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August 5, 2022

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)
Updated 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 Updated Study Report (USR) for the Rumford Falls Hydroelectric Project (Project) (FERC No. 2333) in accordance with 18 Code of Federal Regulations (CFR) §5.15(f). 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 (ILP).

RFH initiated and/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

RFH filed an Initial Study Report (ISR) with the Commission on August 6, 2021, which described the Licensee's overall progress in implementing the study plans and associated schedule, the data collected, and any variances from the study plans and schedule. This USR provides similar information and reflects the progress RFH has made since submittal of the ISR. Please note that the Angler Creel Survey and Recreation Study, both of which require in-person surveys with the public, were postponed until 2022 due to safety concerns and anticipated anomalous usage data due to the COVID-19 pandemic and Center for Disease Control and Prevention guidelines. Given the ongoing study activities, and consistent with the Commission's ILP schedule, these studies will not be completed until after the required filing date of the Final License Application (FLA). Therefore, RFH will file these two study reports with the Commission as supplemental to the FLA.

In addition to filing this USR 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(f), RFH will hold a USR meeting with interested parties and Commission staff on Wednesday, August 17, 2022, from 10:00AM to 12:00PM (EST) at the Rumford Town Hall, 145 Congress Street, Rumford, ME 04276. 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 12, 2022.

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,

Luke Anderson
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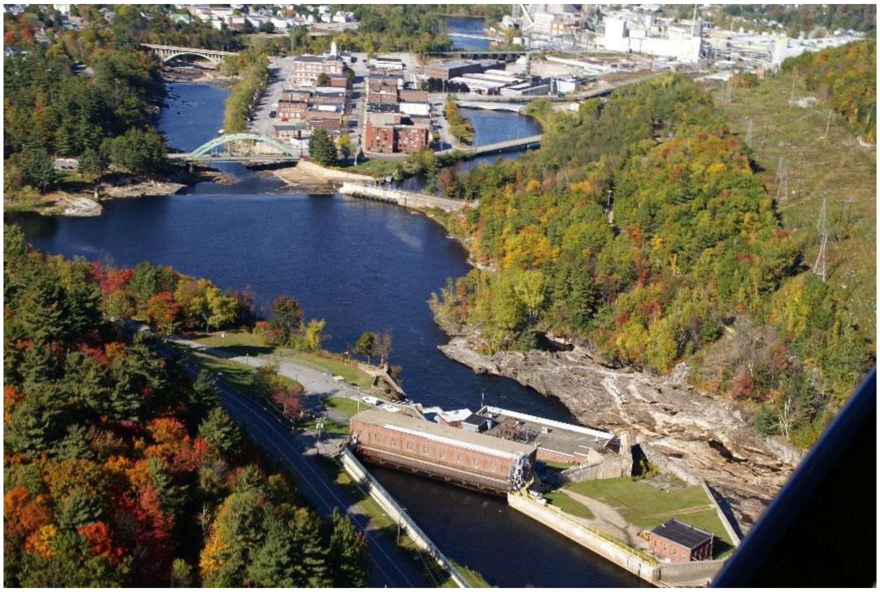
RUMFORD FALLS HYDROELECTRIC PROJECT
(FERC NO. 2333)

UPDATED STUDY REPORT



RUMFORD FALLS HYDRO LLC
Rumford, Maine

AUGUST 2022

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

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List of Acronyms

ac-ft	acre-feet
Brookfield	Brookfield Renewable
CDC	Center for Disease Control and Prevention
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
GSU	generator step-up
ILP	Integrated Licensing Process
ISR	Initial Study Report
kV	kilovolts
kW	kilowatts
LIHI	Low Impact Hydro Institute
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
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 2022).

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 has 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). On August 6, 2021, RFH filed the Initial Study Report (ISR) with FERC pursuant to 18 CFR §5.15(c), which described RFH's overall progress in implementing the study plans and schedule, the data collected, and any variances from the study plans and schedule. Pursuant to 18 CFR §5.15(f), RFH is filing this Updated Study Report (USR), which includes updates to the aforementioned information and provides additional updates since the submittal of the ISR.

Please note that the Angler Creel Survey and Recreation Study, both of which require in-person surveys with the public, were postponed until 2022 due to safety concerns and anticipated anomalous usage data due to the COVID-19 pandemic. Given these ongoing study activities, and consistent with the Commission's ILP schedule, the Angler Creel Survey and Recreation Study will not be completed until after the required filing date of the Final License Application (FLA). Therefore, RFH will file these two study reports with the Commission as supplemental to the FLA.

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[1] LIHI certified through December 9, 2028.

Section 2
Project Description

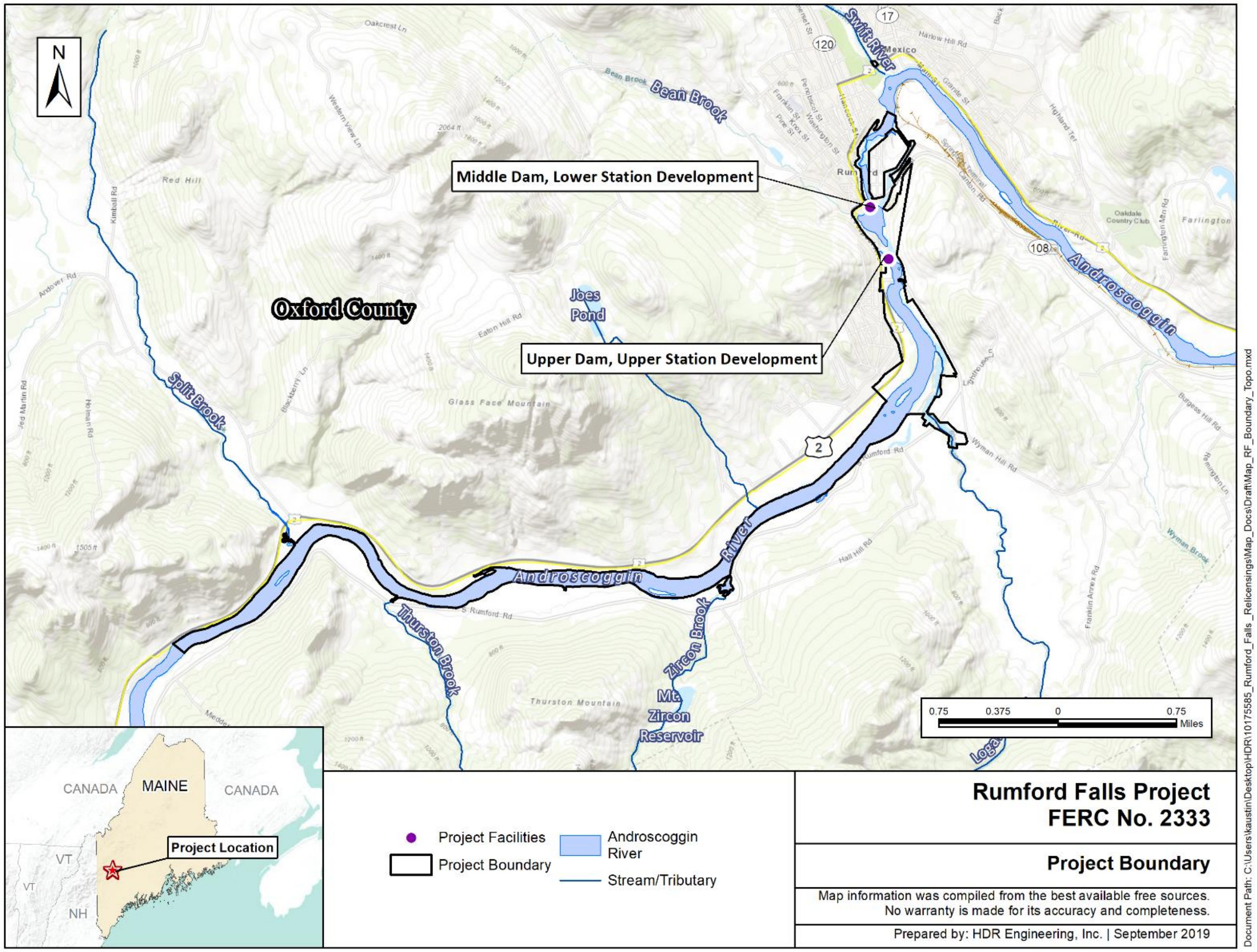
The Project is located at River Mile (RM) 80 on the Androscoggin River in Oxford County in the Town of Rumford, Maine. A Project location map is provided in Figure 2-1. The Project consists of two discrete developments – the Upper Station Development and the Lower Station Development. The total nameplate 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 the Licensee 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, RFH 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



Separate from this relicensing, RFH requested a non-capacity amendment for the Project's license on April 27, 2021, and supplemented on May 18, 2021, to construct and maintain a battery storage system at the Project[2]. On June 3, 2021, FERC issued an order amending the license to include a battery system. The battery system will not change Project operations and will not impact the generating or water control capabilities of the dam or powerhouse.

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 USGS, topped with approximately 2.5-foot-high, pin-supported, wooden flashboards; 271 feet of this consists of an Obermeyer spillway system; (2) a gatehouse with eight headgates (two headgates for each of the four penstocks), trashracks, and other appurtenant equipment; (3) four underground steel-plate penstocks, each approximately 110 feet long, three of which are 12 feet in diameter, and one 13 feet in diameter; (4) a masonry powerhouse integral with the dam, occupying two adjoining sections of the dam: (a) the Old Station, approximately 30 feet wide by 110 feet long by 92 feet high, equipped with one horizontal generating unit with a capacity of 4,300 kilowatts (kW), and (b) the New 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; (5) an impoundment, with a gross storage capacity of 2,900 acre-feet (ac-ft), surface area of approximately 419 acres, normal maximum headwater elevation of 601.24 feet USGS, and tailwater elevation of 502.74 feet USGS; (6) four overhead 11.5-kilovolt (kV) transmission lines

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[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.

extending from the Upper Station to the Generator Step-Up (GSU) substation, varying in length from 4,200 feet long to 4,500 feet long; and (7) appurtenant facilities.

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 section, the Middle Canal, a gatehouse, two penstocks (each with a surge tank), 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 501.24 feet USGS, topped 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 USGS, topped with 1.0-foot-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 ac-ft, surface area of approximately 21 acres, normal maximum headwater elevation of 502.74 feet USGS, and tailwater elevation of 423.24 feet USGS; (8) two 11.5-kV generator leads, extending from the Lower Station to the GSU substation; 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 Notice 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. 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). On February 27, 2020, the Commission issued a letter indicating that although several comments were received during scoping, that they did not affect the content of SD1. Therefore, the Commission indicated that a Scoping Document 2 was not warranted and SD1would be used to prepare the EA.

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 15 comment letters and 45 comments provided by FERC's eComment system. Forty-three of the comments received were from members of the public[3]. Comment were received up to June 12, 2020, and although comments were received after the regulatory deadline, all comments were considered during development of the RSP.

RFH filed the RSP with the Commission on July 7, 2020. On August 6, 2020, the Commission issued the 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

RFH filed the ISR on August 6, 2021, which described the Licensee's overall progress in implementing the study plans and associated schedule, the data collected, and any variances from the study plans and schedule identified in the July 7, 2020 RSP, as modified and/or approved in the Commission's August 6, 2020 SPD. Subsequent to filing the ISR, RFH held a virtual ISR meeting with Commission staff and other relicensing participants on August 19, 2021. RFH filed the ISR Meeting Summary with the Commission on September 3, 2021. No disagreements or requests to amend the study plan were filed by stakeholders.

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

RFH filed the Draft License Application (DLA) with the Commission on May 2, 2022, and will file the FLA with the Commission on or before September 30, 2022.

RFH also filed quarterly progress reports with the Commission on October 30, 2020, January 29, 2021, April 30, 2021, October 29, 2021, January 31, 2022, and April 29, 2022. RFH notified stakeholders of these filings to provide routine updates on each of the studies.

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

Section 4
Study Status and Progress Summary

4.1 Study Status

Table 4-1 below provides the status of the eight studies RFH is conducting in support of relicensing the Project. The Water Quality and Impoundment Bass Spawning Study reports were included in the ISR.

The Aesthetic Flow Study, Flow Study for Aquatic Habitat Evaluation, and Whitewater Boating Study reports are included in this USR (Appendix A-C). Additionally, as specified in the ISR, the Outlet Stream Aquatic Habitat Study component of the Water Quality Study is also included in this USR (Appendix D).

The Angler Creel Survey and Recreation Study both require in-person surveys with the general public and were postponed until 2022 due to safety concerns and anticipated anomalous usage data due to the COVID-19 pandemic and the Center for Disease Control and Prevention (CDC) guidelines. The Angler Creel Survey[4], Recreation Study, and additional water quality data collection will be completed in 2022. In consultation with MDIFW, RFH began conducting the creel surveys in early April 2022, which will be conducted through November 2022. Recreation observations and surveys were initiated in late May 2022 and will continue through early September 2022. RFH conducted an inventory and assessment of recreation facilities and will hold site visits and a meeting with the focus group in the summer of 2022.

Given the ongoing study activities, and consistent with the Commission's ILP schedule, the Recreation and Angler Creel studies will not be completed until after the required FLA filing date. Therefore, the Angler Creel Survey and the Recreation Study reports, as well as the additional water quality data, will be filed with the Commission soon after the studies are completed as a supplement to the FLA.

The Historic Architectural Survey Study Report was sent to the Maine Historic Preservation Commission (MHPC) for review on October 25, 2021. The MHPC concluded that the proposed

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[4] Per the study plan, RFH will consult with MDIFW to determine if a second year of the study is needed after the first year of the study is completed.

undertaking will have no adverse effect upon historic properties. The MHPC's conclusions and associated consultation documents were implemented into the final report, which pursuant to the Commission's request, was kept confidential and was filed with the Commission as privileged on May 27, 2022.

TABLE 4-1
STUDY STATUS

Study	**Status**		**Study Report Location**		
	Completed	**Ongoing**	**ISR**	**USR**	**Post FLA**
Water Quality Study	X[1]		X[1]		
Angler Creel Survey		X			X
Recreation Study		X			X
Historic Architectural Survey	X		Filed as privileged with FERC on May 27, 2022.		
Aesthetic Flow Study	X			X	
Impoundment Bass Spawning Survey	X		X		
Flow Study for Aquatic Habitat Evaluation	X			X	
Whitewater Boating Study	X			X	

[1] As specified in the ISR, the results of the Outlet Aquatic Habitat Study component of the Water Quality Study are presented in this USR and the results of the additional trophic sampling will be filed with the Commission as a supplement to the FLA soon after the sampling is completed. All other water quality sampling has been completed and the results are provided within the ISR.

Section 5
Process and Schedule

5.1 Updated Study Report Meeting

Pursuant to §5.15(f), RFH will hold a USR Meeting with interested parties and Commission staff on Wednesday, August 17, 2022, from 10:00AM to 12:00PM (EST) at the Rumford Town Hall, 145 Congress Street, Rumford, ME 04276. 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 12, 2022.

5.2 Updated Study Report Meeting Summary

Subsequent to the USR Meeting and in accordance with §5.15(f), RFH will file a summary of the USR Meeting on or before September 6, 2022. Participants may file on or before October 6, 2022, any disagreement concerning the USR Meeting summary, 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 meet the applicable criteria as defined by §5.15(f). RFH will then have 30 days (on or before November 5, 2022) to file any responses to comments, disagreements, or requests, and then FERC will have an additional 30 days (on or before December 5, 2022) to issue a determination regarding any disagreements and/or modifications to the approved study plans.

Section 6
Literature Cited

Low Impact Hydropower Institute (LIHI). 2022. LIHI Certificate #38 – Rumford Falls Project, Maine. 2019 Recertification. Online [URL]: https://lowimpacthydro.org/lihi-certificate-38-rumford-falls-hydroelectric-project-maine/. (Accessed March 2022).

APPENDIX A

AESTHETIC FLOW STUDY REPORT

Aesthetic Flow Study Report

1.0 Introduction

The Federal Energy Regulatory Commission (FERC or Commission) requested Rumford Falls Hydro LLC (RFH or Licensee) conduct an Aesthetic Flow Study at the Rumford Falls Hydroelectric Project (Project), which was supported by the Maine Department of Inland Fisheries and Wildlife (MDIFW) and additional stakeholders. RFH conducted the Aesthetic Flow Study pursuant to RFH's July 7, 2020 Revised Study Plan (RSP), as approved in the FERC's August 6, 2020 Study Plan Determination (SPD).

1.1 Background and Existing Information

Flows on the Androscoggin River are regulated by upstream non-project and non-RFH storage reservoirs established by the 1909 Androscoggin River Company Headwater Benefits Agreement (HBA), which was updated in 1983 (Androscoggin Reservoir Company [ARCO] HBA, 1909 /1983).

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).

Pursuant to Article 402 of the Project's existing license, RHF releases a minimum flow of 1 cubic foot per second (cfs) to the Upper Dam bypass reach, also known as Rumford Falls, via leakage from the flashboards. The Upper Station Development has a total installed nameplate capacity of 29.3 MW and a maximum hydraulic capacity of 4,550 cfs. Flows in excess of the maximum hydraulic capacities are spilled over the Upper Dam into the bypass reach.

2.0 Goals and Objectives

The goal of the Aesthetic Flow Study was to obtain information on the existing aesthetic character of water flowing over Rumford Falls and potential aesthetic flow viewing opportunities of Rumford Falls.

The study was designed to achieve the following objectives:

(1) Document the existing aesthetic character and conditions over Rumford Falls;

(2) Identify key observation points (KOPs) used to evaluate acceptable aesthetic flows;

(3) Collect photo and video documentation under various existing and controlled flow conditions over Rumford Falls;

(4) Conduct focus group assessments of controlled flow conditions at KOPs;

(5) Summarize the timing and ranges of historical flows to characterize existing flow conditions as they relate to the aesthetic character of Rumford Falls;

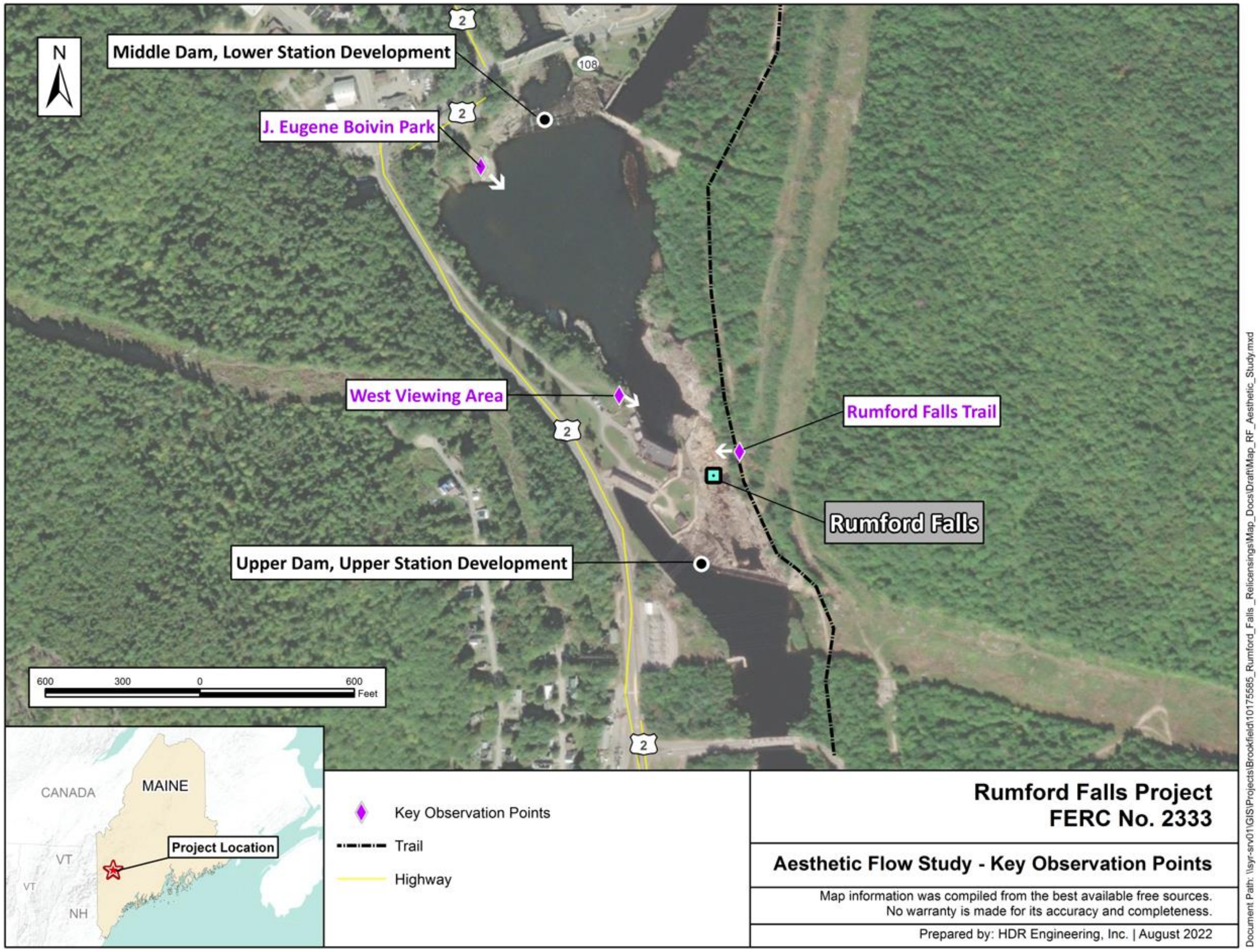
(6) Determine the operational feasibility, effects on generation, and cost of providing acceptable aesthetic flow releases; and

(7) Evaluate the potential effects of aesthetic flow releases on other resources including recreational uses, aquatic resources, water quality, and project generation.

3.0 Study Area

The study area is Rumford Falls, the Project’s 650-foot-long upper bypass reach and natural falls located immediately below the Project’s Upper Dam, and the KOPs that were developed in consultation with the focus group (Figure 1).

FIGURE 1
AESTHETIC FLOW STUDY KEY OBSERVATION POINTS



Note: Access to a portion of the Rumford Falls Trail has been limited due to public safety concerns. RFH continues to evaluate the feasibility of reopening this section.

4.0 Methodology

The aesthetic flow was conducted in conformance with the FERC-approved study plan, which recommended using the methods outlined by Whittaker and Shelby (2017). The study included three Phases:

- Phase 1 – a desktop analysis to summarize historic flows.
- Phase 2 – identification of KOPs, key viewing characteristics, and target flows, as well as development of a field evaluation form, in collaboration with focus group participants.
- Phase 3 – an on-site, controlled flow assessment where the focus group reviewed target flows and completed evaluation forms. RFH also lead an off-site focus group discussion to review the preliminary results from the controlled flow assessment.

4.1 Phase 1 – Desktop Analysis

RFH 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 summarized the flows that occur over Rumford Falls based on the Project's existing FERC license and natural river hydrology. As discussed in Section 5.0 below, the Phase 1 analyses was presented and discussed with the focus group.

4.2 Phase 2 – Identification of Focus Group, Key Observation Points, Key Viewing Characteristics, Target Flows, and Evaluation Form

Consistent with a request from FERC, RFH targeted assembling a focus group with a minimum of 10 stakeholders to the extent that they were willing to participate. Those that expressed interest included the Town of Rumford, Inland Woods + Trails (formerly known as Mahoosuc Pathways)/Rumford residents, MDIFW, and Maine Bureau of Parks and Lands (MBPL). Those stakeholders that expressed interest in participating in the study were considered a part of the focus group moving forward.

In consultation with the focus group, RFH identified KOPs, key viewing characteristics, and target flows, and finalized the evaluation form. Once the KOPs were established, each site was characterized and documented during leaf-on and leaf-off periods. Additionally, the potential use and access of the KOPs were assessed using existing available information.

In consultation with the focus group, RFH determined the number of releases and appropriate flows for conducting the controlled flow assessment. RFH provided a summary of this information in the Initial Study Report (ISR), which was filed with the Commission on August 6, 2021.

4.3 Phase 3 – Controlled Flow Assessment

Following focus group meetings to familiarize participants with the evaluation form and the KOPs, RFH held an on-site visit for the focus group participants to review the targeted flows and complete the evaluation form at each KOP. In addition, as part of the on-site flow evaluation, RFH held an off-site focus group discussion to review the results of the flow assessment. RFH documented the observed flows reviewed by the focus group using photo and video (with sound).

4.4 Data Analysis and Report Preparation

For each KOP, the range of individual scores for specific aesthetic attributes were determined. In accordance with Whitaker, for each aesthetic attribute, the average score for each flow and KOP were determined and used to develop flow evaluation curves to show the overall effect on aesthetics through a range of flows.

The potential effects of providing aesthetic flows on other resources, such as recreation opportunities, aquatic resources, and Project power generation were also assessed.

5.0 Results

5.1 Phase 1 – Desktop Analysis

Flow data from the USGS gage located approximately 550 feet downstream from the Lower Station Development’s powerhouse (i.e., USGS 01054500 Androscoggin River at Rumford, Maine) were compiled to assess and summarize historic flows based on the Project’s operation pursuant to the existing FERC-issued license and natural river hydrology. The monthly and annual minimum, average, and maximum flows from 2000 through 2021 are provided in Table 1. Flow duration curves are provided in Attachment 1. Based on historic flow data, the monthly average flows in the Androscoggin River have been near or below the hydraulic capacity of the Upper

Station (i.e., 4,550 cfs), except in the spring (Table 1). With the exception of spring, the daily average flows in the Androscoggin River have historically exceeded the hydraulic capacity of the Upper Station between 3.9 percent of the time in September to 28.5 percent of the time in November (Table 2). The daily average flows in the Androscoggin River have only exceeded the hydraulic capacity in the summer months of July, August, and September 3.9 percent to 12.9 percent of the time. During July, August, and September estimated daily average flows in the Upper Dam bypass reach exceed 500 cfs between 3.3 percent to 10.4 percent of the time; 1,000 cfs between 3.2 and 8.7 percent of the time; 1,500 cfs between 2.0 to 7.9 percent of the time; and 2,000 cfs between 1.5 percent to 6.3 percent of the time (Table 3). This equates to a total of 71 days in July, 41 days in August, and 22 days in September from 2000 through 2021 when the daily average flows in the Upper Dam bypass reach were over 500 cfs.

