Normandeau Assoc., Inc.
25 Nashua Road

Bedford,NH 03110

Report CC Addresses:
Invoice CC Addresses:

Quote/Incoming:

NoWeb

Login Information:

ANALYSIS INSTRUCTIONS	:	
CHECK NO.	:	
CLIENT PO#	:	24411.000 T2
CLIENT PROJECT MANAGE	:	
CONTRACT	:	
COOLER TEMPERATURE	:	3.1
DELIVERY SERVICES	:	Client
EDD FORMAT	:	KAS064QC-XLS
LOGIN INITIALS	:	JCB
PM	:	SJC
PROJECT NAME	:	Rumford Upper Impoundment
QC LEVEL	:	II
REPORT INSTRUCTIONS	:	report and EDD to mpolchlopek@normandeau.com. Invoice to abogart@normandeau.com
SDG ID	:	
SDG STATUS	:	
VERBAL TAT	:	

Katahdin
ANALYTICAL SERVICES

Katahdin Analytical Services

Login Chain of Custody Report (lno1)

Oct. 27, 2020
04:22 PM

Login Number: SN8943

Quote/Incoming:

Account: NORMAN001 NoWeb
Normandeau Corp.

Project:

Laboratory Sample ID	Client Sample Number	Collect Date/Time	Receive Date	PR	Verbal Date	Due Date	Mailed
SN8943-1	RUMFORD UPPER IMPOUNDMENT	27-OCT-20 09:20	27-OCT-20			08-NOV-20	

Matrix		Product	Hold Date (shortest)	Bottle Type	Bottle Count	Comments
Aqueous	S	E365.4-TOTAL-PHOS	24-NOV-20	125mL Plastic+H2SO4		
Aqueous	S	SM10200-CHLOROPH-SUB	28-OCT-20	1000mL Plastic		
Aqueous	S	SM2120-APP-COLOR	29-OCT-20	125mL Plastic		
Aqueous	S	SM2320B-ALKALINITY	10-NOV-20			
Aqueous	S	SM4500HB-PH	28-OCT-20	125mL Plastic		

Total Samples: *1* ***Total Analyses:*** *5*

APPENDIX B
IMPOUNDMENT BASS SPAWNING SURVEY REPORT

Impoundment Bass Spawning Survey Report

1.0 Introduction

Rumford Falls Hydro LLC (RFH or Licensee) conducted an Impoundment Bass Spawning Survey at the Rumford Falls Hydroelectric Project (Project) pursuant to RFH's July 7, 2020 Revised Study Plan as approved in the Federal Energy Regulatory Commission's (FERC or Commission) August 6, 2020 Study Plan Determination (SPD).

Article 401 requires the Licensee to operate the Project in a run-of-river mode within one foot of full pond elevation, which is elevation 601.24 feet U.S. Geological Survey [USGS] at the Upper Dam impoundment, and shall at all times act to minimize the fluctuations of the reservoir surface elevation (i.e., maintain a discharge from the Project so that, at any point in time, flows immediately downstream from the Project tailraces approximate the sum of the inflows to the Project reservoirs, minus withdrawals). The normal maximum surface area of the Upper Dam impoundment is 419 acres. Surface elevation is automatically maintained unless inflow exceeds the maximum plant capacity. Since the Upper Station Development is operated as run-of-river, there is no usable storage capacity associated with this impoundment.

The Upper Dam at the Project is equipped with 2.5-foot-high wooden flashboards that are designed to fail at certain river flows or when debris loading occurs. When the flashboards fail, the pond level will decrease with the river flow until the water level reaches the crest of the concrete dam (i.e., elevation 598.74 feet; 2.5 feet below the normal maximum headwater elevation of 601.24 feet). Routinely, flashboard repairs are needed after the spring run-off season to restore the impoundment to the full head pond elevation. Historically, board repairs have been completed as soon as possible but cannot be done until the river is under control, allowing workers to safely access the dam to complete needed repairs.

On May 31, 2020, RFH emailed the agencies notifying them of planned flashboard repairs. The Maine Department of Inland Fisheries and Wildlife (MDIFW) responded with concern over potential impacts to early spawning bass. In response to this, RFH agreed to complete a bass spawning survey on the Upper Dam impoundment and began on June 2, 2020.

1.1 Life History of Target Fish Species

In their comments to the Proposed Study Plan (PSP), MDIFW indicated interest in understanding the potential effect of non-emergency drawdowns of the Upper Dam impoundment on both Smallmouth and Largemouth Bass. MDIFW indicated that Smallmouth Bass were of particular interest.

1.1.1 Smallmouth Bass (*Micropterus dolomieu*)

Life History

Smallmouth Bass have a native range extending from the St. Lawrence River north, west through the Great Lakes region, and south to the northern portions of Alabama and Oklahoma (Langdon et al. 2006). This species has also been introduced widely throughout the United States. In lacustrine systems, Smallmouth Bass tend to inhabit rocky and sandy habitat. In riverine systems of higher gradient, they generally inhabit deeper pools. Regardless of the waterbody, Smallmouth Bass tend to seek the cover of large boulders and logs. This species is notably intolerant of low pH and are typically not found in waters where pH is lower than 5.5 (Langdon et al. 2006). Like many predatory fish, this species tends to forage most readily during the crepuscular periods (Langdon et al. 2006).

Juvenile Smallmouth Bass feed on plankton and gradually feed on crayfish, larger insects, and other small fish as they mature.

The average weight of the Smallmouth Bass ranges from 2 to 3 pounds. Males mature at 4 to 5 years of age, while females typically mature 1 to 2 years later. They are known to live up to 12 years (Scarola 1987).

Spawning

The male Smallmouth Bass begins nest building in gravel or rocky substrate in slow-flowing reaches between April and June when water temperatures are between 12.8 and 22.8°C (Langdon et al. 2006). Nests are typically found near a stump or gravel depression in the substrate. Smallmouth Bass will spawn in water depths from 3 to 15 feet. Egg deposition and fertilization starts when water temperatures are between 16.1 and 18.3°C. Spawning occurs between one male, and one or more females. Females are capable of depositing 5,000 to 14,000 eggs. The adhesive

eggs sink into the nest and are protected by the male until they hatch 4 to 10 days later. If water temperatures drop below 15.5°C, spawning may be interrupted and the male may abandon the eggs, leaving them susceptible to predation (Langdon et al. 2006).

1.1.2 Largemouth Bass (*Micropterus salmoides*)

Life History

Largemouth Bass range over the majority of the eastern half of the United States and are found as far north as southern Quebec and south throughout Florida and Texas (Langdon et al. 2006; Rohde et al. 2009). The wide distribution of Largemouth Bass is a function of extensive historical stocking. Largemouth Bass prefer warm waters of lakes, ponds, and slow-moving riverine systems. While 26.7°C is the preferred temperature for this species, some populations are able to tolerate waters as warm as 35°C (Langdon et. al 2006). Substrate preference is generally muddy bottoms with significant aquatic vegetation (Langdon et al. 2006; Rohde et al. 2009). This species is fairly tolerant of lower pH levels, as it is found in waters with pH as low as ~5.0 (Langdon et al. 2006).

Typical weight for adult Largemouth Bass is 2 to3 pounds (Langdon et al. 2006). Age at maturity ranges from 3 to 4 years in males and 4 to 6 years in females and the maximum age reported is 15 years (Langdon et al. 2006).

The diet of juvenile Largemouth Bass consists primarily of plankton and insects. Adults are predominantly piscivorous, but they are also known to eat crayfish, frogs, mice, and aquatic insects (Langdon et al 2006; Rohde et al. 2009). Most feeding occurs in the early morning hours and in the evening (Scarola 1987).

Spawning

Spawning occurs between May and July, while nest building begins once water temperatures have risen past 15.5°C (Langdon et al. 2006). Eggs are laid when water temperature is between 16.7 and 18.3°C. Males build nests in gravel or sand to a depth of approximately 1 to 4 inches, and a diameter of 2 to 3 feet (Langdon et al. 2006). Largemouth Bass will typically spawn in water depths from 3 to 5 feet. After the female deposits 2,000 to 109,000 adhesive eggs, the male guards the nest for up to a month after the eggs have hatched (Langdon et al. 2006). The eggs hatch 2 to 7 days later (Scarola 1987).