TABLE 1
RUMFORD FALLS PROJECT – HISTORICAL MONTHLY AND ANNUAL MINIMUM, AVERAGE,AND MAXIMUM FLOWS IN THE ANDROSCOGGIN RIVER, 2000 THROUGH 2021[1]

Month	Minimum Flow (cfs)	Average Flow (cfs)	Maximum Flow (cfs)	10% Exceedance	90% Exceedance
January	1,110	3,735	19,500	5,129	2,162
February	1,390	3,518	13,000	4,909	2,191
March	1,450	4,625	27,300	6,998	2,450
April	1,960	9,296	42,800	18,320	3,720
May	1,510	6,957	23,500	14,000	2,731
June	1,100	4,371	30,400	8,513	1,740
July	1,260	3,158	20,300	5,118	1,720
August	1,140	2,679	37,900	3,819	1,530
September	1,050	2,263	10,400	3,343	1,390
October	998	3,715	34,900	6,997	1,470
November	925	4,253	22,800	7,774	1,940
December	1,210	4,353	33,400	7,056	1,890
Annual	**925**	**4,410**	**42,800**	**8,375**	**1,720**

[1] Based on daily average discharge data

TABLE 2
RUMFORD FALLS PROJECT – PERCENT OF TIME ANDROSCOGGIN RIVER FLOWS HISTORICALLY WERE GREATER THAN THE HYDRAULIC CAPACITY OF THE UPPER STATION (4,550 CFS), MONTHLY FROM 2000 THROUGH 2021

Month	Percent of Time[1,2]
January	15.1
February	12.4
March	35.5
April	78.9
May	64.2
June	30.0
July	12.9
August	7.6
September	3.9
October	18.6
November	28.5
December	25.8
Annual	27.8

[1] Based on daily average discharge data.

[2] Assumes Upper Station was operating at full capacity of 4,550 cfs.

TABLE 3
RUMFORD FALLS PROJECT – PERCENT OF TIME FLOWS IN THE UPPER DAM BYPASS REACH WERE GREATER THAN THE TARGET FLOWS, MONTHLY FROM 2000 THROUGH 2021

Month	Percent of Time[1,2]			
	500 cfs	1,000 cfs	1,500 cfs	2,000 cfs
January	10.6	7.6	5.9	4.5
February	8.7	4.3	3.1	2.6
March	26.1	19.6	15.2	12.5
April	72.6	65.0	60.5	55.0
May	57.0	50.4	43.8	40.3
June	25.2	21.1	19.4	17.4
July	10.4	8.7	7.9	6.3
August	6.0	5.4	5.0	4.4
September	3.3	3.2	2.0	1.5
October	16.0	13.5	11.7	10.7
November	24.4	21.2	18.3	15.9
December	20.7	18.5	15.0	12.6

[1] Based on daily average discharge data.

[2] Assumes Upper Station was operating at full capacity of 4,550 cfs.

5.2 Phase 2 – Identification of Focus Group, Key Observation Points, Key Viewing Characteristics, Target Flows, and Evaluation Form

On April 30, 2021, RFH invited 11 individuals to participate in the Aesthetic Flow Study focus group (Table 4), including:

1. James Vogel, Maine Bureau of Parks and Lands
2. James Pellerin, Maine Department of Inland Fisheries and Wildlife
3. John Perry, Maine Department of Inland Fisheries and Wildlife
4. George O’Keefe, Town of Rumford
5. Stacy Carter, Town of Rumford
6. Gabe Perkins, Inland Woods + Trails (formerly known as Mahoosuc Pathways)
7. John Preble, Inland Woods + Trails (formerly known as Mahoosuc Pathways)/Rumford resident
8. Todd Papianou, Inland Woods + Trails (formerly known as Mahoosuc Pathways)/Rumford resident
9. Karen Wilson, Inland Woods + Trails (formerly known as Mahoosuc Pathways)/Rumford resident
10. Jennifer Kreckel, EnvisionRumford
11. Tony Carter, Pennacook Falls Investment

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/Rumford residents, MBPL, and MDIFW, which expressed interest in participating in the focus group. After identifying an agreed-upon date with those that responded and time that worked 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 KOPs sites (i.e., recreation sites which are in and around the Project Boundary, however, are not formal recreation sites in the current license and included Veteran’s Park [owned by RFH and maintained by the Town of Rumford],

J. Eugene Boivin Park [owned by the Town of Rumford], the West Viewing Area [owned by RFH], and Rumford Falls Trail [portion owned by RFH]);

- Receive input on the proposed flows (i.e., 500 cfs, 1,000 cfs, 1,500 cfs, and 2,000 cfs); and
- Receive input on an evaluation form for the controlled flow assessment.

The group agreed that the proposed KOP sites and flows were appropriate. The group requested that the form specify that the West Viewing Area and a portion Rumford Falls Trail are currently closed to the public. RFH implemented the recommended edits, and the evaluation form was recirculated to the focus group via email on May 27, 2021 (Attachment 2).

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/Rumford resident, RFH, and HDR. The focus group visited each of the proposed sites and identified the KOPs within each site. The focus group determined that there were not adequate views of Rumford Falls at Veteran's Park and agreed that this site should not be included in the study. Each of the sites and the associated KOP are discussed in greater detail below. Concurrence was received again from the group on the revised evaluation form and the proposed flows.

TABLE 4
LIST OF INVITEES AND ATTENDEES OF THE AESTHETIC FLOW STUDY

Focus Group Invitees			**Focus Group[1]**	**Focus Group Meeting Call - Attendee**	**On-site Focus Group Meeting - Attendee**	**On-site Controlled Flow Assessment - Attendee**	**Controlled Flow Assessment Results - Attendee**
Affiliation	**First Name**	**Last Name**		5/25/2021	6/10/2021	12/14/2022	2/17/2022
State							
Maine Bureau of Parks and Lands	Jim	Vogel	X	X	X	X	X
Maine Department of Inland Fisheries and Wildlife	James	Pellerin	X				
Maine Department of Inland Fisheries and Wildlife	John	Perry	X[2]				
Municipal							
Town of Rumford	George	O'Keefe	X	X	X	X	X
Town of Rumford	Stacy	Carter	X	X		X	
NGOs							
Inland Woods + Trails	Gabe	Perkins					
Inland Woods + Trails/ Rumford Resident	John	Preble	X		X		
Inland Woods + Trails/ Rumford Resident	Todd	Papianou					
Inland Woods + Trails/ 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. These individuals were considered the focus group moving forward.

[2] Indicated participation would occur as schedule allows.

[3] Indicated participation would be limited to attending the controlled flow assessment.

5.2.1 Key Observation Points

The KOPs were documented as part of this study based on the available information to date. Additional information regarding the KOPs is being collected as part of the Recreation Study pursuant to RFH’s July 7, 2020 RSP, as approved with modification in the FERC’s August 6, 2020 SPD. The Recreation Study for the Project was postponed to 2022 due to concerns regarding safety and data representativeness associated with the ongoing COVID-pandemic. Consistent with the Commission’s schedule, as well as ongoing study activities of the Recreation Study, the associated report will be filed with the Commission as a supplement to the Final License Application.

5.2.1.1 Rumford Falls Trail

The Rumford Falls Trail is an approximate 1.6-mile loop consisting of sidewalks and a gravel road, portions of which are located along public roadways and within the Project Boundary. The portion of the trail within the Project Boundary runs along the eastern shore of the Androscoggin River and provides views from the Upper Dam to the base of Rumford Falls. The shoreline consists of a mixture of deciduous and coniferous trees, which limit the views along portions of the trail. The KOP selected by the focus group was located approximately 1,300 feet north from South Rumford Road and faced west with distant views of Black Mountain (See Figure 1; Figure 2).

Access to a portion of the trail located along the falls has been closed due to public safety concerns. RFH continues to evaluate the feasibility of reopening the trail. While the evaluation of reopening the trail is ongoing, RFH completed the development of an alternate trail in the spring of 2022. The alternate trail runs parallel to the closed portion of the existing trail, which allows residents and visitors to complete the Rumford loop with views of Rumford Falls. The alternate trial includes an oval shaped, gravel overlook to view the falls from and is approximately 22 feet wide by 40 feet long (Figure 3). The trail is open from sunrise to sunset.

Specific unique aesthetic features identified by participants at the trail KOP included:

- Views of Black Mountain and Middle Dam impoundment, or referred to by a study participant as the “Reflection Pool”
- Rockledge
- Elevated views

- Proximity to the falls
- Views of the upper portion of falls at the Upper Dam/flashboards

Three of the participants did not identify any potential enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience. Two of the participants specified that a potential enhancement could include removal of a few smaller trees at the KOP that were in the line of sight. One individual referenced potential enhancement to the general aesthetics in the area (i.e., reduce non-natural components, recondition cement walls), but did not provide specific details or location.

FIGURE 2
KEY OBSERVATION POINT AT RUMFORD FALLS TRAIL

Photo at KOP facing south (upstream).

Photo of view from KOP facing west (downstream).

Photo at KOP facing north (downstream).

FIGURE 3
PHOTOGRAPH OF OVERLOOK FROM ALTERNATE TRAIL

Note: Based on provisional USGS gage data from USGS 01054500 and operational records from RFH, flows in this photograph are approximately 2,000 cfs or greater.

5.2.1.2 West Viewing Area

The West Viewing Area is an overlook located approximately 100 feet north of the Upper Station powerhouse along the western shoreline of the Middle Dam impoundment (See Figure 1). The West Viewing area is located within the Project Boundary and is owned by RFH. There are five spotlights installed along the banister, which automatically operate at flows of 7,500 cfs and greater between 8 PM and 12 AM. The lighting was installed and is operated based on a request from the Town of Rumford prior to these relicensing proceedings. The base of the falls is approximately 250 feet southeast of the West Viewing Area. This KOP provides unobstructed views of the lower portion of the falls throughout the year (Figures 4 and 5). There are large deciduous trees adjacent to the north side of the overlook, which partially limit the view of downstream views.

Specific unique aesthetic features identified by participants at this KOP included:

- View of channel and the Middle Dam impoundment or referred to by a study participant as the “Reflection Pool”

- Ledge falls
- Direct view of, and proximity to, the falls
- Viewing platform
- Upper Dam

Three participants did not identify any potential enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience. Two of the participants specified that a potential enhancement could include trimming excess vegetation in front of the overlook. One participant identified providing parking and picnic facilities as a potential enhancement to improve the viewing experience. Another participant identified rehabilitating the stonework on the overlook as a potential enhancement.

FIGURE 4
GENERAL LOCATION OF THE KOP WITHIN THE WEST VIEWING AREA

Photo taken from the entrance road to the powerhouse facing southeast (upstream).

FIGURE 5
KEY OBSERVATION POINT AT WEST VIEWING AREA

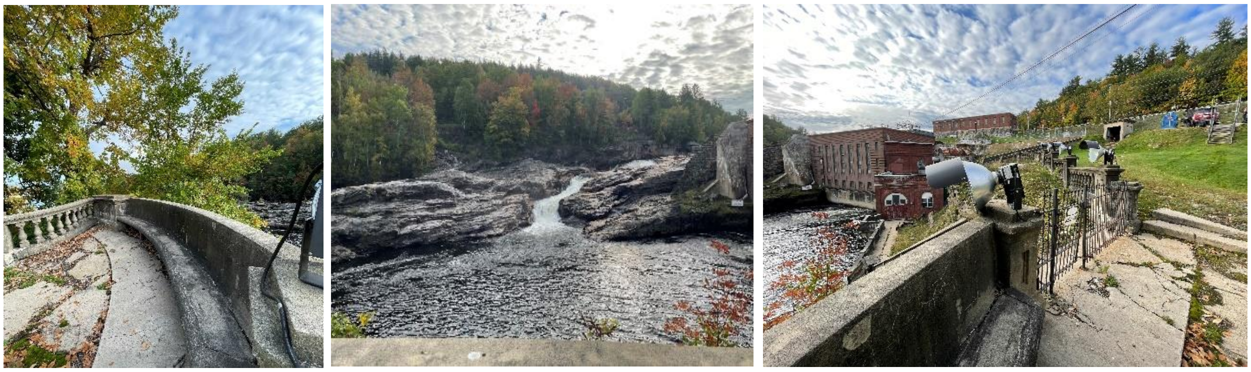


Photo at KOP facing north (downstream).

Photo of view from KOP facing southeast (upstream).

Photo at KOP facing south (upstream).

5.2.1.3 J. Eugene Boivin Park (Boivin Park)

J. Eugene Boivin Park is located off of Bridge Street in the Town of Rumford just outside of the town's business district and on the northern shore of the Middle Dam impoundment west of the Middle Dam (See Figure 1). This site is owned and maintained by the Town of Rumford. There is a relatively large parking area off of Bridge Street, which provides parking for the park as well as the information (aka visitor) center. There are sidewalks with benches that lead down through a lawn area to an Edmund S. Muskie memorial. The lawn area extends down to the shoreline of the Middle Dam impoundment to bedrock outcroppings where there are Native American silhouette steel sculptures (Figure 6 and 7). The park is open from 6:00AM to 9:00PM.

The base of the falls is located approximately 0.2 mile south of the shoreline of the park. There is an unobstructed view of the lower portion (approximate lower half) of the falls throughout the year from various vantage points throughout the park. The KOP for the study was located on the bedrock outcropping approximately 50 feet from the shoreline of the Middle Dam impoundment and approximately 140 feet from the western edge of the Middle Dam (See Figure 1, Figures 6 and 7).

Specific unique aesthetic features identified by participants at this KOP included:

- View of Middle Dam impoundment or referred to by a study participant as the "Reflection Pool"
- Power station

There were no enhancements identified by participants at this KOP location.

FIGURE 6
GENERAL LOCATION OF THE KOP WITHIN THE J. EUGENE BOIVIN PARK

Photo from parking lot facing southeast (upstream).

FIGURE 7
KEY OBSERVATION POINT AT J. EUGENE BOIVIN PARK

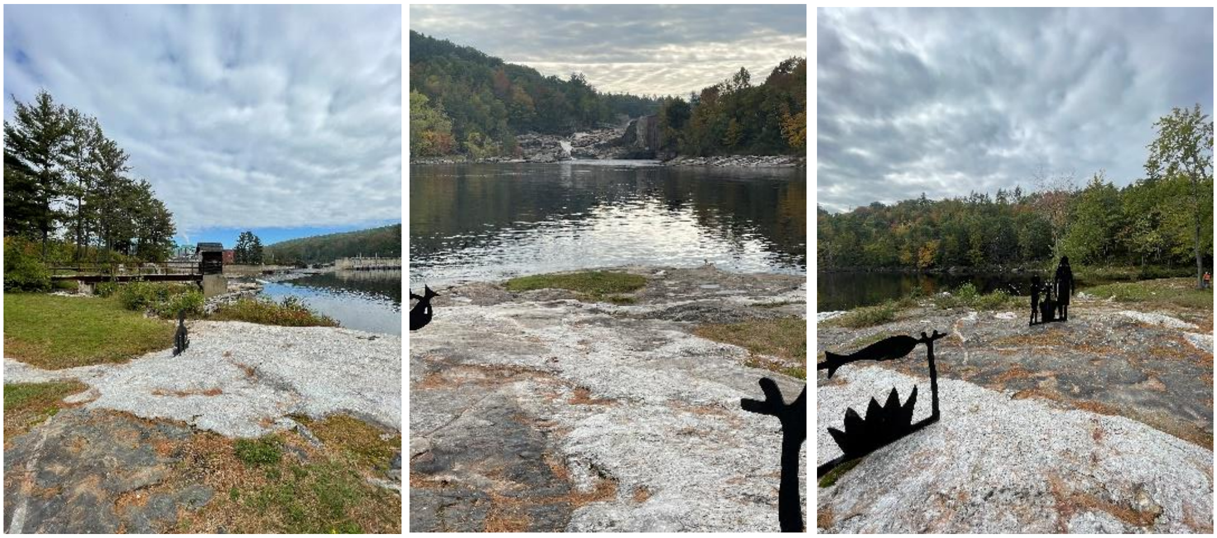


Photo at KOP facing northeast (downstream).

Photo of view from KOP facing southeast (upstream).

Photo at KOP facing southwest.

5.3 Phase 3 – Controlled Flow Assessment

RFH began coordinating with the focus group on scheduling the controlled flow assessment in May 2021. Sustained low river flows in 2021 proved challenging for conducting the study due to drought conditions; during this period, and in ongoing coordination with the focus group, RFH ended up scheduling ten different dates for the controlled flow assessment that worked well for the group. Prior to each of the targeted dates, RFH closely monitored the flow and weather to determine if there would be sufficient flows to successfully complete the flow assessment. RFH provided regular updates and sufficient notice to the focus group for the initial dates when the assessment was postponed due to insufficient flow availability.

The controlled flow assessment was successfully held on December 14, 2021. The four flows identified in consultation with the focus group were targeted during the assessment and verified by RFH, which were very close to the target flows (Table 5). The controlled flow assessment was attended by two representatives of the Town of Rumford and one representative from the MBPL.

RFH also held an in person viewing of the video and audio of the flows for individuals in the focus group that were ultimately unable to attend the flow assessment and expressed interest in conducting the assessment via video on January 18, 2022. Two focus group participants, and one individual who was not a focus group participant, that are town residents and associated with Inland Woods + Trails participated. Participants viewed the video footage taken during the controlled flow assessment and completed the study forms consistent with the order in which it was conducted in the field. The data from the evaluation forms for the desktop assessment have been compiled with those completed in the field for analysis.

TABLE 5
TARGET AND ACTUAL CALCULATED FLOW DURING CONTROLLED FLOW ASSESSMENT

Start Time	Target Flow (cfs)	Actual Flow (cfs)
8:45 AM	500	488
10:32 AM	1,000	895
11:35 AM	1,500	1,423
12:32 PM	2,000	2,150

Note: Actual flows calculated using RFH operational information as well as the USGS gage (No. 01054500 Androscoggin River at Rumford, Maine) data.

During each flow release, participants were provided with time to view the flow and complete the evaluation form. Photos from each KOP during the flow releases are provided in Figures 8-10. Please note, these photos were taken during the controlled flow assessment in December and there are small areas of ice along the shoreline, falls, and Project facilities; however, these areas did not obscure or impede the view of the flows.

FIGURE 8. RUMFORD FALLS TRAIL AT (A) 500 CFS, (B) 1,000 CFS, (C) 1,500 CFS, AND (D) 2,000 CFS.

FIGURE 9. WEST VIEWING AREA AT (A) 500 CFS, (B) 1,000 CFS, (C) 1,500 CFS, AND (D) 2,000 CFS.

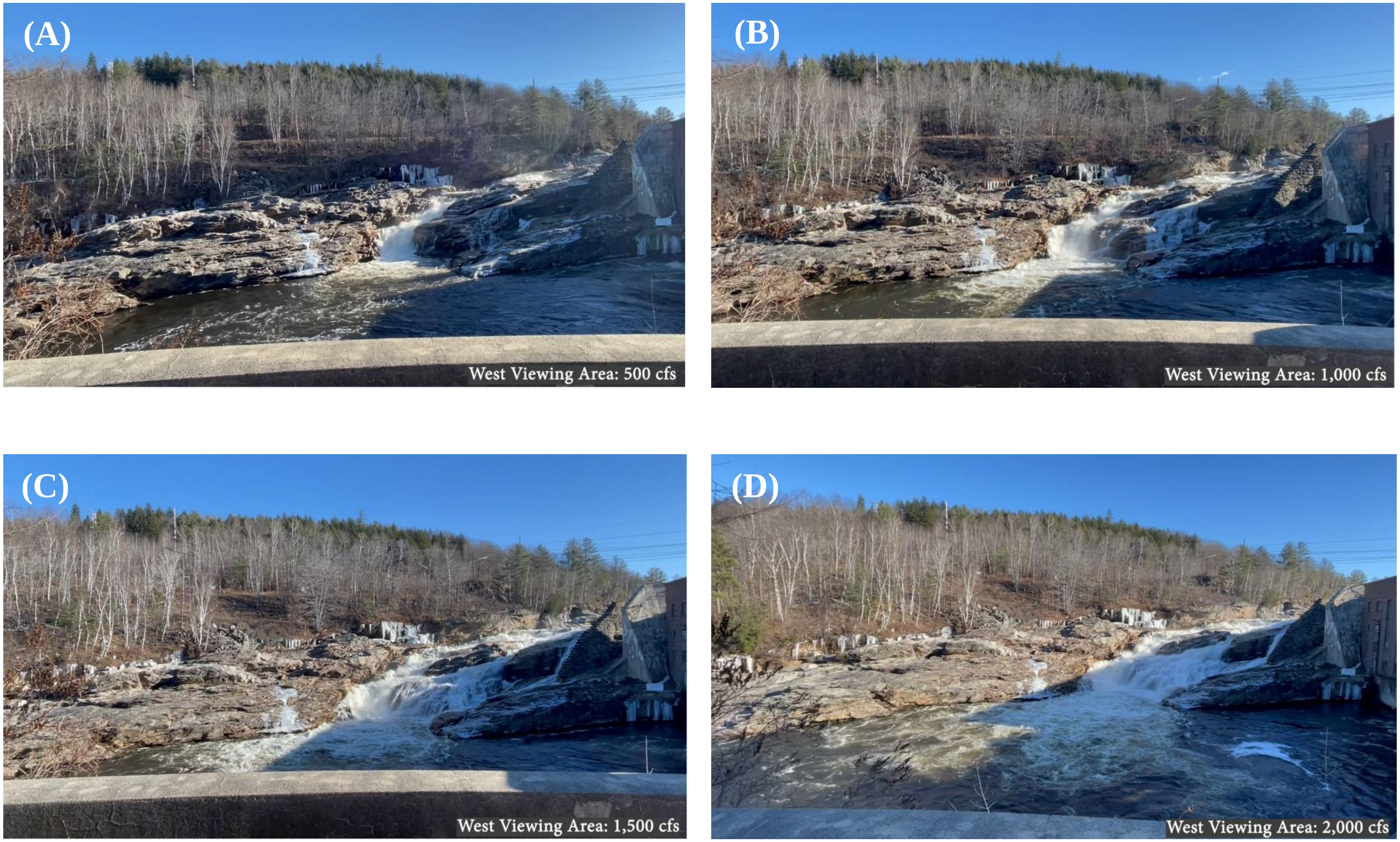
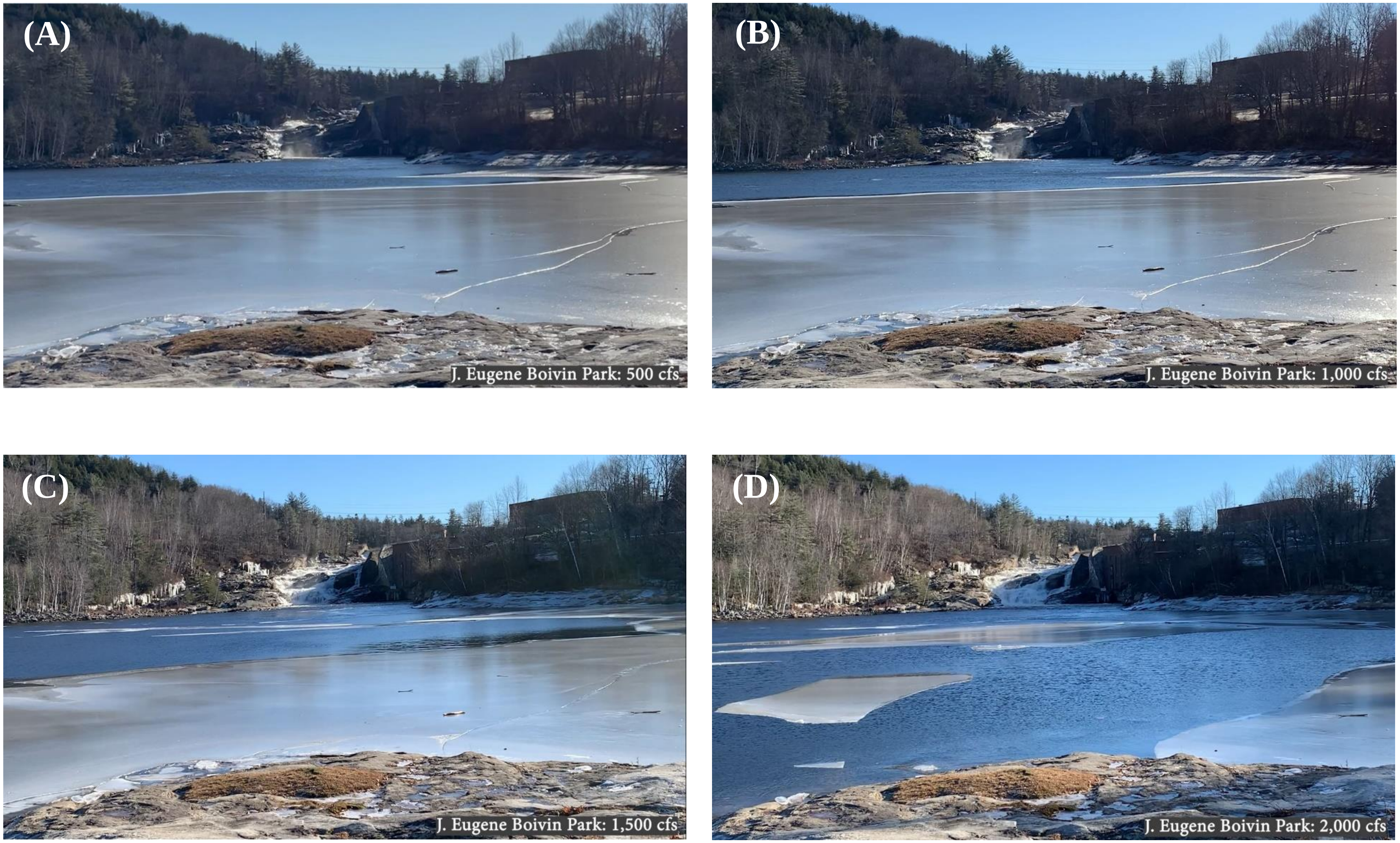


FIGURE 10. J. EUGENE BOIVIN PARK AT (A) 500 CFS, (B) 1,000 CFS, (C) 1,500 CFS, AND (D) 2,000 CFS



5.3.1 Aesthetic Characteristic Evaluation

The participants evaluated eight attributes at each KOP under each flow using a 7-point Likert Scale where 1 was “very unappealing” and 7 was “very appealing”. The eight attributes included:

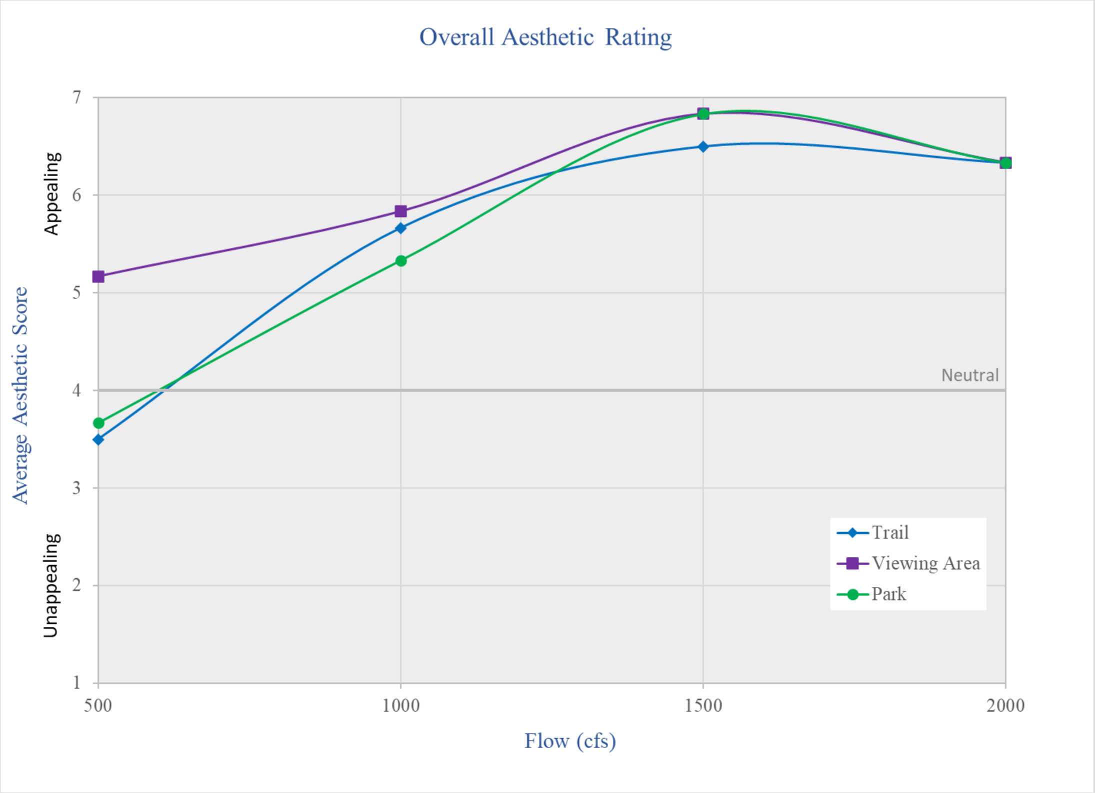
1. Water fall size/volume;
2. Amount of exposed rock at falls;
3. Downstream wetted channel width;
4. Contrast between pools on the steep, ledge falls, and moving water;
5. Amount of pools on the steep, ledge falls, and still water;
6. Amount of turbulence;
7. Amount of exposed rocks/streambed downstream; and
8. Sound-level

A table with the range of individual participant scores for each attribute are provided in Attachment 3. The average aesthetic scores for each attribute are presented in flow evaluation curves in Figures 1 through 8 in Attachment 4. The completed evaluation forms by the focus group are provided in Attachment 5.