2.0 Goals and Objectives

The goal of the Impoundment Bass Spawning Survey was to assess bass spawning within the Project's routine maintenance drawdown zone of the Upper Dam impoundment, as well as the seasonality and frequency of routine maintenance impoundment drawdowns relative to the bass spawning season.

3.0 Study Area

The study area included the littoral zone of the Upper Dam impoundment from the boater barrier, upstream approximately 6.0 miles, to the upstream extent of the FERC Project boundary.

4.0 Methodology

4.1 Field Surveys

Weekly boat-based surveys were conducted in the study area on the Upper Dam impoundment. During each survey, a pair of biologists visually scanned the shoreline habitat to locate and identify bass nests or spawning areas. The survey effort focused specifically on the littoral zone of the Upper Dam impoundment relative to its normal elevation of 601.24 feet.

Sampling was conducted by systematically traversing the littoral zone via boat to visually identify bass nests and/or spawning areas (i.e., groups of nests within relative proximity to one another). Equipment and data collection during this effort included:

- a view tube to identify spawning nests/areas in those instances where they could not be easily identified from the surface;
- a digital camera to photo-document spawning nests/areas;
- a handheld Global Positioning System (GPS) unit to geo-reference the locations of spawning nests/areas and to delineate general littoral zone substrate types (e.g., sand, boulder);
- a handheld water quality meter to measure water temperature at spawning nests/areas;
- a Marsh-McBirney flow meter to measure velocity at identified spawning nests/areas;
- a Secchi disk to estimate water clarity;
- a stadia rod for determining water depth at spawning nests/areas; and

- data sheets for recording water quality parameters, general observations, weather conditions, and other relevant descriptive information (e.g., sediment/grain sizes, embeddedness, and approximate diameter of identified nests, presence of fish and aquatic vegetation at nests, nest abandonment, sedimentation of eggs).

Additional effort was made to visually characterize dominant substrate/habitat types within the littoral zone of the Upper Dam impoundment to help quantify the occurrence of potential spawning habitat. Natural breaks in substrate/habitat type were documented using a handheld GPS and imported into ArcGIS for quantification. Hook and line sampling was conducted during two of the survey days to confirm the presence of the target species within the survey area.

4.2 Impoundment Elevation Review

Available hourly elevation records for the Upper Dam impoundment were obtained from RFH, which included years 2017 through 2019. For the purposes of reviewing potential water level fluctuations relative to bass spawning in the Upper Dam impoundment, the period from May 15 to June 30 was examined for each year. Hourly head pond elevations were plotted relative to the normal maximum headwater elevation of 601.24 feet and the point within one foot of full pond elevation (i.e., 600.24 feet). Periods when the Upper Dam impoundment elevations were below one foot within the normal full pond (i.e., less than 600.24 feet) were noted. The following were recorded for each event:

- Start and end date/time;
- Duration (decimal days);
- Maximum observed variance value (i.e., depth below elevation 600.24 feet);
- Median variance value (i.e., depth below elevation 600.24 feet); and
- Percentage of bass spawning season (May 15-June 30).

5.0 Results

5.1 Field Surveys

Visual surveys for Smallmouth and Largemouth Bass spawning activity were conducted within the Upper Dam impoundment on five dates during June 2020 (June 2, 10, 15, 24, and 30). Visual

surveys were conducted along both banks of the Upper Dam impoundment from the boat barrier to the upstream extent of the FERC Project boundary (approximately 6.0 miles). During four of the five survey dates, visibility was good. Visibility was somewhat reduced during the June 30 survey due to increased flows associated with a precipitation event. Regardless, no bass nests were observed during the five June survey dates.

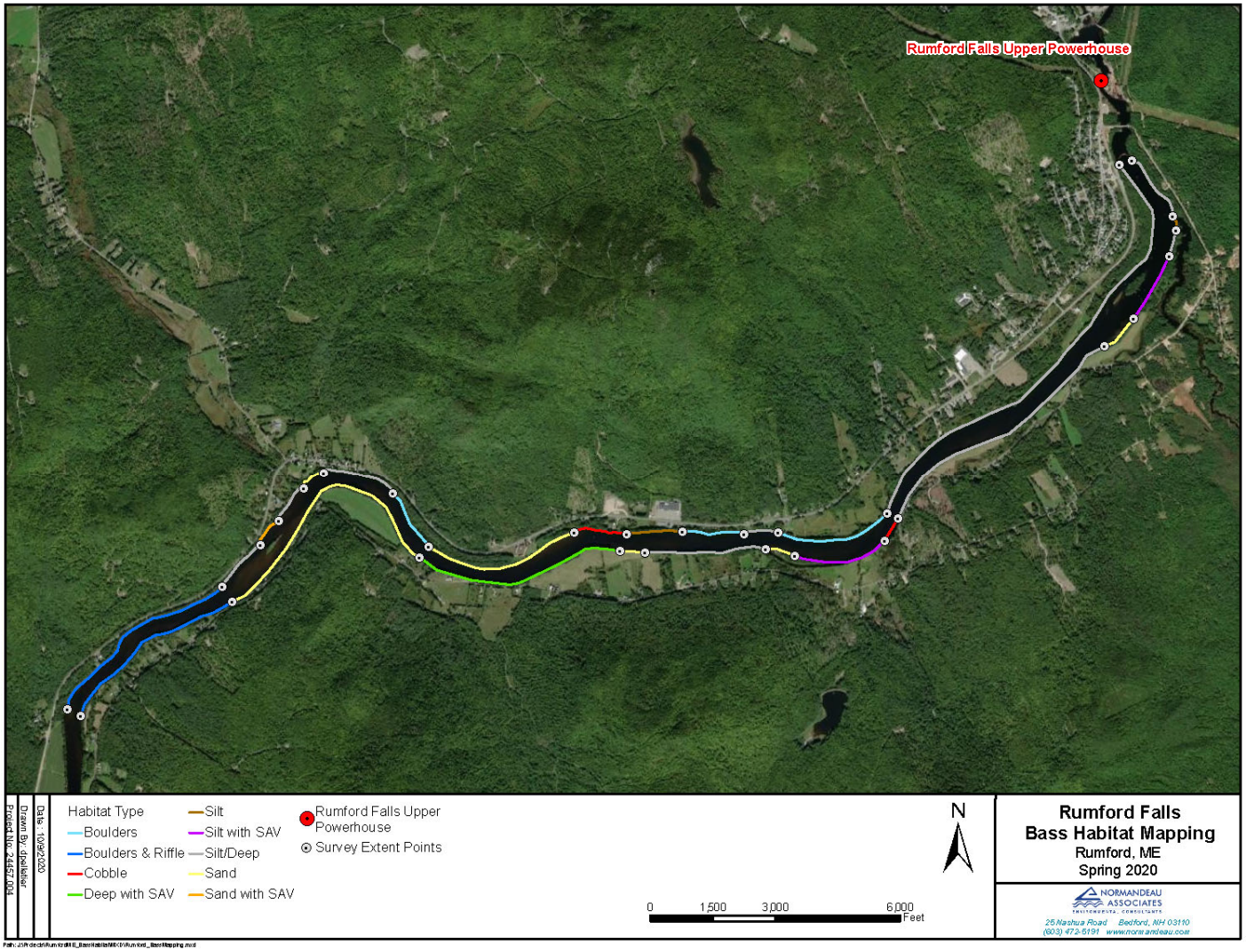
General survey information and observations are provided in Table 1. Water temperatures were lowest during the June 2 survey (11ºC) but had risen to 17.4ºC for the second survey conducted on June 10.