Rumford Falls Trail

At the Rumford Falls Trail KOP, individual participant scores for attributes varied considerably from 1.0 (“very unappealing”) to 7.0 (“very appealing”) (See Attachment 3). The average score of attributes ranged from 5.2 to 6.6 (“slightly appealing” to “very appealing”) at flows of 1,000 cfs and greater (Figure 11 below; See Attachment 4). The average scores increased with flow, until 2,000 cfs when scores either decreased or plateaued. There were relatively minimal changes in the average scores for sound level over the range of flows; however, participants specifically identified sound as a positive attribute at flows of 500 cfs and higher, but it was also identified as a negative attribute at 2,000 cfs. Participants also noted that flows at the Upper Dam/flashboards, which were not visible from this KOP but were visible on the way to the site, were appealing at flows of 500 cfs and 1,000 cfs.

FIGURE 11
OVERALL AESTHETIC RATING OF TARGET FLOWS AT KEY OBSERVATION POINTS



West Viewing Area

At the West Viewing Area KOP, individual participant scores for attributes varied from 3.0 (“slightly unappealing”) to 7.0 (“very appealing”) (See Attachment 3). With the exception of a couple of attributes (i.e., downstream wetted channel width, and amount of exposed rocks/streambed downstream, and sound level), the average attribute scores typically ranged from 5.0 to 6.8 (“slightly appealing” to “very appealing”) at all flows (See Attachment 4). The average score of attributes generally increased with flow, until 2,000 cfs when scores decreased. There were two attributes ([1] contrast between pools on the steep, ledge falls, and moving water, and [2] amount of pools on the steep, ledge falls, and still water) where this was not the case and the average score at 500 cfs was either higher than, or the same as, the average score at 1,000 cfs.

J. Eugene Boivin Park

At the J. Eugene Boivin Park KOP, individual participant scores for attributes varied from 2.0 (“unappealing”) to 7.0 (“very appealing”) (See Attachment 3). With the exception of three attributes, ([1] contrast between pools on the steep, ledge falls, and moving water, [2] amount of pools on the steep, ledge falls and still water, and [3] sound level), the average attribute scores typically ranged from 5.0 to 7.0 (“slightly appealing” to “very appealing”) at flows of 1,000 cfs and greater (See Attachment 4). The average scores at 500 cfs were lower and ranged from 3.2 to 4.3 (“slightly unappealing” to “neutral”). The average score of attributes generally increased with flow, until 2,000 cfs when scores decreased. Sound level was the only attribute where scores increased slightly at 2,000 cfs. Of note, there was spill over the Middle Dam throughout the assessment, and due to its proximity to the KOP, was audible throughout the study. Flows over Rumford Falls, the base of which is located approximately 0.2 mile from the KOP, were much less audible.

5.3.2 Overall Aesthetic Rating

Participants rated the overall aesthetics at each KOP under each flow using the 7-point Likert Scale. The average attribute scores ranged from 5.2 to 6.8 (“slightly appealing” to “very appealing”) at all flows and KOPs except at flows of 500 cfs at the Rumford Falls Trail and J. Eugen Boivin Park (Figure 11). The average scores increased with flow at all sites until 2,000 cfs where values declined at all KOPs (Figure 11).

5.3.3 Comparative Analysis

Similarly, when participants compared flows after the controlled flow assessment was complete, participants found all flows to be “slightly appealing” to “very appealing” except 500 cfs (Figure 12). The average scores increased with flow at all sites and were the same at 1,000 cfs and 2,000 cfs.

Overall, the lowest acceptable flow for aesthetic viewing experience not specific to each KOP was identified as 1,000 cfs by all but two participants, which identified 2,000 cfs and 1,500 cfs as the lowest acceptable flow. The flow identified by participants that would provide the highest quality aesthetic viewing experience ranged from 1,500 cfs to 2,000 cfs, except for one participant who identified a range of 22,000 cfs to 44,000 cfs as the flow providing the highest quality experience. As previously discussed above, these flows were not identified as target flows as part of the study and occur only during high precipitation events and/or snow and ice melt in the spring.

The optimal flow identified by the group for each KOP varied (Table 6). At the Rumford Falls Trail KOP, optimal flows identified by participants ranged from 500 cfs to 2,000 cfs. At the West Viewing Area half of participants identified 1,500 cfs as the optimal flow, but other participants identified 1,000 cfs and 2,000 cfs as the optimal flow. At J. Eugene Boivin Park, the majority of participants identified 2,000 cfs as the ideal flow, but there were also two participants that identified 1,500 cfs as the ideal flow.

All six participants indicated they think aesthetic flows should be released in July and August (Table 7). There was also a strong preference for flow releases in June, September, and October with slightly less interest in April and May. There was not much interest in providing flows for the other months of the year and no interest in providing aesthetic flows in November or December. The days and times participants identified for flow release varied considerably between participants and with month. All participants indicated they would like to have aesthetic releases on the weekend (i.e., Friday, Saturday, Sunday), except one participant who did not identify Friday as a preferred day for aesthetic flow releases. Three participants indicated that they would like to have aesthetic flow releases every day of the week. The preferred timing of flow releases varied considerably from dawn to dusk. All but one participant indicated that they would like to have flows midday, afternoon, and evening. Three participants also identified that they would like to have aesthetic flows in the morning. There was less interest from participants in the other times of day. One participant specified that flow releases should be scheduled in conjunction with or in addition to potential whitewater releases, and that nighttime flow releases should be showcased by lights at the Upper Station.

Compared to other rivers with comparable scenic viewing locations, the aesthetic viewing opportunity at Rumford Falls was identified by participants as “appealing” to “very appealing” when compared to other rivers within a one-hour drive in Maine and in the Northeast.

FIGURE 12
OVERALL COMPARATIVE EVALUATION OF TARGET FLOWS

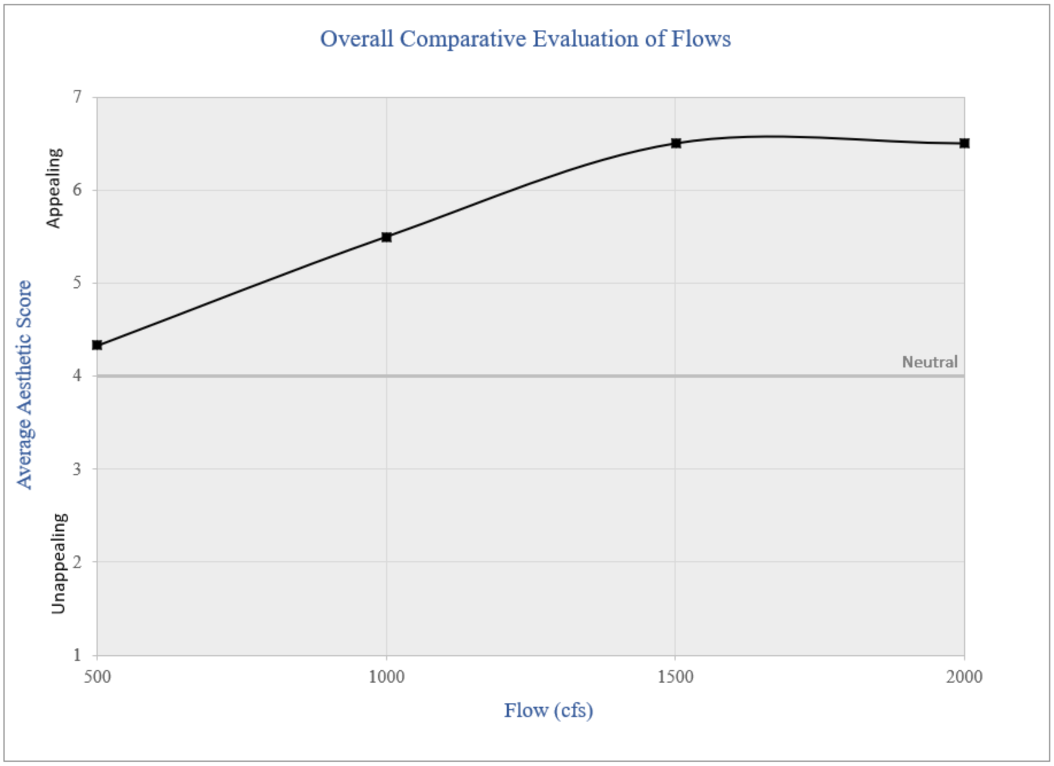


TABLE 6
OPTIMAL FLOWS IDENTIFIED BY PARTICPANTS FOR KOPS

Flow	Rumford Falls Trail	West Viewing Area	J. Eugene Boivin Park
	No. of Participants		
500 cfs	1	0	0
1,000 cfs	1	1	0
1,500 cfs	2	3	2
2,000 cfs	2	2	4

TABLE 7
TIMING OF FLOW RELEASES IDENTIFIED BY PARTICPANTS

Flow	No. of Participants
January	1
February	1
March	1
April	3
May	3
June	5
July	6
August	6
September	4
October	4
November	0
December	0

5.3.4 Off-site Focus Group Meeting

On February 17, 2022, from 11AM to 12PM, RFH held a virtual meeting to review the preliminary results from the controlled flow assessment with the focus group. Attendees included a representative from the Town of Rumford and MBPL. The preliminary results of the study were provided in a presentation (Attachment 6). The following comments were provided by the focus group attendees during the call:

- The Town of Rumford representative said that the chain fence around the West Viewing Area was not appealing and would like to see it changed or removed.
- The Town of Rumford representative said that the results shown during the presentation were consistent with their sentiments and what he heard from others during the controlled flow assessment.
- The MBPL representative said that the graphics were very clear, and in their opinion, it narrows the focus of the study to the two middle flows (i.e., 1,000 and 1,500 cfs).
- The Town of Rumford representative said that he was very satisfied with the survey and evaluation and is happy to move forward with this study.

5.3.5 Potential Effects of Aesthetic Flows

In addition to having a controlled flow assessment to evaluate the aesthetic character over Rumford Falls, the scope of the study also included the evaluation of the potential effects of aesthetic flow releases on other resources including Project generation, recreational uses, aquatic resources, and water quality. Pursuant to the existing FERC-issued license, the Project is operated in a run-of-river mode with no usable storage. The Upper Station Development has a total installed nameplate capacity of 29.3 MW and a maximum hydraulic capacity of 4,550 cfs. Therefore, the Project is not able to store flows for aesthetic releases and any flows directed to the ledge fall below Upper Dam from the bypass reach to the station will impact generation. If flows on the Androscoggin River are at or below the hydraulic capacity of the Project, any aesthetic flow releases to the Upper Dam bypass release would impact generation. As discussed in Section 5.1 above, the daily average flows in the Androscoggin River have only exceeded the hydraulic capacity in the summer months of July, August, and September between 3.9 percent (26 days) to 12.9 percent (88 days) of the time over a 22-year period from 2000 through 2021.

Aesthetic flow releases could potentially result in an improved experience for recreational users at sites where the falls are visible and potentially increase recreational usage in the area. Due to the steep nature and limited habitat for fish in the Upper Dam ledge falls, RFH has no information indicating that it is a popular area for fishing or other instream recreational activities. Therefore, it is unlikely aesthetic flow releases in the Upper Dam ledge falls would affect other potential recreational uses or aquatic habitat.

Water temperature and dissolved oxygen (DO) data collected in the Project area have been shown to meet state water quality standards and were similar between the Upper Dam and Middle Dam impoundments, as presented in the Water Quality Study Report submitted in the ISR filed with the Commission on August 6, 2021. Aesthetic flow releases would result in surface water releases from the Upper Dam impoundment to the Upper Dam ledge falls. Surface water temperatures can often differ from deeper waters; however, based on the vertical profile data collected during the aforementioned Water Quality Study, surface water temperatures from June through October were similar to those throughout the water column. Therefore, depending on the frequency and volume of potential aesthetic flow releases, it is anticipated effects on water temperature and DO concentrations would be negligible.

6.0 Summary

This study assessed the aesthetic quality of various flows over Rumford Falls. Typically, the aesthetic quality of the falls increased with the observed flows up to 1,500 cfs, when the aesthetic quality often plateaued or declined. Flows of 1,000 cfs and greater at the KOPs, as well as flows of 500 cfs at the West Viewing Area, were considered aesthetically pleasing.

The size and extent of Rumford Falls is relatively substantial with a length of over 650 feet and widths over 300 feet. As a result, the flows selected for this study were substantially higher than might be required for similar efforts at smaller natural features in the region, such as providing aesthetic flows over the spillway of a dam. Flows of this magnitude in the Upper Dam ledge falls occur naturally during certain times of the year, especially in the spring and during storm events. However, during the summer months (July, August, and September), which nearly all of the focus group participants identified as months they would like to see aesthetic flows provided, flows over the last 22 years (2000 through 2021) have averaged 3,158 cfs, 2,679 cfs, and 2,263 cfs, respectively, and only exceeded the hydraulic capacity of the Upper Station (i.e., 4,550 cfs) 12.9 percent, 7.6 percent, and 3.9 percent of the time, respectively. Additionally, the Project is operated in a run-of-river mode with no usable storage. Therefore, the Project is not able to store flows for aesthetic releases and any flows directed to the Upper Dam ledge falls from the station will impact generation. Although providing aesthetic flows is not anticipated to result in negative impacts to recreational usage or aquatic resources habitat in the Upper Dam ledge falls, it would have impacts on generation at the Project, with curtailment of generation required approximately 87.1 percent, 92.4 percent, and 96.1 percent of the time that aesthetic flows might be provided in the months of July, August, and September, respectively.

7.0 Variances from FERC-Approved Study Plan

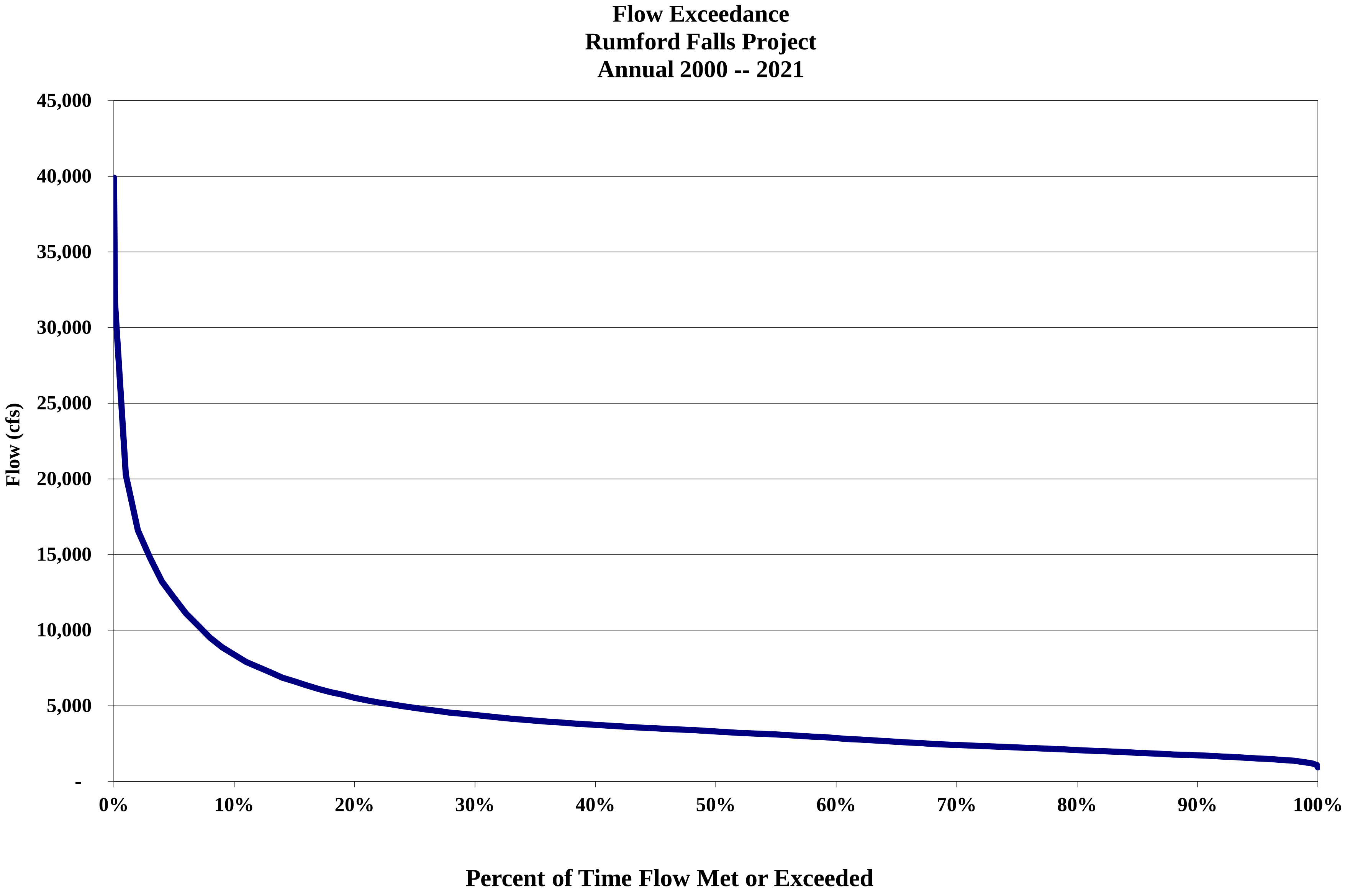
The Aesthetic Flow Study was conducted in accordance with the FERC-approved study plan.

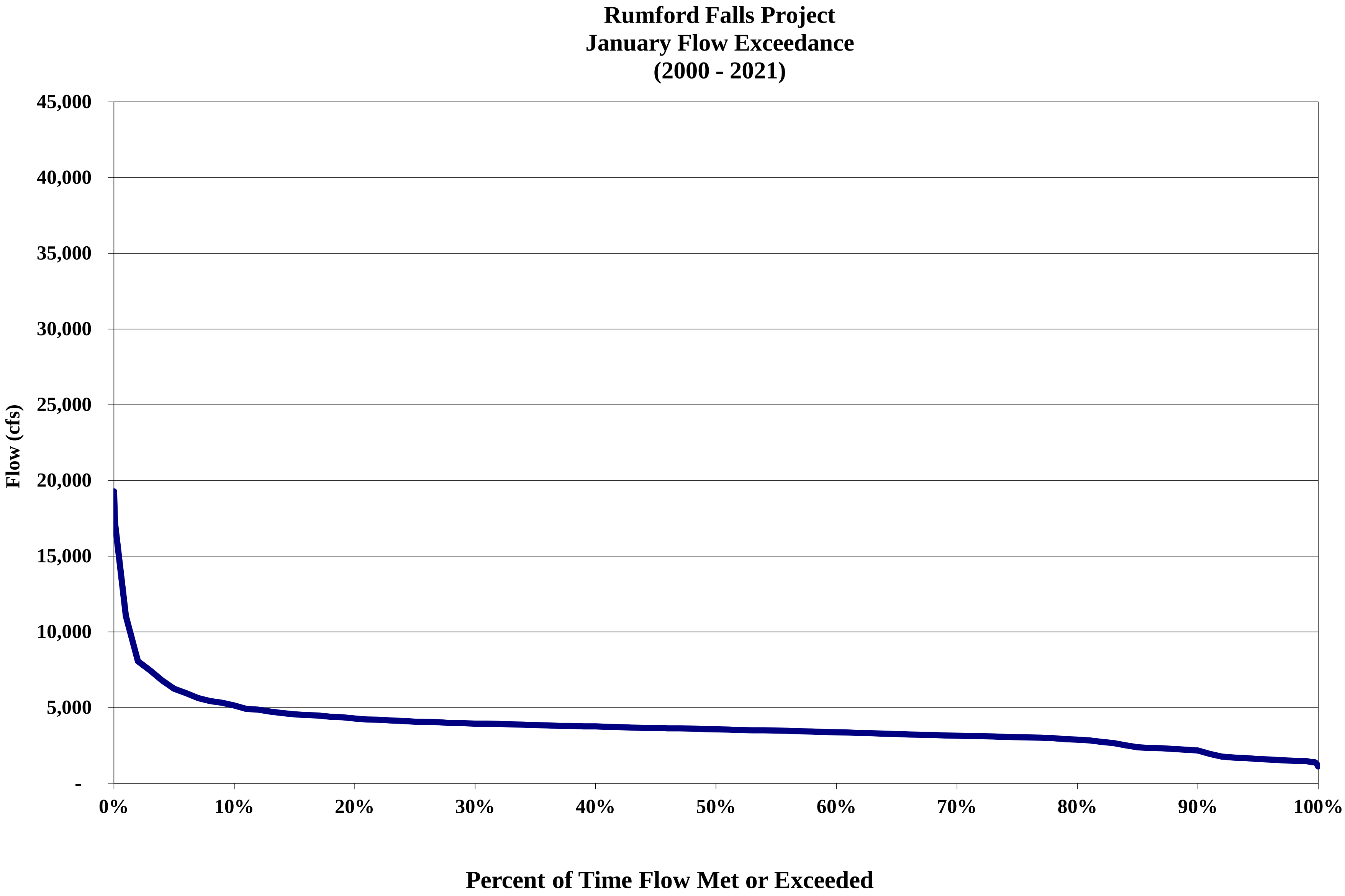
8.0 References

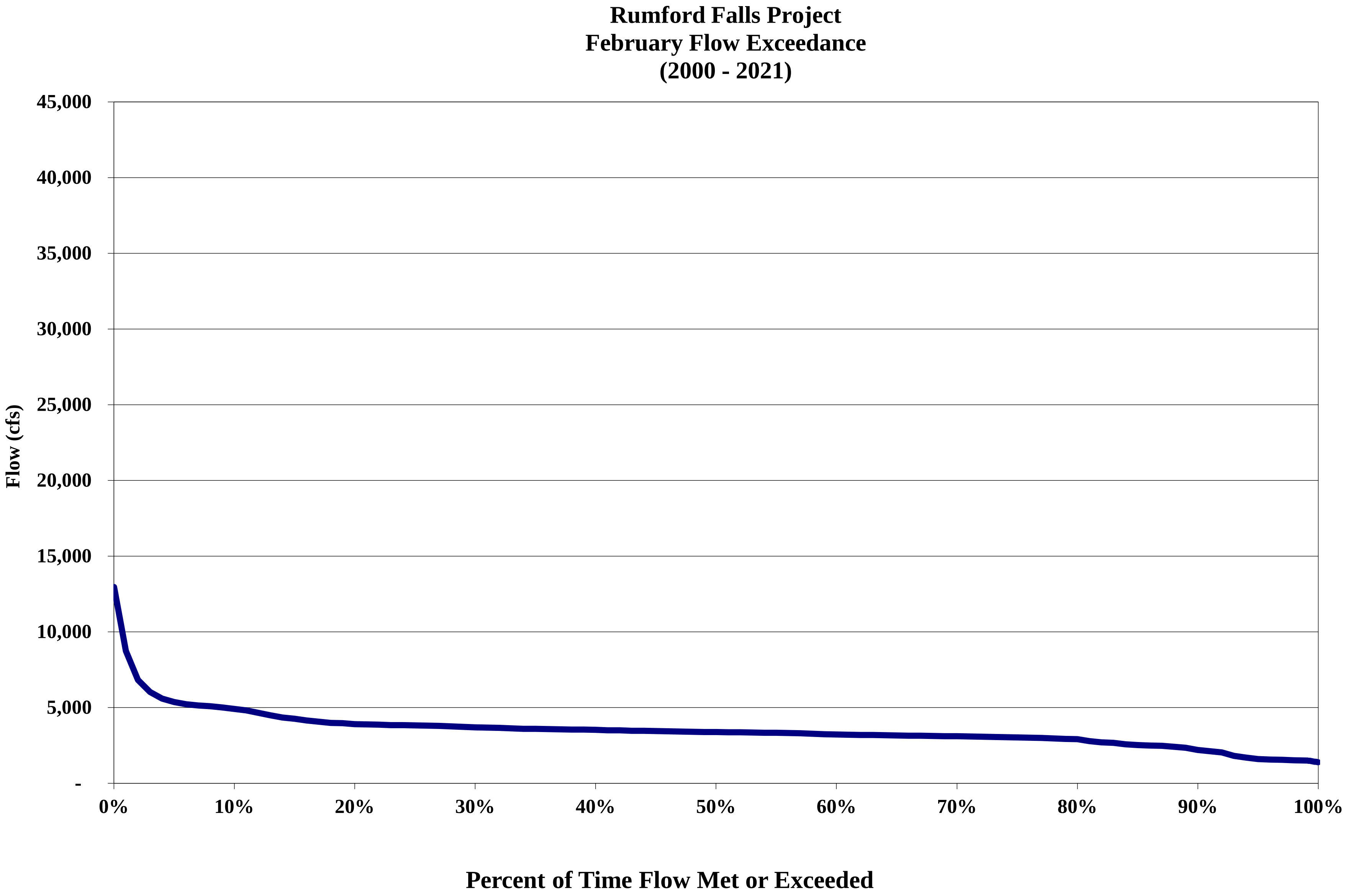
Whittaker, D. and B. Shelby. 2017. Flows and Aesthetics: A Guide to Concepts and Methods. Online [URL]: https://hydroreform.org/wp-content/uploads/2020/05/Flows-and-aesthetics-A-guide-to-concepts-and-methods-2017_Final_web.pdf. (Accessed June 2, 2020).