TABLE 1
GENERAL OBSERVATIONS FOR THE UPPER DAM IMPOUNDMENT BASS SPAWNING SURVEY, JUNE 2020

Date	Water Temp (°C)	Secchi Depth (m)	Weather	# of Nests Detected	Observation Notes
6/2/2020	11.0	-	Sunny; 60˚F	0	
6/10/2020	17.4	-	Overcast; 65°F	0	Smallmouth Bass observed; Fallfish nests observed
6/15/2020	18.5	3.4	Overcast; 67°F	0	
6/24/2020	23.9	-	Partly cloudy; 78°F	0	Smallmouth Bass captured
6/30/2020	18.5	1.0	Rain; 66°F	0	Smallmouth Bass captured

Dominant substrate/habitat types were visually characterized along both banks and are presented graphically in Figure 1 and in tabular format in Table 2. The lower third of the Upper Dam impoundment can be generally characterized as having steep banks with predominantly silty substrates. Upstream of that, littoral habitat becomes more varied with areas of sand, cobble, and submerged aquatic vegetation. Littoral habitat towards the upper end of the Upper Dam impoundment is predominantly boulder substrate.

FIGURE 1
SURVEY AREA AND HABITAT CLASSIFICATIONS FOR THE UPPER DAM IMPOUNDMENT AS NOTED DURING THE JUNE 2020 BASS SPAWNING SURVEYS



Appendix B-7

TABLE 2
HABITAT CLASSIFICATIONS, ESTIMATED LENGTH, AND PERCENTAGE OF TOTAL LITTORAL ZONE AS IDENTIFIED DURING THE JUNE 2020 UPPER DAM IMPOUNDMENT BASS SPAWNING SURVEY

Habitat Classification	Shoreline Length (ft)	Percent of Total
Boulders	5,919	8%
Boulders & Riffle	9,695	14%
Cobble	1,931	3%
Deep & Vegetation	5,170	7%
Mud	1,706	2%
Muddy & Vegetation	4,047	6%
Muddy/Deep	28,705	40%
Sand	13,529	19%
Sand & Vegetation	766	1%
Total	**71,468**	**100%**

In an effort to further document the general presence of bass species in the Upper Dam impoundment, hook and line sampling was conducted during the survey events conducted on June 24 and June 30 to confirm the presence of the target species within the survey area. A total of five Smallmouth Bass were captured within the Upper Dam impoundment during both events, thereby confirming the presence of the target species (Figure 2). No Largemouth Bass were captured or observed during this study.

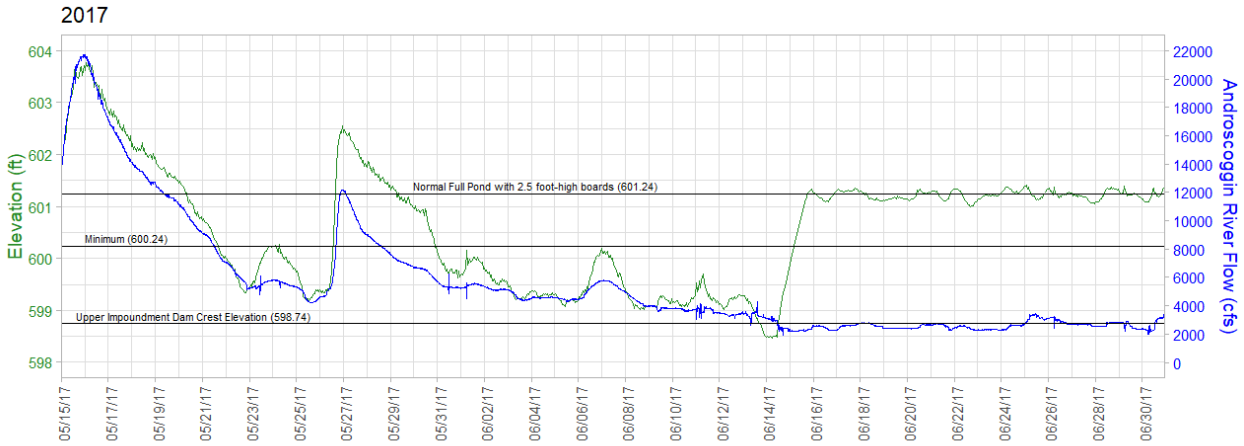
FIGURE 2
REPRESENTATIVE IMAGES OF SMALLMOUTH BASS CAPTURED BY HOOK AND LINE WITHIN THE UPPER DAM IMPOUNDMENT, JUNE 2020

5.2 Impoundment Elevation Review

Hourly head pond elevations in the Upper Dam impoundment are presented in Figure 3 (May 15-June 30, 2017), Figure 4 (May 15-June 30, 2018) and Figure 5 (May 15-June 30, 2019). As indicated above, the Upper Dam is equipped with 2.5-foot-high wooden flashboards that are designed to fail at certain river flows or when debris loading occurs. During the three years considered in this evaluation (2017-2019), high river flows resulted in flashboard loss or damage.