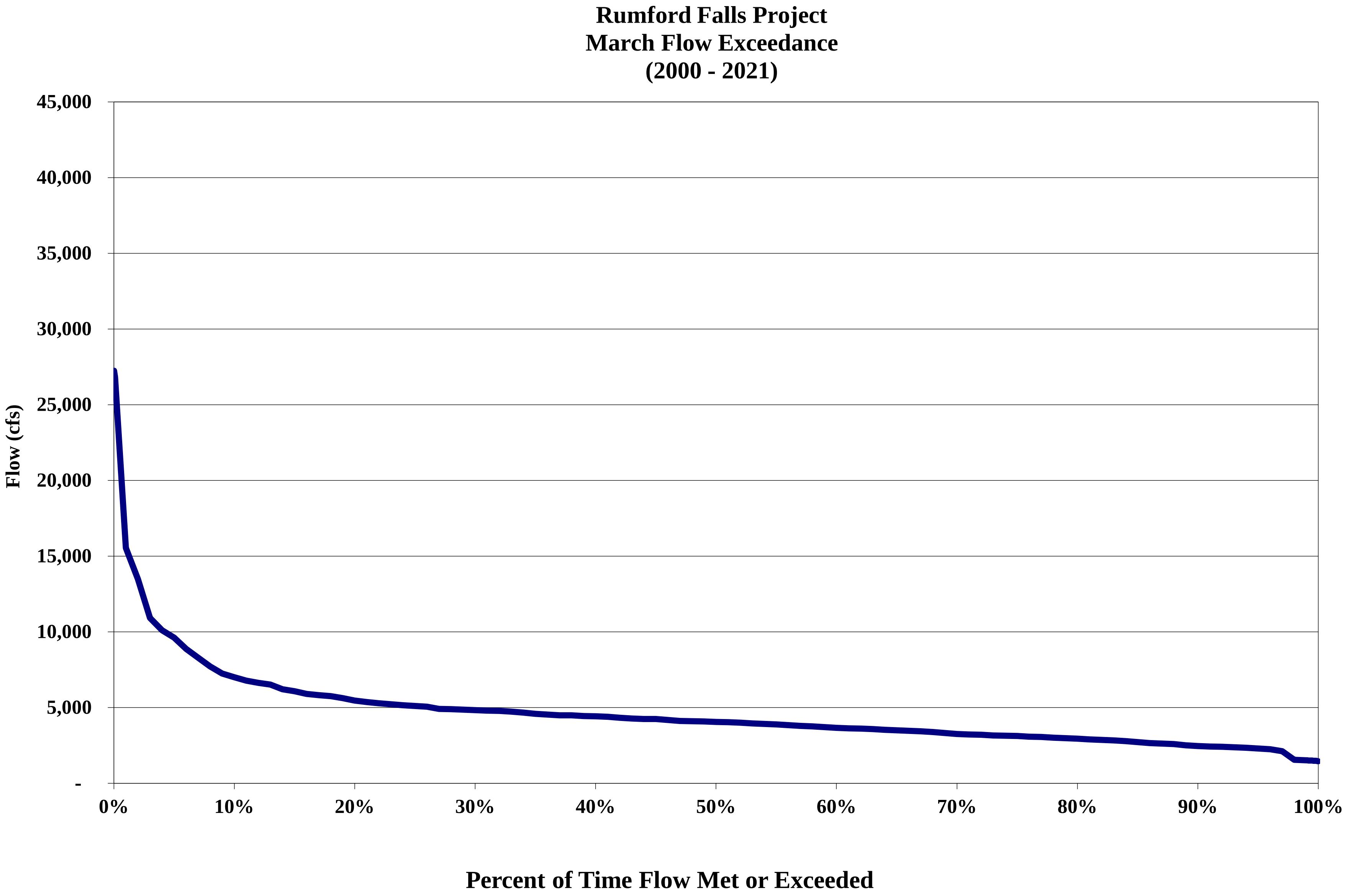
ATTACHMENT 1

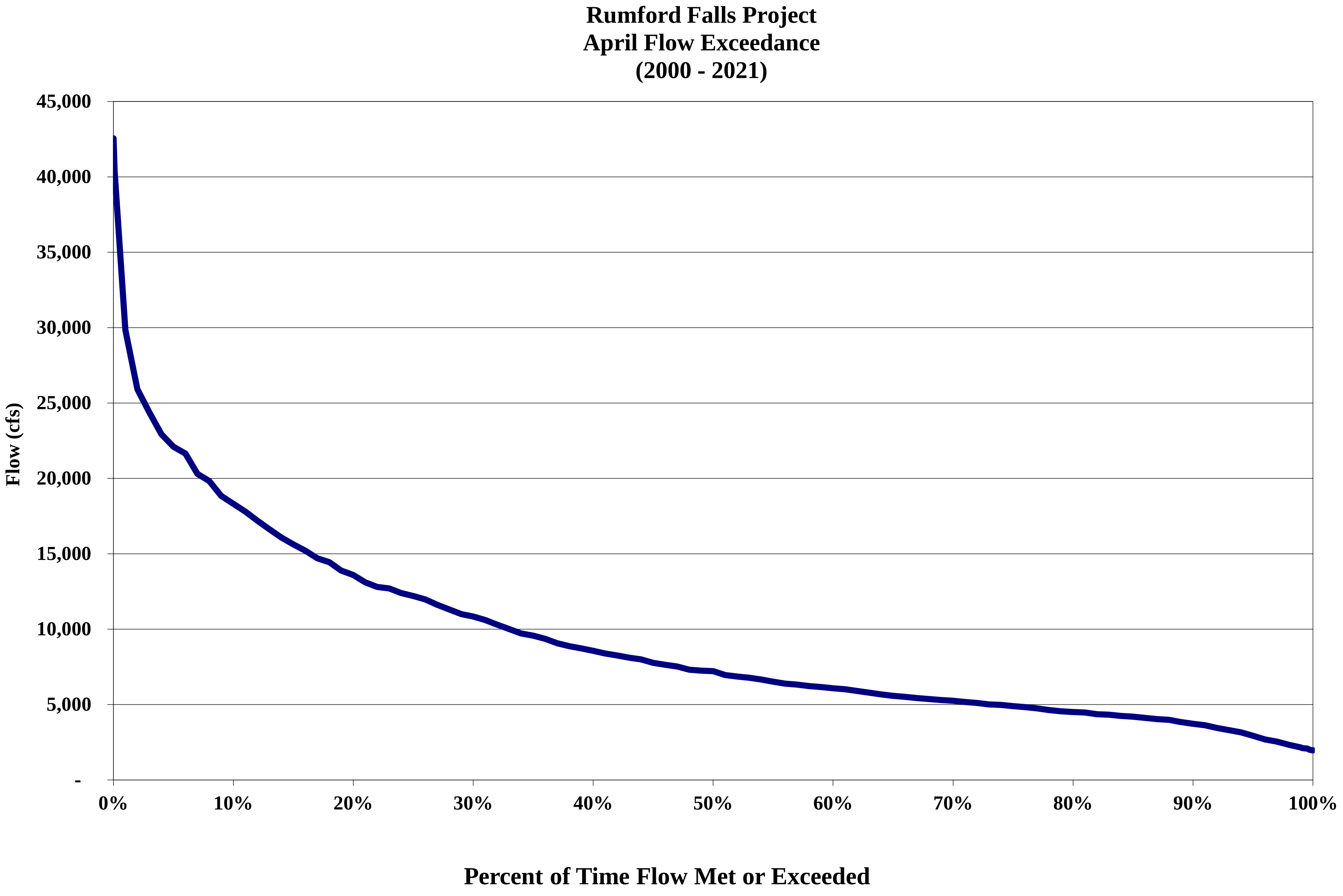
MONTHLY AND ANNUAL FLOW DURATION CURVES, FOR THE PERIOD 2000-2021

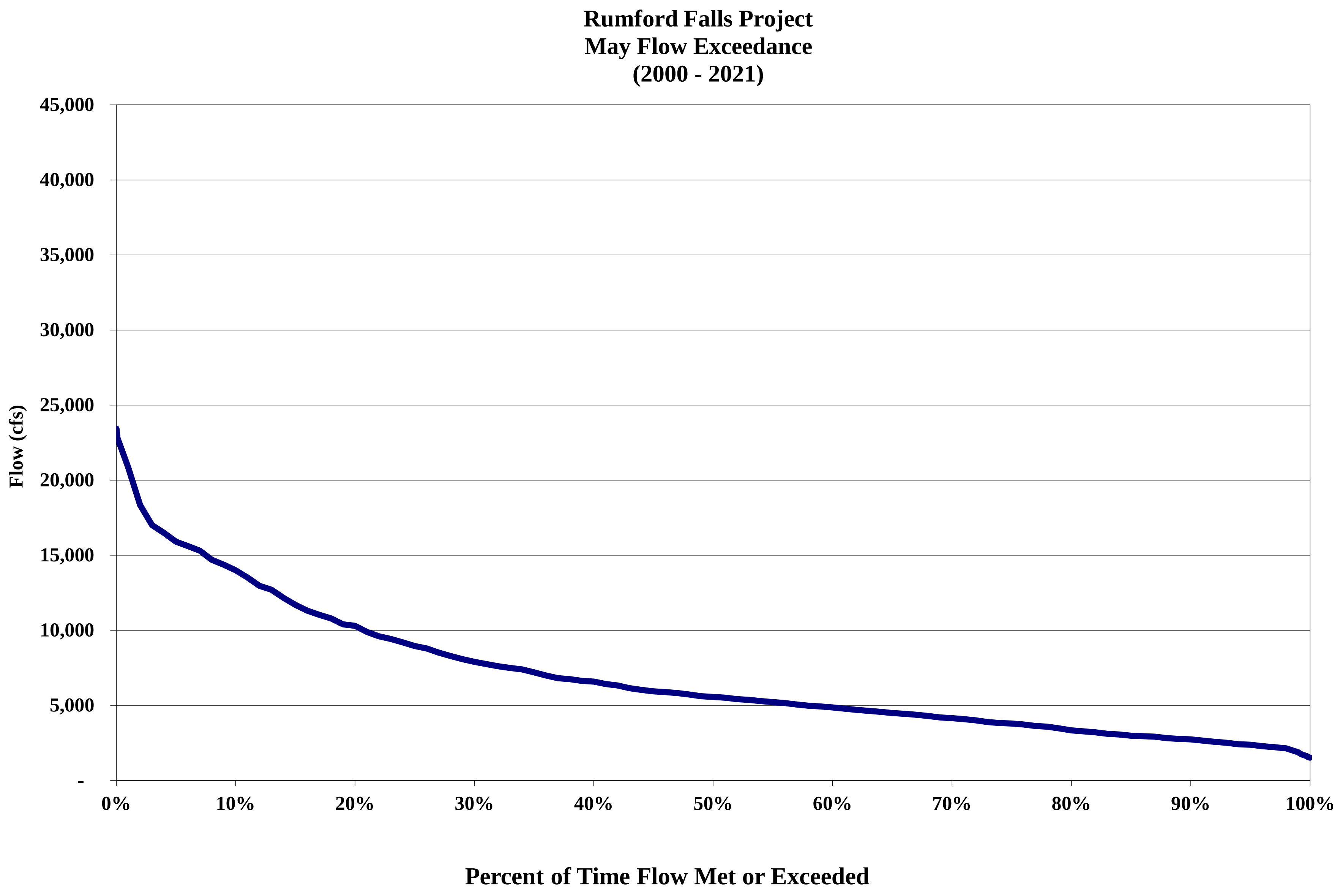

Flow Exceedance
Rumford Falls Project
Annual 2000 -- 2021
Flow (cfs)
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
-
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Percent of Time Flow Met or Exceeded

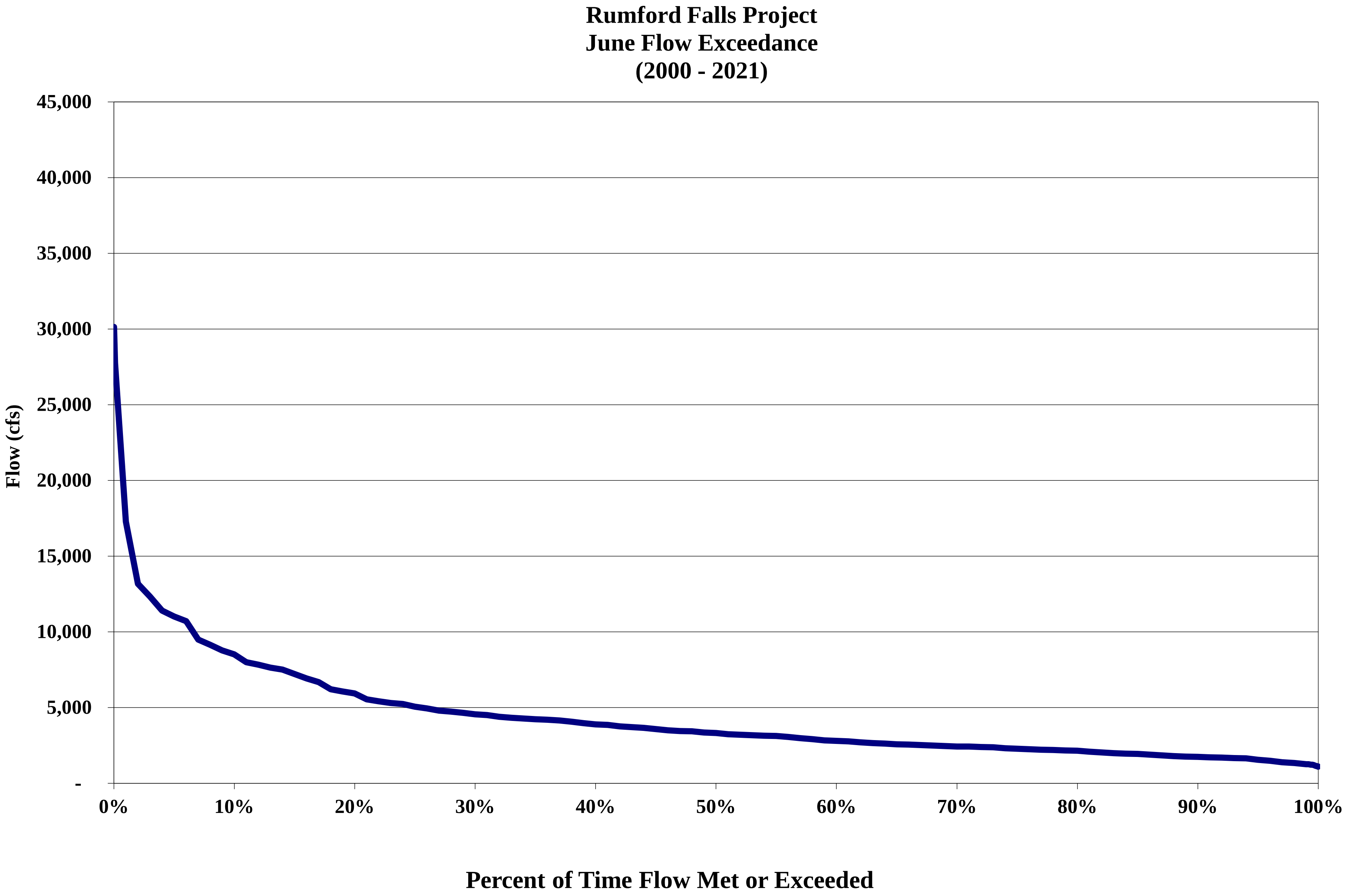

Rumford Falls Project
January Flow Exceedance
(2000 - 2021)
Flow (cfs)
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
-
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Percent of Time Flow Met or Exceeded

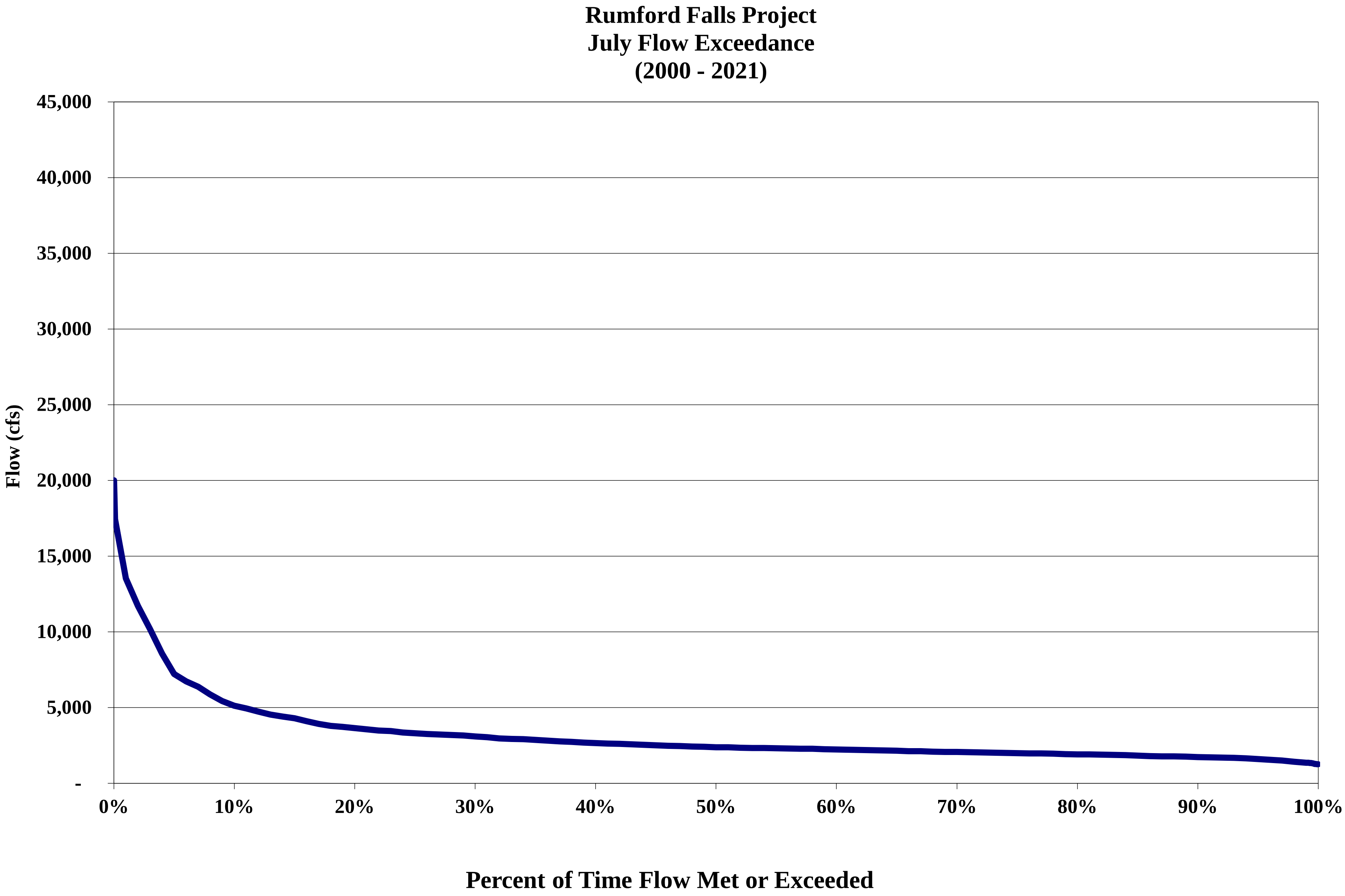

Rumford Falls Project
February Flow Exceedance
(2000 - 2021)
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
-
Flow (cfs)
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Percent of Time Flow Met or Exceeded

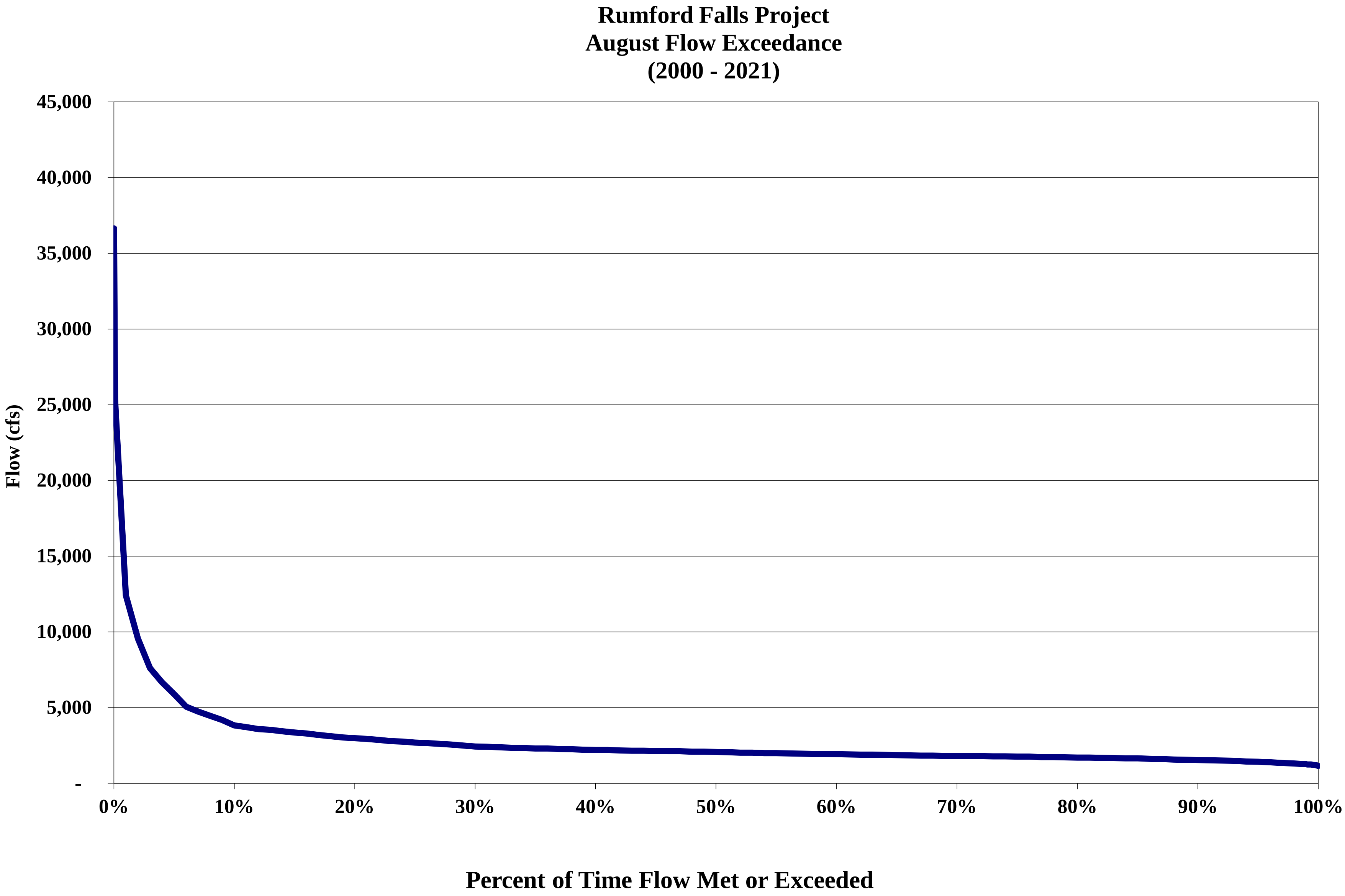

Rumford Falls Project
March Flow Exceedance
(2000 - 2021)
Flow (cfs)
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
-
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Percent of Time Flow Met or Exceeded

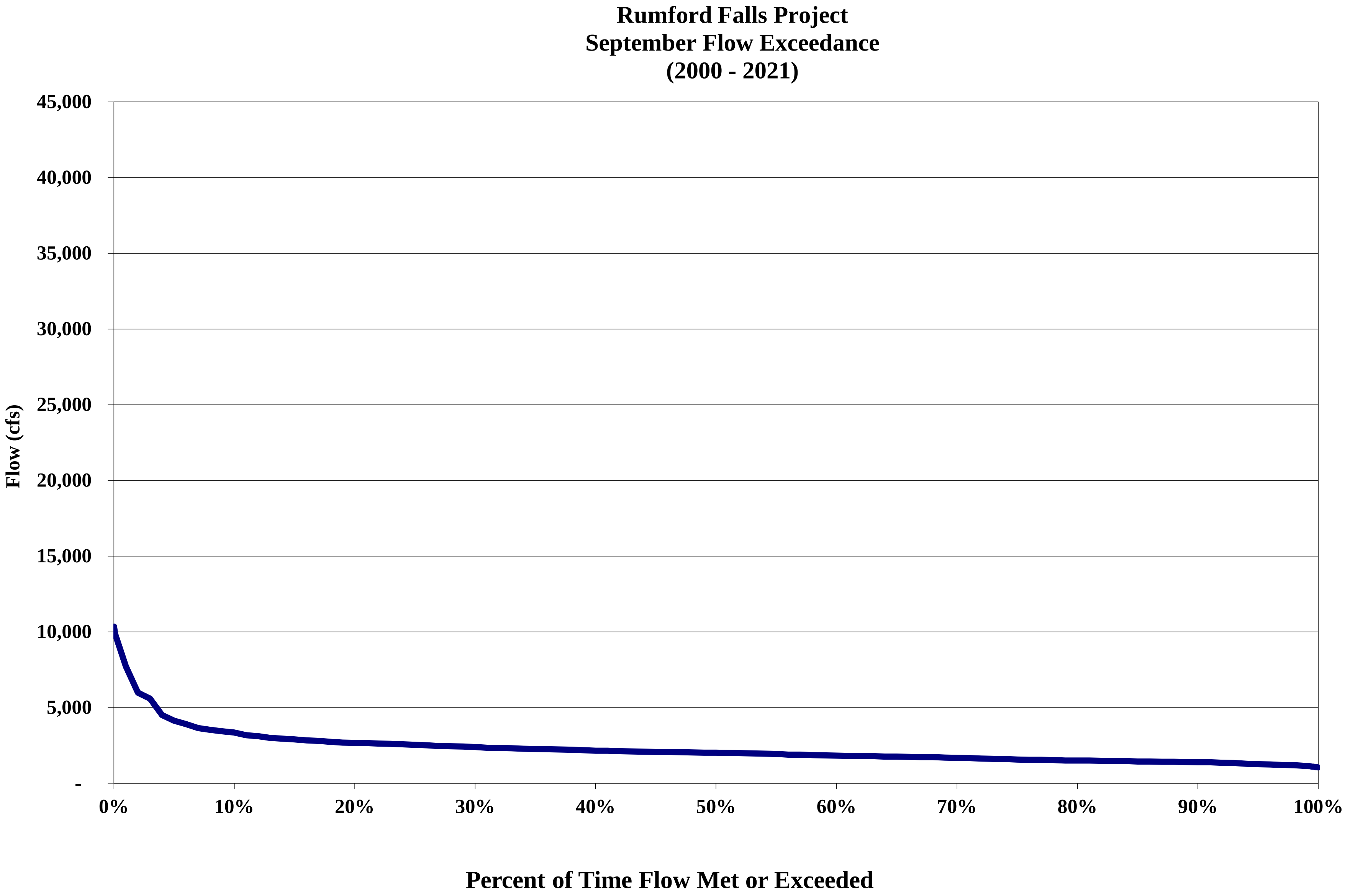

Rumford Falls Project
April Flow Exceedance
(2000 - 2021)
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
-
Flow (cfs)
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Percent of Time Flow Met or Exceeded