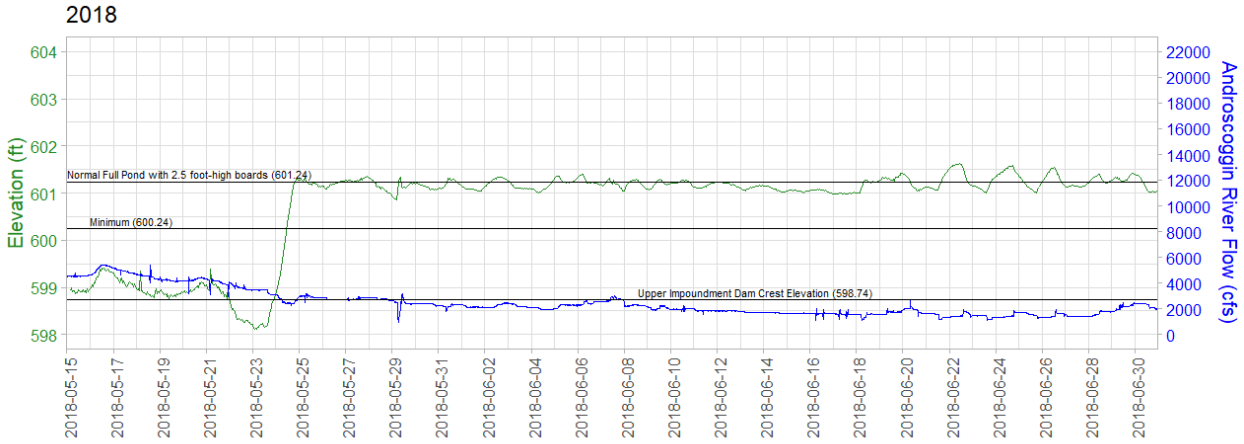
Flashboard failures were reported by RFH to the appropriate resource agencies each year. Table 3 provides a summary of each of the variances depicted graphically in Figure 3 through Figure 5. During the 2017 bass spawning season, the flashboards were lost during a high-flow event on March 8. A subsequent high-flow event naturally increased the water surface elevation of the Upper Dam impoundment in excess of the normal maximum headwater elevation for a period from May 26 to May 30. Following that increase in discharge, the recorded elevation values for Upper Dam impoundment dipped below 600.24 feet until flows receded to a safe level for RFH to safely execute flashboard repairs in mid-June. Collectively, the two periods when impoundment elevations were below an elevation of 600.24 feet, associated with the single period of flashboard damage during the 2017 bass spawning period in the Upper Dam impoundment, represented approximately 43 percent of the seasonal spawning period (i.e., May 15 to June 30). The median exceedance depth during the two separate periods was 0.5 feet and 1.0 feet below the elevation of 600.24 feet, respectively. Similarly, the single variance events during 2018 and 2019 represented 20 percent and 13 percent, respectively, of the May 15 to June 30 bass spawning periods. The median exceedance depth during those two periods was 1.3 feet and 1.1 feet below the elevation of 600.24 feet during 2018 and 2019, respectively. Flashboards were repaired as soon as flows receded to a level that allowed RFH to safely access the dam to complete needed repairs.