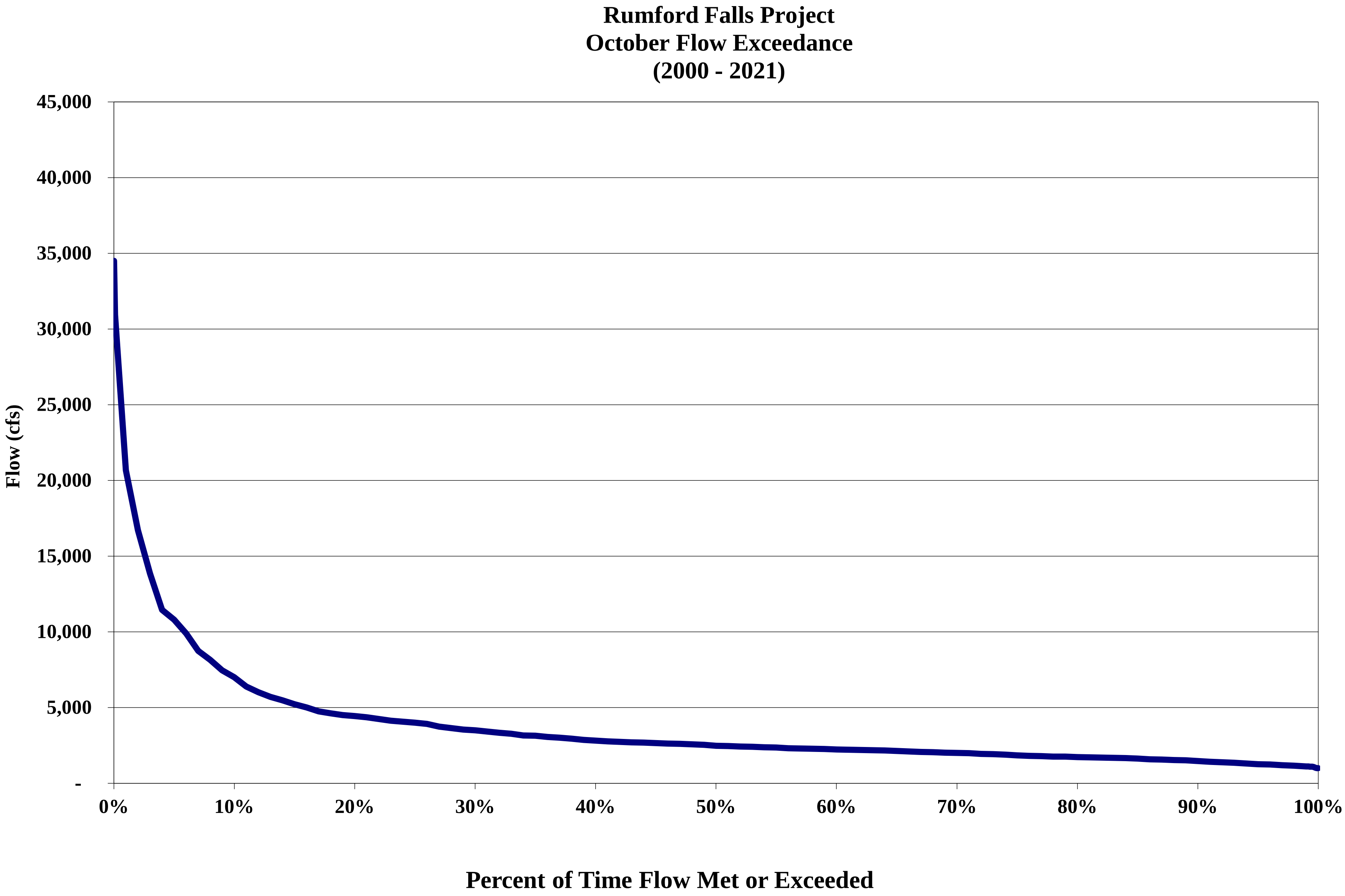

Rumford Falls Project
May Flow Exceedance
(2000 - 2021)
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
-
Flow (cfs)
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Percent of Time Flow Met or Exceeded

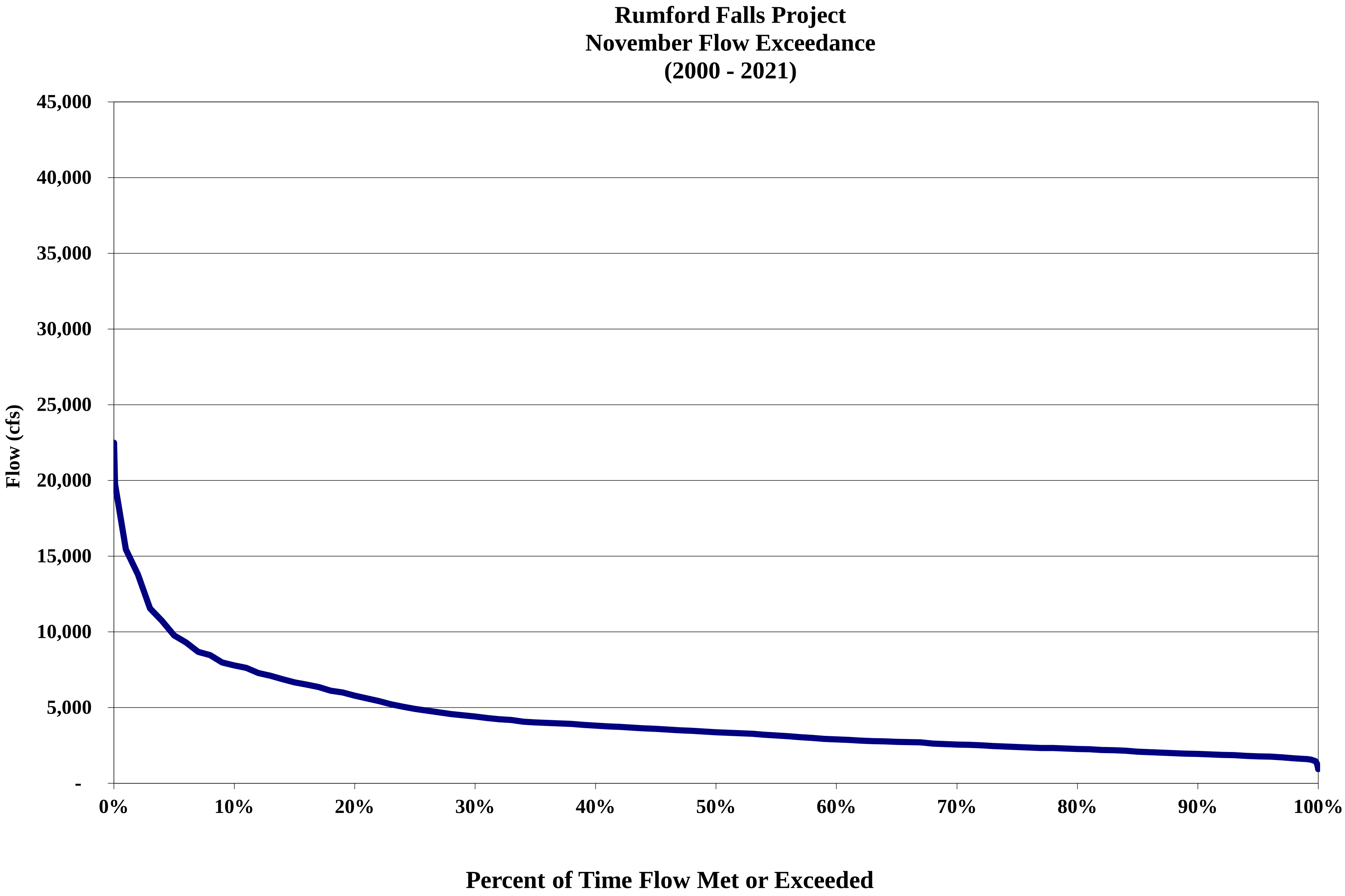

Rumford Falls Project
June Flow Exceedance
(2000 - 2021)
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
-
Flow (cfs)
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Percent of Time Flow Met or Exceeded

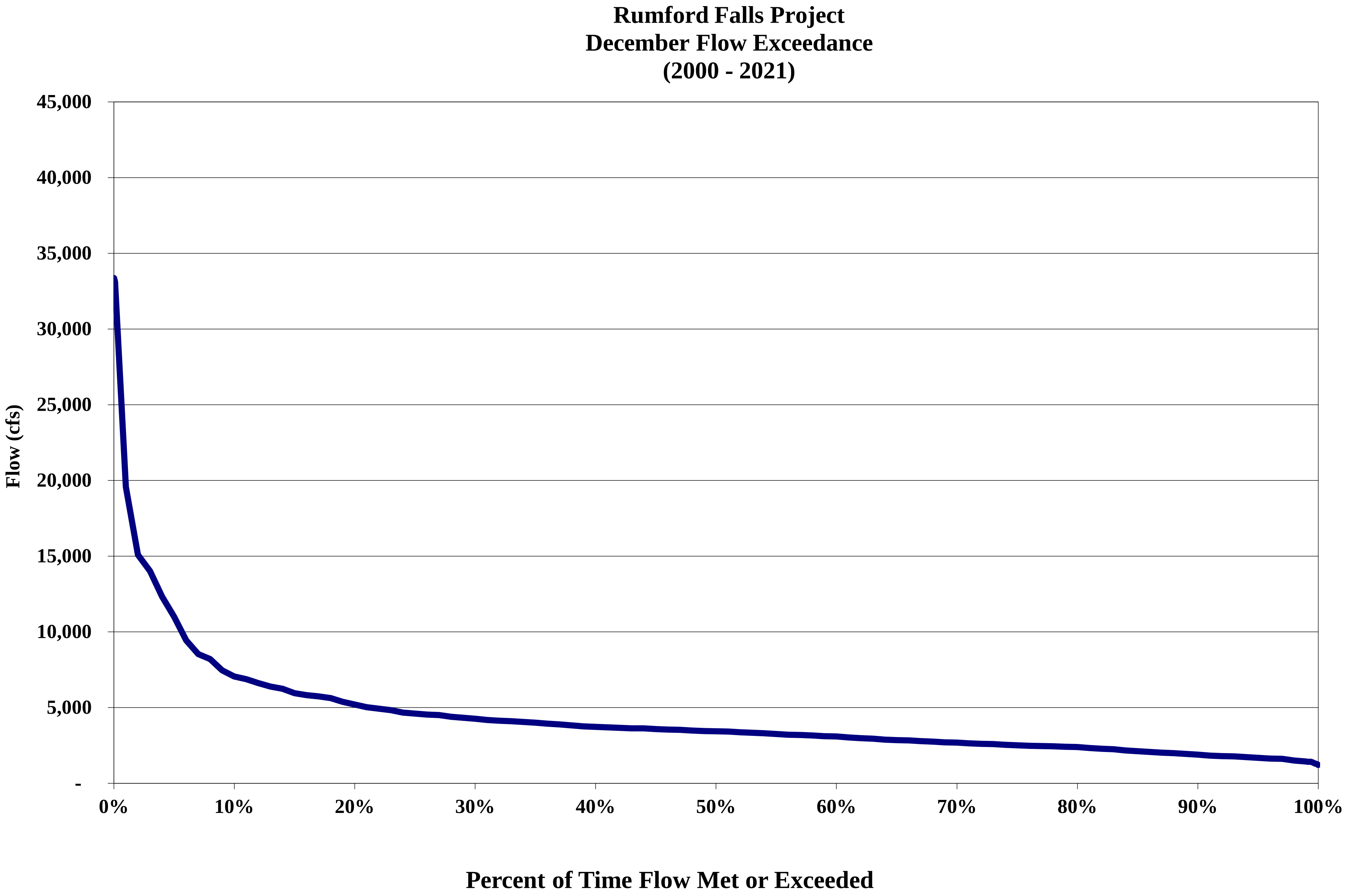

Rumford Falls Project
July Flow Exceedance
(2000 - 2021)
Flow (cfs)
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
-
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Percent of Time Flow Met or Exceeded


Rumford Falls Project
August Flow Exceedance
(2000 - 2021)
Flow (cfs)
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
-
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Percent of Time Flow Met or Exceeded


Rumford Falls Project
September Flow Exceedance
(2000 - 2021)
Flow (cfs)
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
-
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Percent of Time Flow Met or Exceeded


Rumford Falls Project
October Flow Exceedance
(2000 - 2021)
Flow (cfs)
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
-
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Percent of Time Flow Met or Exceeded


Rumford Falls Project
November Flow Exceedance
(2000 - 2021)
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
-
Flow (cfs)
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Percent of Time Flow Met or Exceeded


Rumford Falls Project
December Flow Exceedance
(2000 - 2021)
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
-
Flow (cfs)
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Percent of Time Flow Met or Exceeded

ATTACHMENT 2

CONTROLLED FLOW ASSESSMENT

FINAL EVALUATION FORM

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

Thank you for participating in the Aesthetic Flow Study controlled flow assessment for the Rumford Falls Hydroelectric Project. This controlled flow assessment will include evaluating four different established flows (i.e., 500 cfs, 1,000 cfs, 1,500 cfs, and 2,000 cfs) over the Rumford Falls at Key Observation Point (KOP) locations. KOP locations will include Veteran's Park, the J. Eugene Boivin Park, the West Viewing Area, and Rumford Falls Trail. A map is provided with these forms and identifies the Rumford Falls as well as the KOP locations. These data will be used for analysis in the Aesthetic Flow Study and we request that forms are filled out clearly and completely. Please do not hesitate to ask questions at any time during your assessment.

I. GENERAL INFORMATION

Date: ______________________________

Participant Name: ____

Affiliation: ____

Home or Affiliation Zip Code: _____________

Participant Email: ____

GENERAL QUESTIONS

1. Prior to this Project, have you ever participated in an aesthetic flow assessment?

☐ Yes ☐ No

2. Have you ever visited any of the following KOP locations to view the Rumford Falls? (*Check all that apply.*)

☐ Veteran's Park	Approximately, how many times per year? __________________
☐ J. Eugene Boivin Park	Approximately, how many times per year? __________________
N/A West Viewing Area	Approximately, how many times per year? N/A – currently closed
N/A Rumford Falls Trail	Approximately, how many times per year? N/A – currently closed

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: ___________________________________ **Flow:** ________________

Weather:

☐ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location: ________________________

____

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	**Very Unappealing**	**Unappealing**	**Slightly Unappealing**	**Neutral**	**Slightly Appealing**	**Appealing**	**Very Appealing**	**N/A**
Water fall size/volume (amount of water going over the falls)	1	2	3	4	5	6	7	
Amount of exposed rock at falls	1	2	3	4	5	6	7	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	4	5	6	7	
Contrast between pools and moving water	1	2	3	4	5	6	7	
Amount of pools/still water in channel	1	2	3	4	5	6	7	
Amount of turbulence (visibly moving water in channel)	1	2	3	4	5	6	7	
Amount of exposed rocks/ streambed downstream	1	2	3	4	5	6	7	
Sound level	1	2	3	4	5	6	7	
Overall Aesthetic Rating	1	2	3	4	5	6	7	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow

☐ Slightly lower flow

☐ About the same flow

☐ Slightly higher flow

☐ Much higher flow

☐ Does not matter

4. List specific positive attributes of this flow level: ____

____

____

____

____

5. List specific negative attributes of this flow level: ____

____

____

____

____

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience? ____

____

____

____

____

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

III. SUMMARY COMPARATIVE FLOW EVALUATION

1. Which flows did you participate in? (*Check all that apply.*)

☐ 500 cfs
☐ 1,000 cfs
☐ 1,500 cfs
☐ 2,000 cfs

2. Please provide an overall evaluation for the following flows at the Rumford Falls based on your experience during the controlled flow releases (*Circle one number for each item*).

Flow	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing
500 cfs	1	2	3	4	5	6	7
1,000 cfs	1	2	3	4	5	6	7
1,500 cfs	1	2	3	4	5	6	7
2,000 cfs	1	2	3	4	5	6	7

3. Please answer the following questions based on your experience during the controlled flow releases. You may specify flows not observed during the controlled flow releases.

What is the lowest flow that you consider acceptable for a quality aesthetic viewing experience? ___________**Flow in cfs**

What flow provides the highest quality (i.e., optimal flow) aesthetic viewing experience? ___________**Flow in cfs**

4. Based on your evaluation of the controlled flow releases, please indicate the optimal flow for aesthetic viewing opportunities for the following KOP locations. Please consider all of the flow-dependent characteristics that contribute to the aesthetic experience (e.g., sound, rock exposure, flow in channel, volume of flow over falls). (*Please check one flow for each KOP location.*)

KOP Location	500 cfs	1,000 cfs	1,500 cfs	2,000 cfs	Other (please specify)	Don't Know
Veteran's Park						
J. Eugene Boivin Park						
West Viewing Are						
Rumford Falls Trail						

5. Compared to other rivers with comparable scenic viewing locations, how would you rate the aesthetic viewing opportunity at the Rumford Falls (assume optimal flows). (*Circle one number for each.*)

Compared to river reaches of similar aesthetic quality	**Very Unappealing**	**Unappealing**	**Slightly Unappealing**	**Neutral**	**Slightly Appealing**	**Appealing**	**Very Appealing**
Other rivers within a one-hour drive	1	2	3	4	5	6	7
Other rivers in Maine	1	2	3	4	5	6	7
Other rivers in the Northeast	1	2	3	4	5	6	7

6. Please complete the following table indicating when you think flows should be released over the Rumford Falls for aesthetic viewing.

Month (*Please check all that apply.)*	**Start Date During Month**	**End Date During Month**	**Day of Week During Identified Period (*Please check all that apply.)***		**Time of Day During Identified Period (*Please check all that apply.)***	
☐ January			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☐ Friday ☐ Saturday ☐ Sunday	☐ Dawn ☐ Morning ☐ Midday ☐ Afternoon	☐ Evening ☐ Dusk ☐ Night
☐ February			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☐ Friday ☐ Saturday ☐ Sunday	☐ Dawn ☐ Morning ☐ Midday ☐ Afternoon	☐ Evening ☐ Dusk ☐ Night
☐ March			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☐ Friday ☐ Saturday ☐ Sunday	☐ Dawn ☐ Morning ☐ Midday ☐ Afternoon	☐ Evening ☐ Dusk ☐ Night
☐ April			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☐ Friday ☐ Saturday ☐ Sunday	☐ Dawn ☐ Morning ☐ Midday ☐ Afternoon	☐ Evening ☐ Dusk ☐ Night
☐ May			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☐ Friday ☐ Saturday ☐ Sunday	☐ Dawn ☐ Morning ☐ Midday ☐ Afternoon	☐ Evening ☐ Dusk ☐ Night

Month (*Please check all that apply.*)	**Start Date During Month**	**End Date During Month**	**Day of Week During Identified Period (*Please check all that apply.*)**		**Time of Day During Identified Period (*Please check all that apply.*)**	
☐ June			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☐ Friday ☐ Saturday ☐ Sunday	☐ Dawn ☐ Morning ☐ Midday ☐ Afternoon	☐ Evening ☐ Dusk ☐ Night
☐ July			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☐ Friday ☐ Saturday ☐ Sunday	☐ Dawn ☐ Morning ☐ Midday ☐ Afternoon	☐ Evening ☐ Dusk ☐ Night
☐ August			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☐ Friday ☐ Saturday ☐ Sunday	☐ Dawn ☐ Morning ☐ Midday ☐ Afternoon	☐ Evening ☐ Dusk ☐ Night
☐ September			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☐ Friday ☐ Saturday ☐ Sunday	☐ Dawn ☐ Morning ☐ Midday ☐ Afternoon	☐ Evening ☐ Dusk ☐ Night
☐ October			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☐ Friday ☐ Saturday ☐ Sunday	☐ Dawn ☐ Morning ☐ Midday ☐ Afternoon	☐ Evening ☐ Dusk ☐ Night
☐ November			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☐ Friday ☐ Saturday ☐ Sunday	☐ Dawn ☐ Morning ☐ Midday ☐ Afternoon	☐ Evening ☐ Dusk ☐ Night
☐ December			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☐ Friday ☐ Saturday ☐ Sunday	☐ Dawn ☐ Morning ☐ Midday ☐ Afternoon	☐ Evening ☐ Dusk ☐ Night

ATTACHMENT 3

TABLE OF MINIMUM AND MAXIMUM ATTRIBUTE SCORES

Flow (cfs)	Key Observation Point	Aesthetic Score	Attribute								
			Water fall size/volume	Amount of exposed rock at falls	Downstream wetted channel width	Contrast between pools and moving water	Amount of pools/still water in channel	Amount of turbulence	Amount of exposed rocks/ streambed downstream	Sound level	Overall Aesthetic rating
500	Trail	min	1	2	2	2	2	2	1	4	1
		max	5	5	3	5	6	5	4	6	5
	Viewing Area	min	4	3	3	4	4	4	4	4	4
		max	7	6	6	7	7	6	6	6	6
	Park	min	3	2	3	3	3	3	3	2	3
		max	5	5	4	4	5	5	5	5	5
	Overall Minimum		**1**	**2**	**2**	**2**	**2**	**2**	**1**	**2**	**1**
	Overall Maximum		**7**	**6**	**6**	**7**	**7**	**6**	**6**	**6**	**6**
1,000	Trail	min	5	5	5	4	4	5	4	5	5
		max	7	6	6	6	6	6	6	6	6
	Viewing Area	min	6	4	4	3	3	5	4	4	5
		max	6	6	6	6	6	7	6	6	6
	Park	min	5	5	4	4	4	4	4	4	5
		max	6	6	6	5	5	6	6	7	6
	Overall Minimum		**5**	**4**	**4**	**3**	**3**	**4**	**4**	**4**	**5**
	Overall Maximum		**7**	**6**	**6**	**6**	**6**	**7**	**6**	**7**	**6**
1,500	Trail	min	6	6	6	6	5	6	5	4	6
		max	7	7	7	7	7	7	7	6	7
	Viewing Area	min	6	6	5	5	4	5	5	6	6
		max	7	7	7	7	7	7	7	7	7
	Park	min	6	6	7	4	5	5	4	4	6
		max	7	7	7	7	7	7	7	7	7
	Overall Minimum		**6**	**6**	**5**	**4**	**4**	**5**	**4**	**4**	**6**
	Overall Maximum		**7**	**7**	**7**	**7**	**7**	**7**	**7**	**7**	**7**

Flow (cfs)	**Key Observation Point**	**Aesthetic Score**	**Attribute**								
			Water fall size/volume	**Amount of exposed rock at falls**	**Downstream wetted channel width**	**Contrast between pools and moving water**	**Amount of pools/still water in channel**	**Amount of turbulence**	**Amount of exposed rocks/ streambed downstream**	**Sound level**	**Overall Aesthetic rating**
2,000	Trail	min	5	5	5	3	3	5	5	3	5
		max	7	7	7	7	7	7	7	7	7
	Viewing Area	min	6	4	4	4	4	4	4	4	4
		max	7	7	7	7	7	7	7	7	7
	Park	min	6	5	6	5	5	5	5	4	5
		max	7	7	7	7	7	7	7	7	7
	Overall Minimum		**5**	**4**	**4**	**3**	**3**	**4**	**4**	**3**	**4**
	Overall Maximum		**7**	**7**	**7**	**7**	**7**	**7**	**7**	**7**	**7**

ATTACHMENT 4

FLOW EVALUATION CURVES

FIGURE 1
AESTHETIC RATING OF WATERFALL SIZE/ VOLUME AT KEY OBSERVATION POINTS

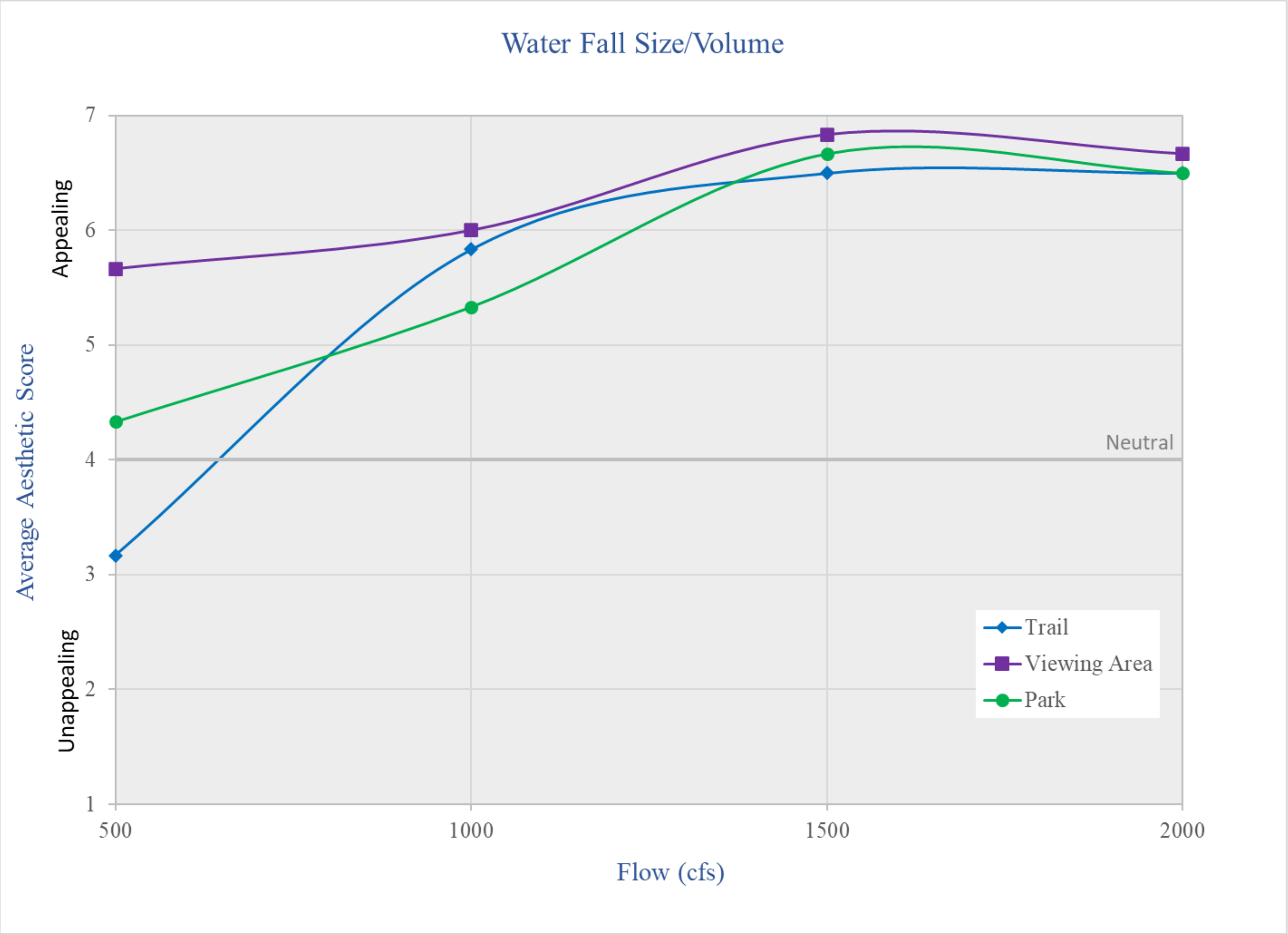


FIGURE 2
AESTHETIC RATING OF AMOUNT OF EXPOSED ROCK AT FALLS AT KEY OBSERVATION POINTS

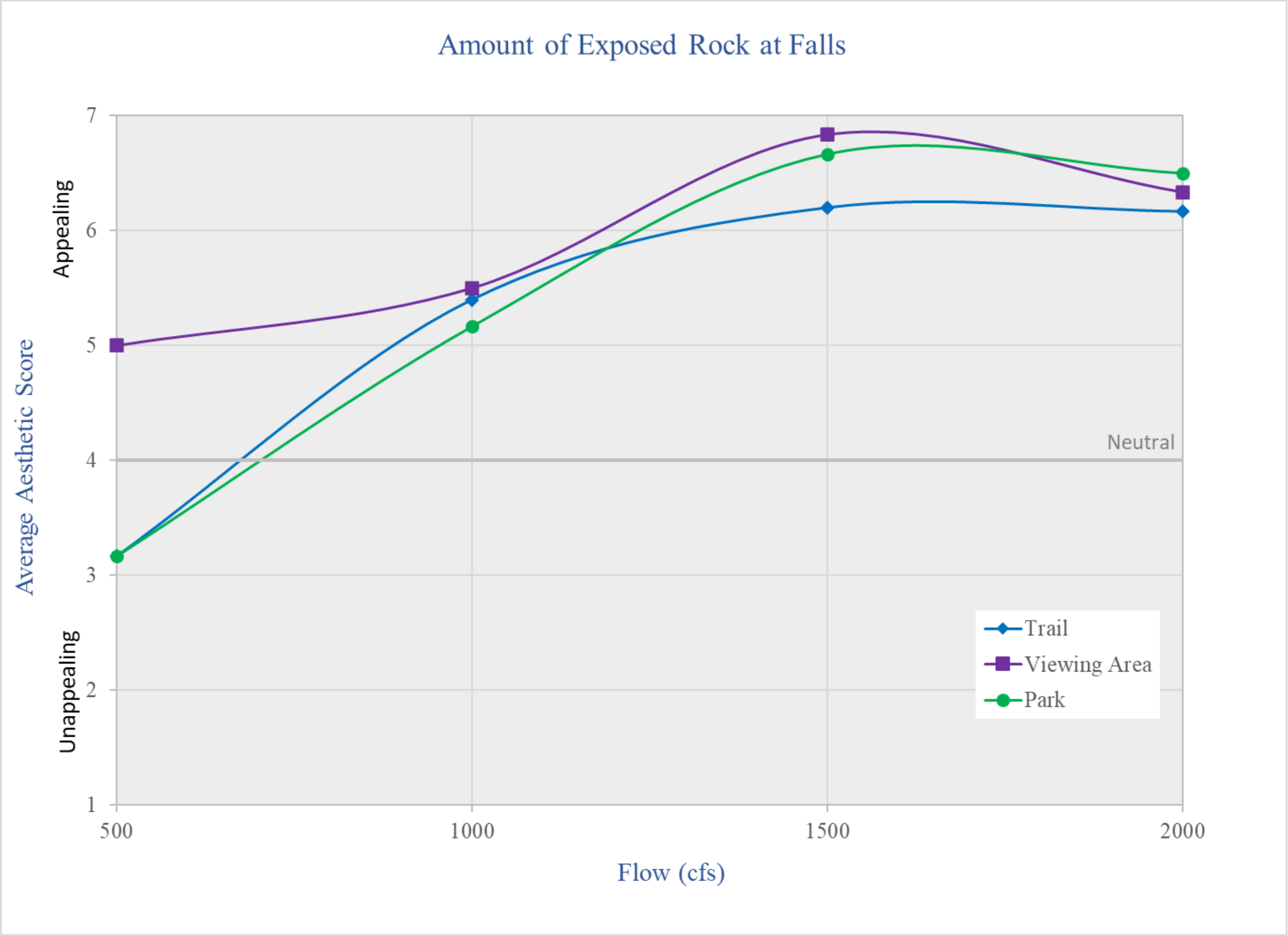


FIGURE 3
AESTHETIC RATING OF DOWNSTREAM WETTED CHANNEL WIDTH AT KEY OBSERVATION POINTS

FIGURE 4
AESTHETIC RATING OF CONTRAST BETWEEN POOLS AND MOVING WATER AT KEY OBSERVATION POINTS

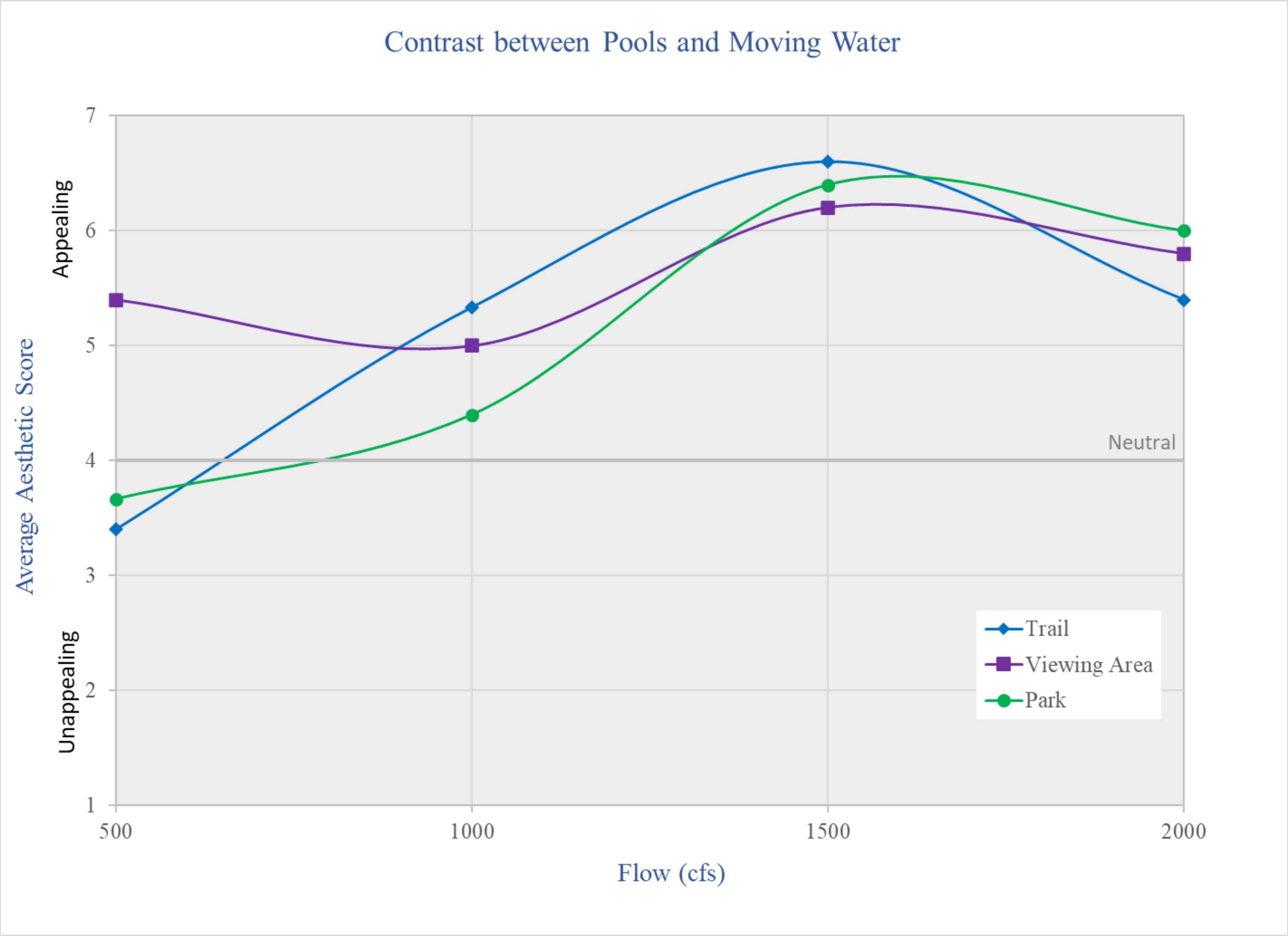


FIGURE 5
AESTHETIC RATING OF AMOUNT OF POOLS AND STILL WATER IN CHANNEL AT KEY OBSERVATION POINTS

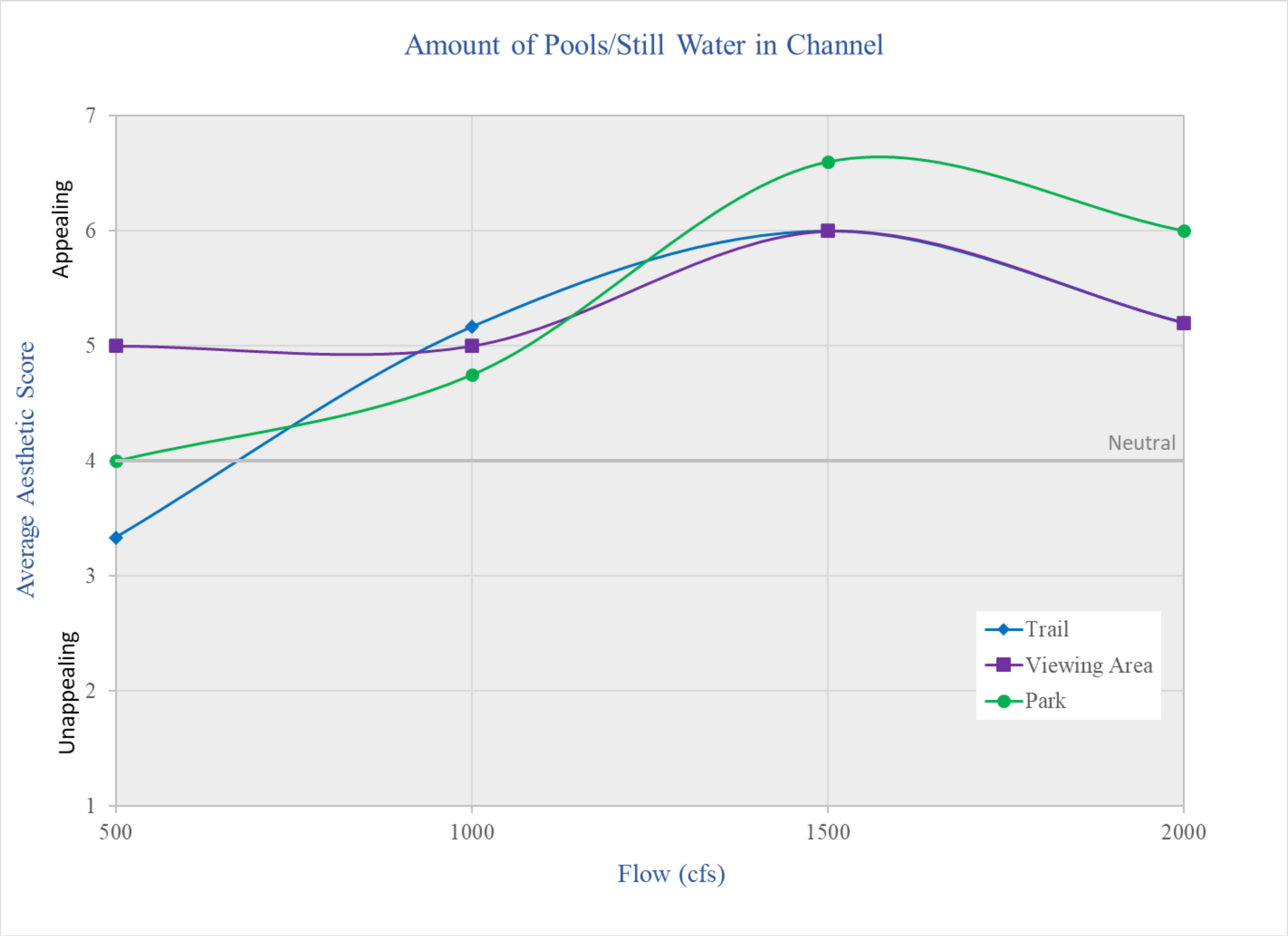


FIGURE 6
AESTHETIC RATING OF AMOUNT OF TURBULENCE AT KEY OBSERVATION POINTS

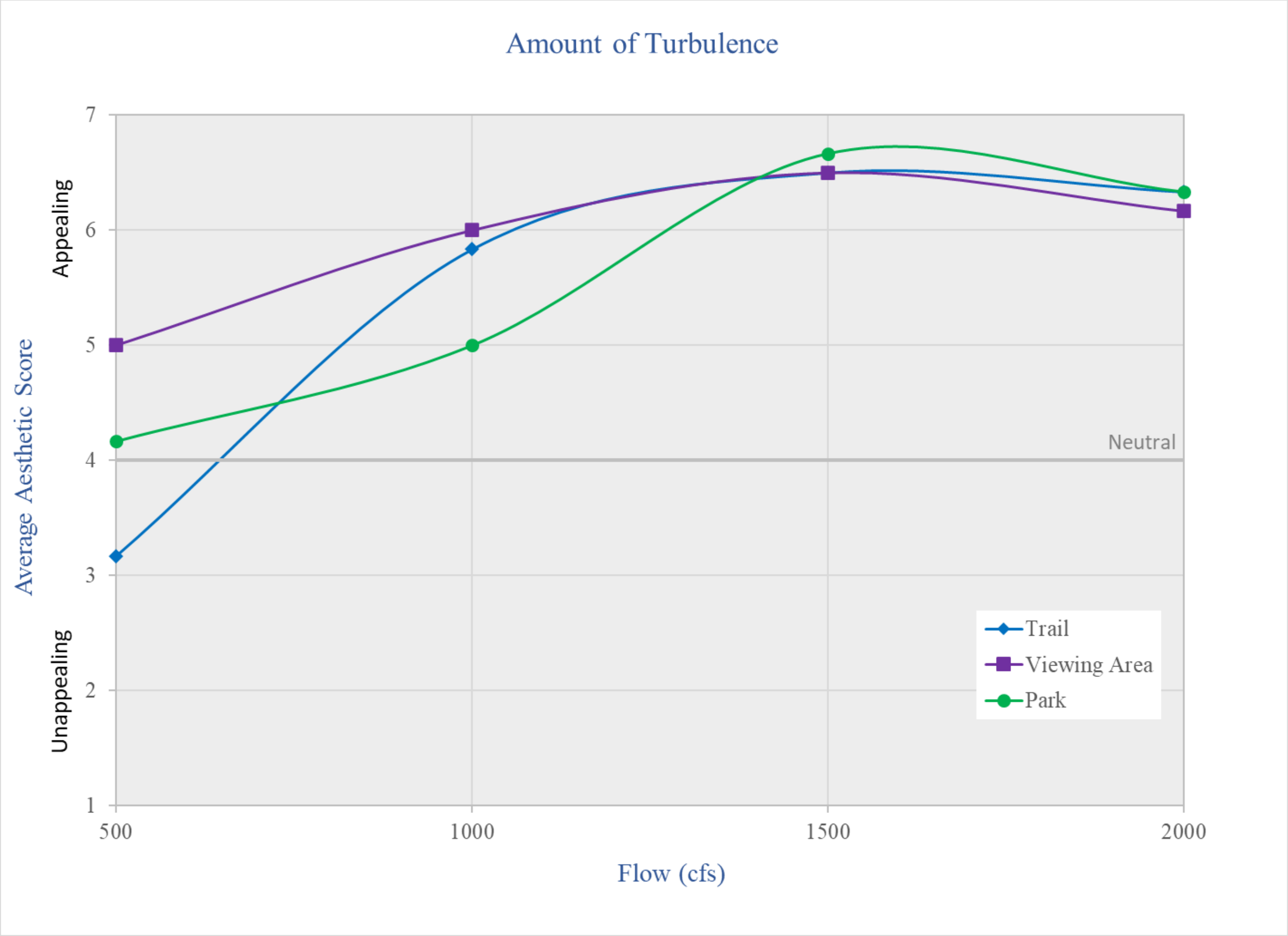


FIGURE 7
AESTHETIC RATING OF AMOUNT OF EXPOSED ROCKS AND STREAMBED DOWNSTREAM AT KEY OBSERVATION POINTS

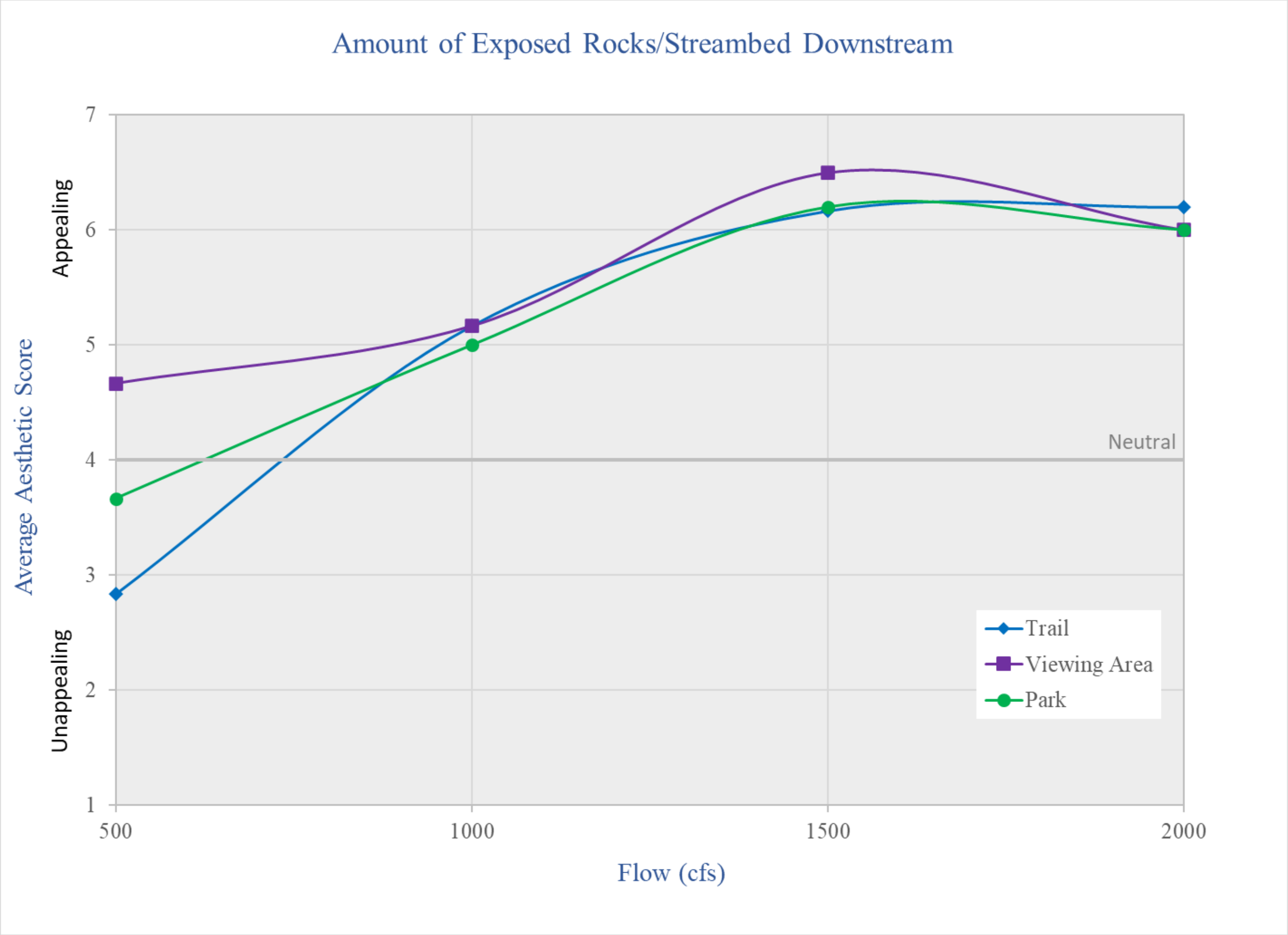
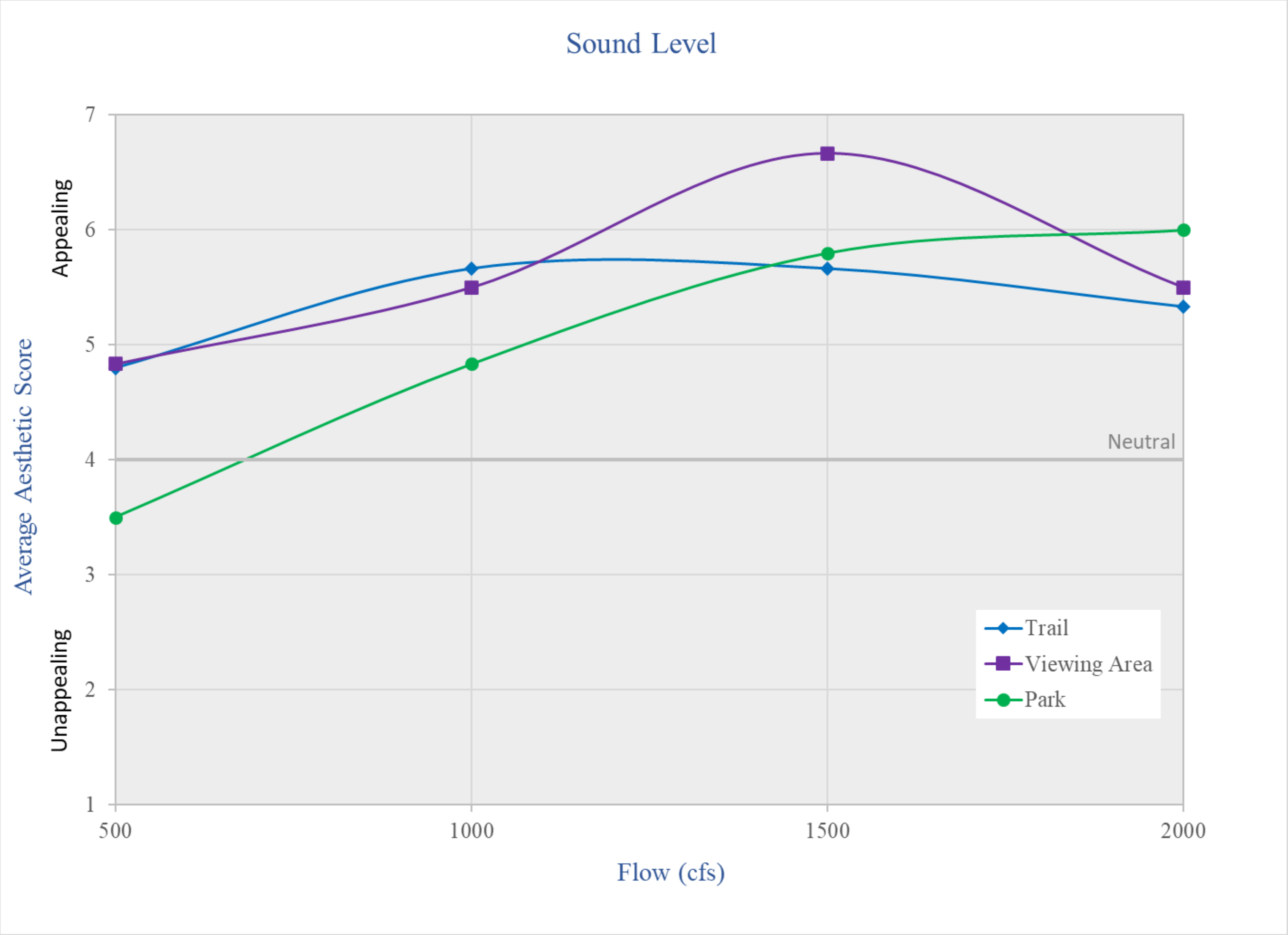


FIGURE 8
AESTHETIC RATING OF SOUND LEVEL AT KEY OBSERVATION POINTS



ATTACHMENT 5

COMPLETED FLOW ASSESSMENT FORMS

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

Thank you for participating in the Aesthetic Flow Study controlled flow assessment for the Rumford Falls Hydroelectric Project. This controlled flow assessment will include evaluating four different established flows (i.e., 500 cfs, 1,000 cfs, 1,500 cfs, and 2,000 cfs) over the Rumford Falls at Key Observation Point (KOP) locations. KOP locations will include J. Eugene Boivin Park, the West Viewing Area, and Rumford Falls Trail. A map is provided with these forms and identifies the Rumford Falls as well as the KOP locations. These data will be used for analysis in the Aesthetic Flow Study and we request that forms are filled out clearly and completely. Please do not hesitate to ask questions at any time during your assessment.