FIGURE 3
HOURLY UPPER DAM IMPOUNDMENT ELEVATION AND INFLOW
FOR THE PERIOD MAY 15 TO JUNE 30, 2017



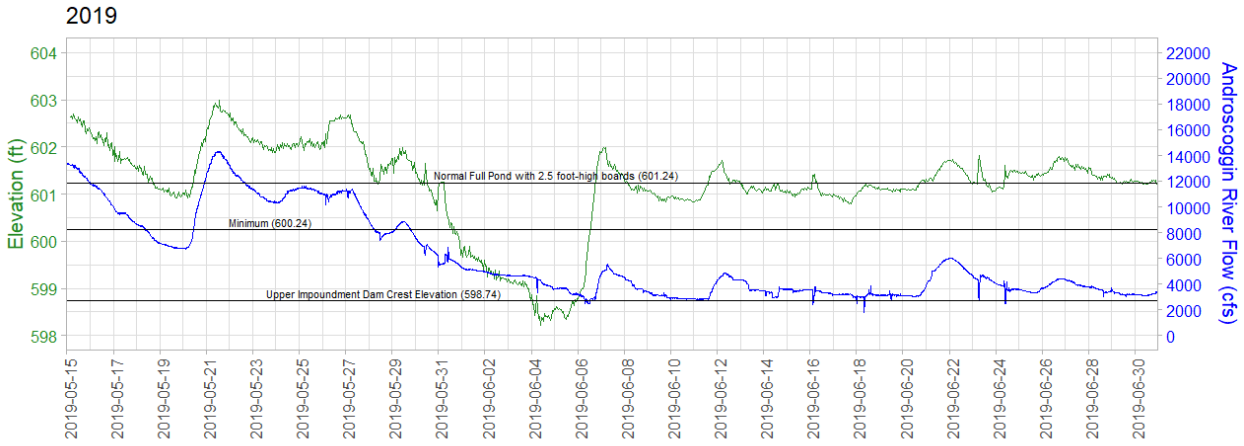
Note: Green line is elevation data and blue line is river flow.

FIGURE 4
HOURLY UPPER DAM IMPOUNDMENT ELEVATION AND INFLOW
FOR THE PERIOD MAY 15 TO JUNE 30, 2018



Note: Green line is elevation data and blue line is river flow.

FIGURE 5
HOURLY UPPER DAM IMPOUNDMENT ELEVATION AND INFLOW
FOR THE PERIOD MAY 15 TO JUNE 30, 2019



Note: Green line is elevation data and blue line is river flow.

TABLE 3
SUMMARY OF UPPER DAM IMPOUNDMENT HEADWATER ELEVATION VARIANCES DURING THE MAY 15 TO JUNE 30 BASS SPAWNING PERIODS FOR THE YEARS 2017-2019

Year	Variance No.	Start Date	End Date	Duration	Max. Depth Below 600.24 feet	Median Depth Below 600.24 feet	Percent of Season
2017	1a	5/21/2017	5/26/2017	4.9 days	1.1 feet	0.5 feet	10%
2017	1b	5/30/2017	6/15/2017	15.3 days	1.8 feet	1.0 feet	33%
2018	1	5/15/2018	5/24/2018	9.5 days	2.1 feet	1.3 feet	20%
2019	1	5/31/2019	6/6/2019	6 days	2.0 feet	1.1 feet	13%

Note: Variances were due to high flows which removed flashboards and precluded repairs until water levels were safe.

6.0 Summary

Rod and reel-based observations made during this study demonstrate that Smallmouth Bass are present within the Upper Dam impoundment. However, no active or abandoned bass nests were observed within the littoral zone of the study area in the Upper Dam impoundment. Although no nests were observed during the 2020 surveys, visual mapping of littoral substrate/habitat types suggest that suitable spawning habitat for Smallmouth Bass (i.e., gravel or coarse sand substrate in the vicinity of physical cover) exists within the impoundment. Smallmouth Bass are reported to initiate nest construction in water depths from 3 to 15 feet when water temperatures are between 12.8 and 22.8°C, and egg deposition and fertilization commence when water temperatures are

between 16.1 and 18.3°C. Water temperatures during the June survey dates met these criteria, suggesting bass spawning was likely occurring concurrent with the study period.

In the absence of field observations of spawning activity or nest areas during the 2020 surveys, a review of previously collected fish community data along the Androscoggin River was conducted to evaluate the relative abundance of Smallmouth Bass in the Project area (Yoder et al. 2006). Yoder et al. 2006 conducted a series of standardized boat-electrofishing surveys along the Androscoggin River during August-September 2003. Table 4 provides a summary of the locations sampled within 20 river miles (RM) upstream and downstream of the Project (i.e., RM 80.0). Adult, juvenile, and young-of-year (YOY) individuals were captured from each of the three sample locations located upstream of the Project as well as the six sample areas downstream of the Project. Observed catch per unit of effort (CPUE) rates appeared to be lower for sample stations located upstream of the Project than those located downstream. Sampling within the Upper Dam impoundment (RM 83.1) did yield YOY bass, suggesting that some level of successful spawning was taking place in the Upper Dam impoundment.

TABLE 4
SUMMARY OF BOAT ELECTROFISHING SAMPLING AND SMALLMOUTH BASS COLLECTIONS BETWEEN ANDROSCOGGIN RM 61.7 AND 97.3 DURING AUGUST-SEPTEMBER 2003 AS REPORTED IN YODER ET AL. 2006

Date	Location Reference	RM	Location Relative to Project	Distance From Project (RM)	Time Sampled (seconds)	Distance Sampled (km)	Number of Adults Captured	Adult CPUE (Fish per minute)	Number of Juveniles Captured	Juvenile CPUE (Fish per minute)	Number of YOY Captured	YOY CPUE (Fish per minute)
8/14/2003	Newry Access	97.3	Upstream	17.3	1722	1	4	0.1	1	0.0	56	2.0
8/14/2003	Rumford Corner	88.7	Upstream	8.7	1375	1	6	0.3	2	0.1	99	4.3
8/14/2003	US Rumford Falls	83.1	Upstream	3.1	1613	1	2	0.1	1	0.0	30	1.1
9/8/2003	DS Lower Dam	79.3	Downstream	0.7	3831	1	42	0.7	32	0.5	496	7.8
9/8/2003	Mexico, ME	78.5	Downstream	1.5	1642	1	30	1.1	16	0.6	244	8.9
9/8/2003	US Dixfield	76.9	Downstream	3.1	1921	1	30	0.9	59	1.8	361	11.3
9/9/2003	Peru, ME	70.8	Downstream	9.2	1711	1	26	0.9	45	1.6	594	20.8
9/9/2003	US St. Rt. 140	66.2	Downstream	13.8	3552	1	20	0.3	34	0.6	782	13.2
9/9/2003	Riley Impoundment	61.7	Downstream	18.3	3536	1	15	0.3	8	0.1	334	5.7

Subsequent to the completion of the 2020 bass spawning surveys, RFH consulted on study results with MDIFW. The summary of bass abundance in the Project area provided above (as described in Yoder et al. 2006) was developed in response to a request from MDIFW as a part of that consultation. In general, a consensus was reached that bass are present in the Upper Dam impoundment based on historical sampling and rod and reel observations made during the 2020 surveys. Environmental conditions and seasonal timing of the 2020 field surveys were appropriate for observations of spawning activity in the visible portion of the littoral zone. It is likely that spawning of Smallmouth Bass in the Upper Dam impoundment is occurring at water depths outside of the range viewable from the surface (i.e., towards the deeper end of the reported 3- to 15-foot range of spawning depths for the species). Largemouth Bass, which were not observed during the study, will typically spawn in water depths from 3 to 5 feet. The lack of bass nests observed indicates that bass are not spawning at depths that would be affected when the 2.5-foot flashboards are out at the Upper Dam. MDIFW indicated a second year of study was not necessary.

7.0 Variances from FERC-Approved Study Plan

There were no variances from the FERC-approved study plan.

8.0 References

Langdon, R. W., Ferguson, M. T., and Cox, K. M. 2006. Fishes of Vermont. Waterbury, VT. Vermont Department of Fish and Wildlife.

Rohde F. C., Arndt R. G., Foltz, J. W., Quattro, J. M. 2009. Freshwater Fishes of South Carolina. University of South Carolina. University of South Carolina Press.

Scarola, J.F. 1987. Freshwater Fishes of New Hampshire. New Hampshire Fish and Game Department.

Yoder, C.O., B.H. Kulik, J.M. Audet, and J.D. Bagley. 2006. The spatial and relative abundance characteristics of the fish assemblages in three Maine rivers.