I. GENERAL INFORMATION

Date: 12-14-21

Participant Name: Stacy Carter

Affiliation: Town of Rumford

Home or Affiliation Zip Code: 04276

Participant Email: townmanager@rumfordme.org

GENERAL QUESTIONS

1. Prior to this Project, have you ever participated in an aesthetic flow assessment?

☐ Yes ☒ No

2. Have you ever visited any of the following KOP locations ~~to view~~ the Rumford Falls? (*Check all that apply.*)

☑ J. Eugene Boivin Park	Approximately, how many times per year? 2
N/A West Viewing Area	Approximately, how many times per year? N/A – currently closed
N/A Rumford Falls Trail	Approximately, how many times per year? N/A – currently closed

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Stacy Carter

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: Rumford Falls Trail **Flow:** 500 - 650

Weather:

☑ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location: Close up of Upper Dam Main Falls - unappealing - Upper Dam - more appealing

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	[✓ 2]	3	4	5	6	7	
Amount of exposed rock at falls	1	2	[✓ 3]	4	5	6	7	
Downstream wetted channel width (area of the river channel filled with water)	1	2	[✓ 3]	4	5	6	7	
Contrast between pools and moving water	1	2	3	4	5	6	7	✓
Amount of pools/still water in channel	1	2	[✓ 3]	4	5	6	7	/
Amount of turbulence (visibly moving water in channel)	1	2	[✓ 3]	4	5	6	7	
Amount of exposed rocks/ streambed downstream	1	2	[✓ 3]	4	5	6	7	
Sound level	1	2	3	4	[✓ 5]	6	7	
Overall Aesthetic Rating	1	2	[✓ 3]	4	5	6	7	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☐ Slightly lower flow
☐ About the same flow
☒ Slightly higher flow
☐ Much higher flow
☐ Does not matter

4. List specific positive attributes of this flow level: Upper falls had appealing view. Main falls boring.

5. List specific negative attributes of this flow level:

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience?

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: West Viewing Area **Flow:** 500 - 650

Weather:

☑ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location:

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	[✓ 4]	5	6	7	
Amount of exposed rock at falls	1	2	[✓ 3]	4	5	6	7	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	[✓ 4]	5	6	7	
Contrast between pools and moving water	1	2	3	4	[✓ 5]	6	7	
Amount of pools/still water in channel	1	2	3	[✓ 4]	5	6	7	
Amount of turbulence (visibly moving water in channel)	1	2	3	4	[✓ 5]	6	7	
Amount of exposed rocks/ streambed downstream	1	2	3	[✓ 4]	5	6	7	
Sound level	1	2	3	4	[✓ 5]	6	7	
Overall Aesthetic Rating	1	2	3	4	[✓ 5]	6	7	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☐ Slightly lower flow
☐ About the same flow
☒ Slightly higher flow
☐ Much higher flow
☐ Does not matter

4. List specific positive attributes of this flow level: ______

5. List specific negative attributes of this flow level: ______

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience? ______

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: Boivin Park **Flow:** 500

Weather:

☐ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location: ______

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	[✓ 5]	6	7	
Amount of exposed rock at falls	1	2	3	4	[✓ 5]	6	7	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	[✓ 4]	5	6	7	
Contrast between pools and moving water	1	2	3	4	5	6	7	x
Amount of pools/still water in channel	1	2	3	4	5	6	7	x
Amount of turbulence (visibly moving water in channel)	1	2	3	4	[✓ 5]	6	7	
Amount of exposed rocks/ streambed downstream	1	2	3	4	[✓ 5]	6	7	
Sound level	1	2	3	[✓ 4]	5	6	7	
Overall Aesthetic Rating	1	2	3	4	[✓ 5]	6	7	

Stacy Carter

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: Rumford Falls Trail **Flow:** 1000

Weather:

☒ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location: ____

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	5	[✓ 6]	7	
Amount of exposed rock at falls	1	2	3	4	5	[✓ 6]	7	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	4	5	[✓ 6]	7	
Contrast between pools and moving water	1	2	3	4	5	[✓ 6]	7	
Amount of pools/still water in channel	1	2	3	4	5	[✓ 6]	7	
Amount of turbulence (visibly moving water in channel)	1	2	3	4	5	[✓ 6]	7	
Amount of exposed rocks/ streambed downstream	1	2	3	[✓ 4]	5	6	7	
Sound level	1	2	3	4	5	[✓ 6]	7	
Overall Aesthetic Rating	1	2	3	4	5	[✓ 6]	7	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☐ Slightly lower flow
☐ About the same flow
☒ Slightly higher flow
☐ Much higher flow
☐ Does not matter

4. List specific positive attributes of this flow level: Not too noisy

5. List specific negative attributes of this flow level: ____

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience? ____

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☐ Slightly lower flow
☒ About the same flow
☐ Slightly higher flow
☐ Much higher flow
☐ Does not matter

4. List specific positive attributes of this flow level: Large area that is now appealing. to include Main falls and Upper falls

5. List specific negative attributes of this flow level:

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience?

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: West Viewing Area **Flow:** 1000

Weather:

☒ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location: Close Proximity to Falls.

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	5	[✓ 6]	7	
Amount of exposed rock at falls	1	2	3	[✓ 4]	5	6	7	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	[✓ 4]	5	6	7	
Contrast between pools and moving water	1	2	3	4	[✓ 5]	6	7	
Amount of pools/still water in channel	1	2	3	4	[✓ 5]	6	7	
Amount of turbulence (visibly moving water in channel)	1	2	3	4	5	[✓ 6]	7	
Amount of exposed rocks/ streambed downstream	1	2	3	[✓ 4]	5	6	7	
Sound level	1	2	3	4	5	[✓ 6]	7	
Overall Aesthetic Rating	1	2	3	4	5	[✓ 6]	7	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☐ Slightly lower flow
☒ About the same flow
☐ Slightly higher flow
☐ Much higher flow
☐ Does not matter

4. List specific positive attributes of this flow level: Close up gives better Viewing

5. List specific negative attributes of this flow level:

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience?

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: Boivin Park **Flow:** 1000

Weather:

☒ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location:

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	[✓ 5]	6	7	
Amount of exposed rock at falls	1	2	3	4	[✓ 5]	6	7	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	4	[✓ 5]	6	7	
Contrast between pools and moving water	1	2	3	[✓ 4]	5	6	7	
Amount of pools/still water in channel	1	2	3	[✓ 4]	5	6	7	
Amount of turbulence (visibly moving water in channel)	1	2	3	[✓ 4]	5	6	7	
Amount of exposed rocks/ streambed downstream	1	2	3	4	5	6	7	X
Sound level	1	2	3	4	[✓ 5]	6	7	
Overall Aesthetic Rating	1	2	3	4	[✓ 5]	6	7	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☐ Slightly lower flow
☐ About the same flow
☒ Slightly higher flow
☐ Much higher flow
☐ Does not matter

4. List specific positive attributes of this flow level: Have Fuller View of Falls - reflection pool and middle dam

5. List specific negative attributes of this flow level: Set back from falls - Not as impressive has other viewing areas but still pleasing

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience?

Stacy Carter

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: Rumford Falls Trail **Flow:** 1500

Weather:

☒ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location:

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	5	6	[✓ 7]	
Amount of exposed rock at falls	1	2	3	4	5	6	[✓ 7]	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	4	5	[✓ 6]	7	
Contrast between pools and moving water	1	2	3	4	5	6	[✓ 7]	
Amount of pools/still water in channel	1	2	3	4	5	[✓ 6]	7	
Amount of turbulence (visibly moving water in channel)	1	2	3	4	5	6	[✓ 7]	
Amount of exposed rocks/ streambed downstream	1	2	3	4	5	6	[✓ 7]	
Sound level	1	2	3	4	5	[✓ 6]	7	
Overall Aesthetic Rating	1	2	3	4	5	6	[✓ 7]	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☐ Slightly lower flow
☒ About the same flow
☐ Slightly higher flow
☐ Much higher flow
☐ Does not matter

4. List specific positive attributes of this flow level:

5. List specific negative attributes of this flow level:

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience?

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: West Viewing Area **Flow:** 1500

Weather:

☒ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location:

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	5	6	[✓ 7]	
Amount of exposed rock at falls	1	2	3	4	5	6	[✓ 7]	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	4	5	6	[✓ 7]	
Contrast between pools and moving water	1	2	3	4	5	[✓ 6]	7	
Amount of pools/still water in channel	1	2	3	4	5	[✓ 6]	7	
Amount of turbulence (visibly moving water in channel)	1	2	3	4	[✓ 5]	6	7	
Amount of exposed rocks/ streambed downstream	1	2	3	4	5	[✓ 6]	7	
Sound level	1	2	3	4	5	[✓ 6]	7	
Overall Aesthetic Rating	1	2	3	4	5	6	[✓ 7]	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☐ Slightly lower flow
☒ About the same flow
☐ Slightly higher flow
☐ Much higher flow
☐ Does not matter

4. List specific positive attributes of this flow level: ____________________

5. List specific negative attributes of this flow level: ____________________

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience? ____________________

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: Boivin Park **Flow:** 1500

Weather:

☒ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location: ____________________

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	5	6	[✓ 7]	
Amount of exposed rock at falls	1	2	3	4	5	6	[✓ 7]	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	4	5	6	[✓ 7]	
Contrast between pools and moving water	1	2	3	4	5	6	[✓ 7]	
Amount of pools/still water in channel	1	2	3	4	5	6	[✓ 7]	
Amount of turbulence (visibly moving water in channel)	1	2	3	4	5	6	[✓ 7]	
Amount of exposed rocks/ streambed downstream	1	2	3	4	5	6	7	X
Sound level	1	2	3	4	5	6	7	
Overall Aesthetic Rating	1	2	3	4	5	6	[✓ 7]	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☐ Slightly lower flow
☒ About the same flow
☐ Slightly higher flow
☐ Much higher flow
☐ Does not matter

4. List specific positive attributes of this flow level: Very appealing flow coming down falls plus serenity of reflection pool

5. List specific negative attributes of this flow level:

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience?

Stacy Carter

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: Rumford Falls Trail **Flow:** 2000

Weather:

☒ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location:

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	[✓ 5]	6	7	
Amount of exposed rock at falls	1	2	3	4	[✓ 5]	6	7	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	4	[✓ 5]	6	7	
Contrast between pools and moving water	1	2	[✓ 3]	4	5	6	7	
Amount of pools/still water in channel	1	2	3	[✓ 4]	5	6	7	
Amount of turbulence (visibly moving water in channel)	1	2	3	4	[✓ 5]	6	7	
Amount of exposed rocks/ streambed downstream	1	2	3	4	5	6	7	×
Sound level	1	2	[✓ 3]	4	5	6	7	
Overall Aesthetic Rating	1	2	3	4	[✓ 5]	6	7	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☒ Slightly lower flow
☐ About the same flow
☐ Slightly higher flow
☐ Much higher flow
☐ Does not matter

4. List specific positive attributes of this flow level: ______

5. List specific negative attributes of this flow level: ______

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience? ______

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: West Viewing area **Flow:** 2000

Weather:

☐ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location: ______

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	5	[✓ 6]	7	
Amount of exposed rock at falls	1	2	3	4	5	[✓ 6]	7	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	4	[✓ 5]	6	7	
Contrast between pools and moving water	1	2	3	[✓ 4]	5	6	7	
Amount of pools/still water in channel	1	2	3	[✓ 4]	5	6	7	
Amount of turbulence (visibly moving water in channel)	1	2	3	4	[✓ 5]	6	7	
Amount of exposed rocks/ streambed downstream	1	2	3	4	5	6	7	
Sound level	1	2	3	[✓ 4]	5	6	7	
Overall Aesthetic Rating	1	2	3	4	5	[✓ 6]	7	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☐ Slightly lower flow
☐ About the same flow
☐ Slightly higher flow
☐ Much higher flow
☐ Does not matter

4. List specific positive attributes of this flow level: ____________________

5. List specific negative attributes of this flow level: ____________________

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience? ____________________

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: Boivin Park **Flow:** 2000

Weather:

☒ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location: ____________________

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	5	[✓ 6]	7	
Amount of exposed rock at falls	1	2	3	4	[✓ 5]	6	7	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	4	5	[✓ 6]	7	
Contrast between pools and moving water	1	2	3	4	5	[✓ 6]	7	
Amount of pools/still water in channel	1	2	3	4	[✓ 5]	6	7	
Amount of turbulence (visibly moving water in channel)	1	2	3	4	5	[✓ 6]	7	
Amount of exposed rocks/ streambed downstream	1	2	3	4	5	6	7	✓
Sound level	1	2	3	4	5	[✓ 6]	7	
Overall Aesthetic Rating	1	2	3	4	5	[✓ 6]	7	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☒ Slightly lower flow
☐ About the same flow
☐ Slightly higher flow
☐ Much higher flow
☐ Does not matter

4. List specific positive attributes of this flow level:

5. List specific negative attributes of this flow level:

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience?

Stacy Carter

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

III. SUMMARY COMPARATIVE FLOW EVALUATION

1. Which flows did you participate in? (*Check all that apply.*)

☒ 500 cfs
☒ 1,000 cfs
☒ 1,500 cfs
☒ 2,000 cfs

2. Please provide an overall evaluation for the following flows at the Rumford Falls based on your experience during the controlled flow releases (*Circle one number for each item*).

Flow	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing
500 cfs	1	2	3	4	[✓ 5]	6	7
1,000 cfs	1	2	3	4	5	[✓ 6]	7
1,500 cfs	1	2	3	4	5	6	[✓ 7]
2,000 cfs	1	2	3	4	5	[✓ 6]	7

3. Please answer the following questions based on your experience during the controlled flow releases. You may specify flows not observed during the controlled flow releases.

What is the lowest flow that you consider acceptable for a quality aesthetic viewing experience? 1000 **Flow in cfs**

What flow provides the highest quality (i.e., optimal flow) aesthetic viewing experience? 1500 **Flow in cfs**

4. Based on your evaluation of the controlled flow releases, please indicate the optimal flow for aesthetic viewing opportunities for the following KOP locations. Please consider all of the flow-dependent characteristics that contribute to the aesthetic experience (e.g., sound, rock exposure, flow in channel, volume of flow over falls). (*Please check one flow for each KOP location.*)

KOP Location	500 cfs	1,000 cfs	1,500 cfs	2,000 cfs	Other (please specify)	Don't Know
J. Eugene Boivin Park			X			
West Viewing Are			X			
Rumford Falls Trail		X				

5. Compared to other rivers with comparable scenic viewing locations, how would you rate the aesthetic viewing opportunity at the Rumford Falls (assume optimal flows). (*Circle one number for each.*)

Compared to river reaches of similar aesthetic quality	**Very Unappealing**	**Unappealing**	**Slightly Unappealing**	**Neutral**	**Slightly Appealing**	**Appealing**	**Very Appealing**
Other rivers within a one-hour drive	1	2	3	4	5	[✓ 6]	7
Other rivers in Maine	1	2	3	4	5	6	[✓ 7]
Other rivers in the Northeast	1	2	3	4	5	[✓ 6]	7

6. Please complete the following table indicating when you think flows should be released over the Rumford Falls for aesthetic viewing.

Month ***(Please check all that apply.)***	**Start Date During Month**	**End Date During Month**	**Day of Week During Identified Period** ***(Please check all that apply.)***		**Time of Day During Identified Period** ***(Please check all that apply.)***	
☐ January			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☐ Friday ☐ Saturday ☐ Sunday	☐ Dawn ☐ Morning ☐ Midday ☐ Afternoon	☐ Evening ☐ Dusk ☐ Night
☐ February			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☐ Friday ☐ Saturday ☐ Sunday	☐ Dawn ☐ Morning ☐ Midday ☐ Afternoon	☐ Evening ☐ Dusk ☐ Night
☐ March			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☐ Friday ☐ Saturday ☐ Sunday	☐ Dawn ☐ Morning ☐ Midday ☐ Afternoon	☐ Evening ☐ Dusk ☐ Night
☐ April			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☐ Friday ☐ Saturday ☐ Sunday	☐ Dawn ☐ Morning ☐ Midday ☐ Afternoon	☐ Evening ☐ Dusk ☐ Night
☐ May			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☐ Friday ☐ Saturday ☐ Sunday	☐ Dawn ☐ Morning ☐ Midday ☐ Afternoon	☐ Evening ☐ Dusk ☐ Night
☑ June			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☑ Friday ☑ Saturday ☑ Sunday	☐ Dawn ☐ Morning ☑ Midday ☑ Afternoon	☑ Evening ☐ Dusk ☐ Night
☑ July			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☑ Friday ☑ Saturday ☑ Sunday	☐ Dawn ☐ Morning ☑ Midday ☑ Afternoon	☑ Evening ☐ Dusk ☐ Night
☑ August			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☑ Friday ☑ Saturday ☑ Sunday	☐ Dawn ☐ Morning ☑ Midday ☑ Afternoon	☑ Evening ☐ Dusk ☐ Night
☑ September			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☑ Friday ☑ Saturday ☑ Sunday	☐ Dawn ☐ Morning ☑ Midday ☑ Afternoon	☐ Evening ☐ Dusk ☐ Night
☑ October			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☑ Friday ☑ Saturday ☑ Sunday	☐ Dawn ☐ Morning ☑ Midday ☑ Afternoon	☐ Evening ☐ Dusk ☐ Night
☐ November			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☐ Friday ☐ Saturday ☐ Sunday	☐ Dawn ☐ Morning ☐ Midday ☐ Afternoon	☐ Evening ☐ Dusk ☐ Night
☐ December			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☐ Friday ☐ Saturday ☐ Sunday	☐ Dawn ☐ Morning ☐ Midday ☐ Afternoon	☐ Evening ☐ Dusk ☐ Night

7. Please provide any additional comments or relevant information regarding the scenic views and flows that you observed today.

THANK YOU FOR YOUR PARTICIPATION!

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

Thank you for participating in the Aesthetic Flow Study controlled flow assessment for the Rumford Falls Hydroelectric Project. This controlled flow assessment will include evaluating four different established flows (i.e., 500 cfs, 1,000 cfs, 1,500 cfs, and 2,000 cfs) over the Rumford Falls at Key Observation Point (KOP) locations. KOP locations will include J. Eugene Boivin Park, the West Viewing Area, and Rumford Falls Trail. A map is provided with these forms and identifies the Rumford Falls as well as the KOP locations. These data will be used for analysis in the Aesthetic Flow Study and we request that forms are filled out clearly and completely. Please do not hesitate to ask questions at any time during your assessment.

I. GENERAL INFORMATION

Date: 12/14/2024

Participant Name: George O'Keefe

Affiliation: Town of Rumford

Home or Affiliation Zip Code: 04276

Participant Email: gokeefe @ rumfordme, org

GENERAL QUESTIONS

1. Prior to this Project, have you ever participated in an aesthetic flow assessment?

☐ Yes ☑ No

2. Have you ever visited any of the following KOP locations to view the Rumford Falls? (*Check all that apply.*)

☑ J. Eugene Boivin Park	Approximately, how many times per year? 12
N/A West Viewing Area	Approximately, how many times per year? N/A – currently closed
N/A Rumford Falls Trail	Approximately, how many times per year? N/A – currently closed

George OKeefe

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: Rumford Falls Trail **Flow:** 500 CFS

Weather:

- ☑ Sunny
- ☐ Partly Cloudy
- ☐ Cloudy
- ☐ Light Rain
- ☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location: VIEW OF BLACK MOUNTAIN CLOSE TO FALLS

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	[✓ 3]	4	5	6	7	
Amount of exposed rock at falls	1	2	[✓ 3]	4	5	6	7	
Downstream wetted channel width (area of the river channel filled with water)	1	2	[✓ 3]	4	5	6	7	
Contrast between pools and moving water	1	2	3	[✓ 4]	5	6	7	
Amount of pools/still water in channel	1	2	3	[✓ 4]	5	6	7	
Amount of turbulence (visibly moving water in channel)	1	2	3	[✓ 4]	5	6	7	
Amount of exposed rocks/ streambed downstream	1	2	[✓ 3]	4	5	6	7	
Sound level	1	2	3	[✓ 4]	5	6	7	
Overall Aesthetic Rating	1	2	3	[✓ 4]	5	6	7	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

- ☐ Much lower flow
- ☐ Slightly lower flow
- ☐ About the same flow
- ☐ Slightly higher flow
- ☑ Much higher flow
- ☐ Does not matter

4. List specific positive attributes of this flow level: LOW NOISE LEVEL

5. List specific negative attributes of this flow level: LACK OF WATER FLOW OVER ROCK LEDGES

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience? NONE

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: West Viewing Area **Flow:** 500 cfs

Weather:

☐ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location: View of Channel

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	[✓ 5]	6	7	
Amount of exposed rock at falls	1	2	3	[✓ 4]	5	6	7	
Downstream wetted channel width (area of the river channel filled with water)	1	2	[✓ 3]	4	5	6	7	
Contrast between pools and moving water	1	2	3	[✓ 4]	5	6	7	
Amount of pools/still water in channel	1	2	3	[✓ 4]	5	6	7	
Amount of turbulence (visibly moving water in channel)	1	2	3	[✓ 4]	5	6	7	
Amount of exposed rocks/ streambed downstream	1	2	3	[✓ 4]	5	6	7	
Sound level	1	2	3	[✓ 4]	5	6	7	
Overall Aesthetic Rating	1	2	3	[✓ 4]	5	6	7	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☐ Slightly lower flow
☐ About the same flow
☐ Slightly higher flow
☑ Much higher flow
☐ Does not matter

4. List specific positive attributes of this flow level: Surprisingly Pleasant

5. List specific negative attributes of this flow level: Very Narrow Water Channel

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience? None

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: J. EUGENE BOIVIN PARK **Flow:** 500 CFS

Weather:

☑ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location:

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	[✓ 5]	6	7	
Amount of exposed rock at falls	1	2	[✓ 3]	4	5	6	7	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	[✓ 4]	5	6	7	
Contrast between pools and moving water	1	2	3	4	5	6	7	✓
Amount of pools/still water in channel	1	2	3	4	[✓ 5]	6	7	
Amount of turbulence (visibly moving water in channel)	1	2	3	[✓ 4]	5	6	7	
Amount of exposed rocks/ streambed downstream	1	2	3	[✓ 4]	5	6	7	
Sound level	1	2	3	[✓ 4]	5	6	7	
Overall Aesthetic Rating	1	2	3	[✓ 4]	5	6	7	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☐ Slightly lower flow
☐ About the same flow
☐ Slightly higher flow
☑ Much higher flow
☐ Does not matter

4. List specific positive attributes of this flow level: LIGHT MIST SPRAY COMING OFF CHANNEL

5. List specific negative attributes of this flow level: FLOW IS ALMOST TOO SMALL TO BE WORTH VIEWING

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience? NONE

George O'Keefe

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: Rumford Falls Trail **Flow:** 1000 CFS

Weather:

☑ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location: View of Black Mountain

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	5	[✓ 6]	7	
Amount of exposed rock at falls	1	2	3	4	[✓ 5]	6	7	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	4	[✓ 5]	6	7	
Contrast between pools and moving water	1	2	3	4	5	[✓ 6]	7	
Amount of pools/still water in channel	1	2	3	4	[✓ 5]	6	7	
Amount of turbulence (visibly moving water in channel)	1	2	3	4	5	[✓ 6]	7	
Amount of exposed rocks/ streambed downstream	1	2	3	4	[✓ 5]	6	7	
Sound level	1	2	3	4	[✓ 5]	6	7	
Overall Aesthetic Rating	1	2	3	4	[✓ 5]	6	7	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☐ Slightly lower flow
☐ About the same flow
☑ Slightly higher flow
☐ Much higher flow
☐ Does not matter

4. List specific positive attributes of this flow level: Excellent Coverage of Crest

5. List specific negative attributes of this flow level: Still incomplete Falls

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience? None

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: WEST VIEWING AREA **Flow:** 1000 CFS

Weather:

☑ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location: CLOSE UP VIEW

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	5	[✓ 6]	7	
Amount of exposed rock at falls	1	2	3	4	5	[✓ 6]	7	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	4	5	[✓ 6]	7	
Contrast between pools and moving water	1	2	3	4	5	[✓ 6]	7	
Amount of pools/still water in channel	1	2	3	4	5	[✓ 6]	7	
Amount of turbulence (visibly moving water in channel)	1	2	3	4	5	[✓ 6]	7	
Amount of exposed rocks/ streambed downstream	1	2	3	4	5	[✓ 6]	7	
Sound level	1	2	3	4	[✓ 5]	6	7	
Overall Aesthetic Rating	1	2	3	4	5	[✓ 6]	7	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☐ Slightly lower flow
☐ About the same flow
☑ Slightly higher flow
☐ Much higher flow
☐ Does not matter

4. List specific positive attributes of this flow level: BETTER COVERAGE OF ROCK

5. List specific negative attributes of this flow level: STILL CHANNELED IN PUMPELLY CIRCLE AREA

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience? NONE

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: J. EUGENE BOIVIN PARK **Flow:** 1000 CFS

Weather:

☑ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location:

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	[✓ 5]	6	7	
Amount of exposed rock at falls	1	2	3	4	[✓ 5]	6	7	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	[✓ 4]	5	6	7	
Contrast between pools and moving water	1	2	3	[✓ 4]	5	6	7	
Amount of pools/still water in channel	1	2	3	4	[✓ 5]	6	7	
Amount of turbulence (visibly moving water in channel)	1	2	3	4	[✓ 5]	6	7	
Amount of exposed rocks/ streambed downstream	1	2	3	4	[✓ 5]	6	7	
Sound level	1	2	3	[✓ 4]	5	6	7	
Overall Aesthetic Rating	1	2	3	4	[✓ 5]	6	7	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☐ Slightly lower flow
☐ About the same flow
☐ Slightly higher flow
☑ Much higher flow
☐ Does not matter

4. List specific positive attributes of this flow level: BETTER VISIBILITY OF WATER FLOW

5. List specific negative attributes of this flow level: STILL A LITTLE LOW FROM THIS VANTAGE POINT

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience? NONE

George O'Keefe

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: Rumford Falls Trail **Flow:** 1500

Weather:

☑ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location: View of Black Mtn

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	5	[✓ 6]	7	
Amount of exposed rock at falls	1	2	3	4	5	[✓ 6]	7	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	4	5	[✓ 6]	7	
Contrast between pools and moving water	1	2	3	4	5	[✓ 6]	7	
Amount of pools/still water in channel	1	2	3	4	5	[✓ 6]	7	
Amount of turbulence (visibly moving water in channel)	1	2	3	4	5	[✓ 6]	7	
Amount of exposed rocks/ streambed downstream	1	2	3	4	5	[✓ 6]	7	
Sound level	1	2	3	4	5	[✓ 6]	7	
Overall Aesthetic Rating	1	2	3	4	5	[✓ 6]	7	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☐ Slightly lower flow
☑ About the same flow
☐ Slightly higher flow
☐ Much higher flow
☐ Does not matter

4. List specific positive attributes of this flow level: Fine Coverage of Ledge Excellent Visual Attributes

5. List specific negative attributes of this flow level: None

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience? None

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: West Viewing Area **Flow:** 1500

Weather:

☑ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location: Close up view of the falls

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	5	6	[✓ 7]	
Amount of exposed rock at falls	1	2	3	4	5	6	[✓ 7]	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	4	5	6	[✓ 7]	
Contrast between pools and moving water	1	2	3	4	5	6	[✓ 7]	
Amount of pools/still water in channel	1	2	3	4	5	6	[✓ 7]	
Amount of turbulence (visibly moving water in channel)	1	2	3	4	5	6	[✓ 7]	
Amount of exposed rocks/ streambed downstream	1	2	3	4	5	6	[✓ 7]	
Sound level	1	2	3	4	5	6	[✓ 7]	
Overall Aesthetic Rating	1	2	3	4	5	6	[✓ 7]	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☐ Slightly lower flow
☑ About the same flow
☐ Slightly higher flow
☐ Much higher flow
☐ Does not matter

4. List specific positive attributes of this flow level: Excellent coverage of ledge. Especially pretty visual.

5. List specific negative attributes of this flow level: None

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience? None

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: J. EUGENE BOIVIN PARK **Flow:** 1500

Weather:

☑ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location: BEST VIEW OF APPEALING PARK WITH FALLS

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	5	6	[✓ 7]	
Amount of exposed rock at falls	1	2	3	4	5	6	[✓ 7]	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	4	5	6	[✓ 7]	
Contrast between pools and moving water	1	2	3	4	5	6	[✓ 7]	
Amount of pools/still water in channel	1	2	3	4	5	6	[✓ 7]	
Amount of turbulence (visibly moving water in channel)	1	2	3	4	5	6	[✓ 7]	
Amount of exposed rocks/ streambed downstream	1	2	3	4	5	6	[✓ 7]	
Sound level	1	2	3	4	5	6	[✓ 7]	
Overall Aesthetic Rating	1	2	3	4	5	6	[✓ 7]	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☐ Slightly lower flow
☑ About the same flow
☐ Slightly higher flow
☐ Much higher flow
☐ Does not matter

4. List specific positive attributes of this flow level: WIDE WIDTH OF FALLS. HIGHLY VISIBLE FROM DISTANCE

5. List specific negative attributes of this flow level: NONE

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience? NONE

George OKeefe

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: [illegible] Falls Trail **Flow:** 2000

Weather:

☑ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location: View of Black water

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	5	[✓ 6]	7	
Amount of exposed rock at falls	1	2	3	4	[✓ 5]	6	7	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	4	[✓ 5]	6	7	
Contrast between pools and moving water	1	2	3	[✓ 4]	5	6	7	
Amount of pools/still water in channel	1	2	3	4	[✓ 5]	6	7	
Amount of turbulence (visibly moving water in channel)	1	2	3	4	[✓ 5]	6	7	
Amount of exposed rocks/ streambed downstream	1	2	3	4	[✓ 5]	6	7	
Sound level	1	2	3	[✓ 4]	5	6	7	
Overall Aesthetic Rating	1	2	3	4	[✓ 5]	6	7	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☑ Slightly lower flow
☐ About the same flow
☐ Slightly higher flow
☐ Much higher flow
☐ Does not matter

4. List specific positive attributes of this flow level: None

5. List specific negative attributes of this flow level: A little loud

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience? None

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: WEST VIEWING AREA **Flow:** 2000

Weather:

☑ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location: CLOSE UP VIEW

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	5	[✓ 6]	7	
Amount of exposed rock at falls	1	2	3	[✓ 4]	5	6	7	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	[✓ 4]	5	6	7	
Contrast between pools and moving water	1	2	3	[✓ 4]	5	6	7	
Amount of pools/still water in channel	1	2	3	[✓ 4]	5	6	7	
Amount of turbulence (visibly moving water in channel)	1	2	3	[✓ 4]	5	6	7	
Amount of exposed rocks/ streambed downstream	1	2	3	[✓ 4]	5	6	7	
Sound level	1	2	3	[✓ 4]	5	6	7	
Overall Aesthetic Rating	1	2	3	[✓ 4]	5	6	7	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☑ Slightly lower flow
☐ About the same flow
☐ Slightly higher flow
☐ Much higher flow
☐ Does not matter

4. List specific positive attributes of this flow level: NONE

5. List specific negative attributes of this flow level: LOUD AND LACKS VIEW OF SOME NICE ROCK FEATURES

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience? NONE

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: J. EUGENE BOIVIN PARK **Flow:** 2000

Weather:

☑ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location: VIEW OF REFLECTING POOL

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	5	[✓ 6]	7	
Amount of exposed rock at falls	1	2	3	4	5	[✓ 6]	7	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	4	5	[✓ 6]	7	
Contrast between pools and moving water	1	2	3	4	[✓ 5]	6	7	
Amount of pools/still water in channel	1	2	3	4	[✓ 5]	6	7	
Amount of turbulence (visibly moving water in channel)	1	2	3	4	[✓ 5]	6	7	
Amount of exposed rocks/ streambed downstream	1	2	3	4	[✓ 5]	6	7	
Sound level	1	2	3	4	[✓ 5]	6	7	
Overall Aesthetic Rating	1	2	3	4	[✓ 5]	6	7	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☑ Slightly lower flow
☐ About the same flow
☐ Slightly higher flow
☐ Much higher flow
☐ Does not matter

4. List specific positive attributes of this flow level: NONE

5. List specific negative attributes of this flow level: NONE

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience? NONE

George OKeafe

Aesthetic Flow Assessment Form
Rumford Falls Hydroelectric Project (FERC No. 2333)

III. SUMMARY COMPARATIVE FLOW EVALUATION

1. Which flows did you participate in? (*Check all that apply.*)

☑ 500 cfs
☑ 1,000 cfs
☑ 1,500 cfs
☑ 2,000 cfs

2. Please provide an overall evaluation for the following flows at the Rumford Falls based on your experience during the controlled flow releases (*Circle one number for each item*).

Flow	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing
500 cfs	1	2	3	[✓ 4]	5	6	7
1,000 cfs	1	2	3	4	[✓ 5]	6	7
1,500 cfs	1	2	3	4	5	6	[✓ 7]
2,000 cfs	1	2	3	4	[✓ 5]	6	7

3. Please answer the following questions based on your experience during the controlled flow releases. You may specify flows not observed during the controlled flow releases.

What is the lowest flow that you consider acceptable for a quality aesthetic viewing experience? 1,000 **Flow in cfs**

What flow provides the highest quality (i.e., optimal flow) aesthetic viewing experience? 1,500 **Flow in cfs**

4. Based on your evaluation of the controlled flow releases, please indicate the optimal flow for aesthetic viewing opportunities for the following KOP locations. Please consider all of the flow-dependent characteristics that contribute to the aesthetic experience (e.g., sound, rock exposure, flow in channel, volume of flow over falls). (*Please check one flow for each KOP location.*)

KOP Location	500 cfs	1,000 cfs	1,500 cfs	2,000 cfs	Other (please specify)	Don't Know
J. Eugene Boivin Park			✓			
West Viewing Are			✓			
Rumford Falls Trail			✓			

5. Compared to other rivers with comparable scenic viewing locations, how would you rate the aesthetic viewing opportunity at the Rumford Falls (assume optimal flows). (*Circle one number for each.*)

Compared to river reaches of similar aesthetic quality	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing
Other rivers within a one-hour drive	1	2	3	4	5	6	[✓ 7]
Other rivers in Maine	1	2	3	4	5	6	[✓ 7]
Other rivers in the Northeast	1	2	3	4	5	[✓ 6]	7

6. Please complete the following table indicating when you think flows should be released over the Rumford Falls for aesthetic viewing.

Month (*Please check all that apply.*)	Start Date During Month	End Date During Month	Day of Week During Identified Period (*Please check all that apply.*)		Time of Day During Identified Period (*Please check all that apply.*)	
☐ January			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☐ Friday ☐ Saturday ☐ Sunday	☐ Dawn ☐ Morning ☐ Midday ☐ Afternoon	☐ Evening ☐ Dusk ☐ Night
☐ February			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☐ Friday ☐ Saturday ☐ Sunday	☐ Dawn ☐ Morning ☐ Midday ☐ Afternoon	☐ Evening ☐ Dusk ☐ Night
☐ March			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☐ Friday ☐ Saturday ☐ Sunday	☐ Dawn ☐ Morning ☐ Midday ☐ Afternoon	☐ Evening ☐ Dusk ☐ Night
☐ April			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☐ Friday ☐ Saturday ☐ Sunday	☐ Dawn ☐ Morning ☐ Midday ☐ Afternoon	☐ Evening ☐ Dusk ☐ Night
☐ May			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☐ Friday ☐ Saturday ☐ Sunday	☐ Dawn ☐ Morning ☐ Midday ☐ Afternoon	☐ Evening ☐ Dusk ☐ Night

Month *(Please check all that apply.)*	**Start Date During Month**	**End Date During Month**	**Day of Week During Identified Period** *(Please check all that apply.)*		**Time of Day During Identified Period** *(Please check all that apply.)*	
☑ June			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☑ Friday ☑ Saturday ☑ Sunday	☐ Dawn ☐ Morning ☑ Midday ☑ Afternoon	☑ Evening ☐ Dusk ☐ Night
☑ July			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☑ Friday ☑ Saturday ☑ Sunday	☐ Dawn ☐ Morning ☑ Midday ☑ Afternoon	☑ Evening ☐ Dusk ☐ Night
☑ August			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☑ Friday ☑ Saturday ☑ Sunday	☐ Dawn ☐ Morning ☑ Midday ☑ Afternoon	☑ Evening ☐ Dusk ☐ Night
☑ September			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☑ Friday ☑ Saturday ☑ Sunday	☐ Dawn ☐ Morning ☑ Midday ☑ Afternoon	☐ Evening ☐ Dusk ☐ Night
☑ October			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☑ Friday ☑ Saturday ☑ Sunday	☐ Dawn ☐ Morning ☑ Midday ☑ Afternoon	☐ Evening ☐ Dusk ☐ Night
☐ November			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☐ Friday ☐ Saturday ☐ Sunday	☐ Dawn ☐ Morning ☐ Midday ☐ Afternoon	☐ Evening ☐ Dusk ☐ Night
☐ December			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☐ Friday ☐ Saturday ☐ Sunday	☐ Dawn ☐ Morning ☐ Midday ☐ Afternoon	☐ Evening ☐ Dusk ☐ Night

7. Please provide any additional comments or relevant information regarding the scenic views and flows that you observed today.

SHOULD SCHEDULE IN CONJUNCTION

WITH WHITE WATER RELEASE

IN CONJUNCTION OR IN ADDITION TO —

THANK YOU FOR YOUR PARTICIPATION!

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

Thank you for participating in the Aesthetic Flow Study controlled flow assessment for the Rumford Falls Hydroelectric Project. This controlled flow assessment will include evaluating four different established flows (i.e., 500 cfs, 1,000 cfs, 1,500 cfs, and 2,000 cfs) over the Rumford Falls at Key Observation Point (KOP) locations. KOP locations will include J. Eugene Boivin Park, the West Viewing Area, and Rumford Falls Trail. A map is provided with these forms and identifies the Rumford Falls as well as the KOP locations. These data will be used for analysis in the Aesthetic Flow Study and we request that forms are filled out clearly and completely. Please do not hesitate to ask questions at any time during your assessment.

I. GENERAL INFORMATION

Date: 12/14/21

Participant Name: James Vogel

Affiliation: ME BPL

Home or Affiliation Zip Code: 04011

Participant Email: jim.vogel@maine.gov

GENERAL QUESTIONS

1. Prior to this Project, have you ever participated in an aesthetic flow assessment?

☐ Yes ☒ No

2. Have you ever visited any of the following KOP locations to view the Rumford Falls? (*Check all that apply.*)

☐ J. Eugene Boivin Park	Approximately, how many times per year? ______
N/A West Viewing Area	Approximately, how many times per year? N/A – currently closed
N/A Rumford Falls Trail	Approximately, how many times per year? N/A – currently closed

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Jim Vogel

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: Trail **Flow:** 500

Weather:

☒ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location: Elevated View

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	[✓ 5]	6	7	
Amount of exposed rock at falls	1	2	3	[✓ 4]	5	6	7	
Downstream wetted channel width (area of the river channel filled with water)	1	2	[✓ 3]	4	5	6	7	
Contrast between pools and moving water	1	2	3	4	[✓ 5]	6	7	
Amount of pools/still water in channel	1	2	[✓ 3]	4	5	6	7	
Amount of turbulence (visibly moving water in channel)	1	2	[✓ 3]	4	5	6	7	
Amount of exposed rocks/ streambed downstream	1	2	3	[✓ 4]	5	6	7	
Sound level	1	2	3	4	[✓ 5]	6	7	
Overall Aesthetic Rating	1	2	3	4	[✓ 5]	6	7	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☐ Slightly lower flow
☐ About the same flow
☐ Slightly higher flow
☒ Much higher flow
☐ Does not matter

4. List specific positive attributes of this flow level: nice small waterfalls, nice sound, most attractive part is actually immediately below dam (flashboards)

5. List specific negative attributes of this flow level: not very dramatic effect, main flow at lower part of falls is hidden from view at this KOP?

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience? —

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: West viewing area **Flow:** 500

Weather:

☒ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location: Direct view to base of falls, fairly close

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	5	[✓ 6]	7	
Amount of exposed rock at falls	1	2	3	4	5	[✓ 6]	7	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	4	[✓ 5]	6	7	
Contrast between pools and moving water	1	2	3	4	5	6	7	X
Amount of pools/still water in channel	1	2	3	4	5	6	7	X
Amount of turbulence (visibly moving water in channel)	1	2	3	4	5	[✓ 6]	7	
Amount of exposed rocks/ streambed downstream	1	2	3	[✓ 4]	5	6	7	
Sound level	1	2	3	4	[✓ 5]	6	7	
Overall Aesthetic Rating	1	2	3	4	5	[✓ 6]	7	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☐ Slightly lower flow
☐ About the same flow
☐ Slightly higher flow
☒ Much higher flow
☐ Does not matter

4. List specific positive attributes of this flow level: Fairly impressive torrent at base of falls

5. List specific negative attributes of this flow level: Most of base of falls still with little or no flow

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience? Minor vegetation clearing in front of overlook.

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: Boivin Park **Flow:** 500

Weather:

☒ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location:

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	[✓ 3]	4	5	6	7	
Amount of exposed rock at falls	1	2	[✓ 3]	4	5	6	7	
Downstream wetted channel width (area of the river channel filled with water)	1	2	[✓ 3]	4	5	6	7	
Contrast between pools and moving water	1	2	3	4	5	6	7	N/A
Amount of pools/still water in channel	1	2	3	4	5	6	7	N/A
Amount of turbulence (visibly moving water in channel)	1	2	3	4	[✓ 5]	6	7	
Amount of exposed rocks/ streambed downstream	1	2	3	[✓ 4]	5	6	7	
Sound level	1	[✓ 2]	3	4	5	6	7	
Overall Aesthetic Rating	1	2	3	[✓ 4]	5	6	7	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☐ Slightly lower flow
☐ About the same flow
☐ Slightly higher flow
☒ Much higher flow
☐ Does not matter

4. List specific positive attributes of this flow level: better than no flow or very low flow, but not that impressive at this distance

5. List specific negative attributes of this flow level: to low to be truly impactful from this KOP

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience?

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: Trail **Flow:** 1,000

Weather:

☑ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location:

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	[✓ 5]	6	7	
Amount of exposed rock at falls	1	2	3	4	[✓ 5]	6	7	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	4	[✓ 5]	6	7	
Contrast between pools and moving water	1	2	3	[✓ 4]	5	6	7	
Amount of pools/still water in channel	1	2	3	[✓ 4]	5	6	7	
Amount of turbulence (visibly moving water in channel)	1	2	3	4	5	[✓ 6]	7	
Amount of exposed rocks/ streambed downstream	1	2	3	4	[✓ 5]	6	7	
Sound level	1	2	3	4	5	[✓ 6]	7	
Overall Aesthetic Rating	1	2	3	4	5	[✓ 6]	7	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☐ Slightly lower flow
☐ About the same flow
☒ Slightly higher flow
☐ Much higher flow
☐ Does not matter

4. List specific positive attributes of this flow level: flow fills most of width of falls, sound is more impressive; some spray (with rainbow effect) at lower falls

5. List specific negative attributes of this flow level: still considerably bare rock at lower falls

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience? —

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: West Pitch **Flow:** 1,000

Weather:

☒ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location:

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	5	[✓ 6]	7	
Amount of exposed rock at falls	1	2	3	4	[✓ 5]	6	7	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	4	5	[✓ 6]	7	
Contrast between pools and moving water	1	2	3	4	5	6	7	N/A
Amount of pools/still water in channel	1	2	3	4	5	6	7	N/A
Amount of turbulence (visibly moving water in channel)	1	2	3	4	5	[✓ 6]	7	
Amount of exposed rocks/ streambed downstream	1	2	3	4	5	[✓ 6]	7	
Sound level	1	2	3	4	5	[✓ 6]	7	
Overall Aesthetic Rating	1	2	3	4	5	[✓ 6]	7	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☐ Slightly lower flow
☐ About the same flow
☒ Slightly higher flow
☐ Much higher flow
☐ Does not matter

4. List specific positive attributes of this flow level: Main flow is pretty impressive, and at nice smaller cascade alongside. Sound carries well too.

5. List specific negative attributes of this flow level: —

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience? —

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: Boivin Park **Flow:** 1,000

Weather:

☑ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location:

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	5	[✓ 6]	7	
Amount of exposed rock at falls	1	2	3	4	5	[✓ 6]	7	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	4	5	[✓ 6]	7	
Contrast between pools and moving water	1	2	3	4	5	6	7	N/A
Amount of pools/still water in channel	1	2	3	4	5	6	7	N/A
Amount of turbulence (visibly moving water in channel)	1	2	3	4	5	[✓ 6]	7	
Amount of exposed rocks/ streambed downstream	1	2	3	4	5	[✓ 6]	7	
Sound level	1	2	3	[✓ 4]	5	6	7	
Overall Aesthetic Rating	1	2	3	4	5	[✓ 6]	7	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☐ Slightly lower flow
☐ About the same flow
☒ Slightly higher flow
☐ Much higher flow
☐ Does not matter

4. List specific positive attributes of this flow level: Nice of main flow down primary channel of lower falls, Flow is somewhat impressive but hard to fully appreciate at this distance

5. List specific negative attributes of this flow level: ~

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience?

Jim Vogel

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: Trail **Flow:** 1,500

Weather:

☒ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location:

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	5	[✓ 6]	7	
Amount of exposed rock at falls	1	2	3	4	5	[✓ 6]	7	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	4	5	6	[✓ 7]	
Contrast between pools and moving water	1	2	3	4	5	6	7	N/A
Amount of pools/still water in channel	1	2	3	4	5	6	7	NA
Amount of turbulence (visibly moving water in channel)	1	2	3	4	5	[✓ 6]	7	
Amount of exposed rocks/ streambed downstream	1	2	3	4	5	[✓ 6]	7	
Sound level	1	2	3	4	5	[✓ 6]	7	
Overall Aesthetic Rating	1	2	3	4	5	[✓ 6]	7	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☐ Slightly lower flow
☐ About the same flow
☒ Slightly higher flow
☐ Much higher flow
☐ Does not matter

4. List specific positive attributes of this flow level: Impressive flow across fall with falls, Lots of turbulence, sheets of water over ledges.

5. List specific negative attributes of this flow level: —

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience? —

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: West Pitch **Flow:** 1,500

Weather:

☑ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location:

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	5	6	[✓ 7]	
Amount of exposed rock at falls	1	2	3	4	5	6	[✓ 7]	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	4	5	6	[✓ 7]	
Contrast between pools and moving water	1	2	3	4	5	6	7	NA
Amount of pools/still water in channel	1	2	3	4	5	6	7	NA
Amount of turbulence (visibly moving water in channel)	1	2	3	4	5	6	[✓ 7]	
Amount of exposed rocks/ streambed downstream	1	2	3	4	5	6	[✓ 7]	
Sound level	1	2	3	4	5	6	[✓ 7]	
Overall Aesthetic Rating	1	2	3	4	5	6	[✓ 7]	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☐ Slightly lower flow
☒ About the same flow
☐ Slightly higher flow
☐ Much higher flow
☐ Does not matter

4. List specific positive attributes of this flow level: Impressive torrent + cascades [illegible] across most of lower falls with small cascade at far right. Turbulent white water in pool at base.

5. List specific negative attributes of this flow level: —

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience? —

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: Borwin Park **Flow:** 1,500

Weather:

☒ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location:

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	5	[✓ 6]	7	
Amount of exposed rock at falls	1	2	3	4	5	[✓ 6]	7	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	4	5	6	[✓ 7]	
Contrast between pools and moving water	1	2	3	4	5	6	7	NA
Amount of pools/still water in channel	1	2	3	4	5	6	7	NA
Amount of turbulence (visibly moving water in channel)	1	2	3	4	5	6	[✓ 7]	
Amount of exposed rocks/ streambed downstream	1	2	3	4	5	[✓ 6]	7	
Sound level	1	2	3	[✓ 4]	5	6	7	
Overall Aesthetic Rating	1	2	3	4	5	6	[✓ 7]	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow	☐ Slightly higher flow
☐ Slightly lower flow	☐ Much higher flow
☒ About the same flow	☐ Does not matter

4. List specific positive attributes of this flow level: Nice, nearly full
channel cascades

5. List specific negative attributes of this flow level: similar to 1,000 cfs,
not so impressive at
this distance

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience? —

Jim Vogel

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: Trail **Flow:** 2,000

Weather:

☒ Sunny	☐ Light Rain
☐ Partly Cloudy	☐ Heavy Rain
☐ Cloudy	

1. Please identify any unique aesthetic features of this KOP viewing location:

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	5	6	[✓ 7]	
Amount of exposed rock at falls	1	2	3	4	5	[✓ 6]	7	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	4	5	6	[✓ 7]	
Contrast between pools and moving water	1	2	3	4	5	6	7	N/A
Amount of pools/still water in channel	1	2	3	4	5	6	7	N/A
Amount of turbulence (visibly moving water in channel)	1	2	3	4	5	6	[✓ 7]	
Amount of exposed rocks/ streambed downstream	1	2	3	4	5	[✓ 6]	7	
Sound level	1	2	3	4	5	6	[✓ 7]	
Overall Aesthetic Rating	1	2	3	4	5	6	[✓ 7]	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☐ Slightly lower flow
☒ About the same flow
☐ Slightly higher flow
☐ Much higher flow
☐ Does not matter

4. List specific positive attributes of this flow level: Powerful flow across entire part of falls in view and loud flow

5. List specific negative attributes of this flow level: —

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience? —

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: West **Flow:** 2,000

Weather:

☒ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location:

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	5	6	[✓ 7]	
Amount of exposed rock at falls	1	2	3	4	5	6	[✓ 7]	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	4	5	6	[✓ 7]	
Contrast between pools and moving water	1	2	3	4	5	6	7	NA
Amount of pools/still water in channel	1	2	3	4	5	6	7	NA
Amount of turbulence (visibly moving water in channel)	1	2	3	4	5	6	[✓ 7]	
Amount of exposed rocks/ streambed downstream	1	2	3	4	5	6	[✓ 7]	
Sound level	1	2	3	4	5	6	[✓ 7]	
Overall Aesthetic Rating	1	2	3	4	5	6	[✓ 7]	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☐ Slightly lower flow
☒ About the same flow
☐ Slightly higher flow
☐ Much higher flow
☐ Does not matter

4. List specific positive attributes of this flow level: Powerful flows framing island of rock in middle of falls Turbulent flows reach well into pool below falls, Loud!

5. List specific negative attributes of this flow level: —

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience? —

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: Boivin Park **Flow:** 2,000

Weather:

☒ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location:

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	5	[✓ 6]	7	
Amount of exposed rock at falls	1	2	3	4	5	6	[✓ 7]	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	4	5	6	[✓ 7]	
Contrast between pools and moving water	1	2	3	4	5	6	7	NA
Amount of pools/still water in channel	1	2	3	4	5	6	7	NA
Amount of turbulence (visibly moving water in channel)	1	2	3	4	5	6	[✓ 7]	
Amount of exposed rocks/ streambed downstream	1	2	3	4	5	[✓ 6]	7	
Sound level	1	2	3	[✓ 4]	5	6	7	
Overall Aesthetic Rating	1	2	3	4	5	[✓ 6]	7	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☐ Slightly lower flow
☐ About the same flow
☐ Slightly higher flow
☒ Much higher flow
☐ Does not matter

4. List specific positive attributes of this flow level: about same attributes as 1,500 — impressive, but at a distance

5. List specific negative attributes of this flow level: —

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience?

Jim Vogel

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

III. SUMMARY COMPARATIVE FLOW EVALUATION

1. Which flows did you participate in? (*Check all that apply.*)

☒ 500 cfs
☒ 1,000 cfs
☒ 1,500 cfs
☒ 2,000 cfs

2. Please provide an overall evaluation for the following flows at the Rumford Falls based on your experience during the controlled flow releases (*Circle one number for each item*).

Flow	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing
500 cfs	1	2	3	4	[✓ 5]	6	7
1,000 cfs	1	2	3	4	5	[✓ 6]	7
1,500 cfs	1	2	3	4	5	6	[✓ 7]
2,000 cfs	1	2	3	4	5	6	[✓ 7]

3. Please answer the following questions based on your experience during the controlled flow releases. You may specify flows not observed during the controlled flow releases.

What is the lowest flow that you consider acceptable for a quality aesthetic viewing experience? 1,000 **Flow in cfs**

What flow provides the highest quality (i.e., optimal flow) aesthetic viewing experience? 2000 **Flow in cfs**

4. Based on your evaluation of the controlled flow releases, please indicate the optimal flow for aesthetic viewing opportunities for the following KOP locations. Please consider all of the flow-dependent characteristics that contribute to the aesthetic experience (e.g., sound, rock exposure, flow in channel, volume of flow over falls). (*Please check one flow for each KOP location.*)

KOP Location	500 cfs	1,000 cfs	1,500 cfs	2,000 cfs	Other (please specify)	Don't Know
J. Eugene Boivin Park				X		
West Viewing Area				X		
Rumford Falls Trail			X	~~X~~		

5. Compared to other rivers with comparable scenic viewing locations, how would you rate the aesthetic viewing opportunity at the Rumford Falls (assume optimal flows). (*Circle one number for each.*)

Compared to river reaches of similar aesthetic quality	**Very Unappealing**	**Unappealing**	**Slightly Unappealing**	**Neutral**	**Slightly Appealing**	**Appealing**	**Very Appealing**
Other rivers within a one-hour drive	1	2	3	4	5	[✓ 6]	7
Other rivers in Maine	1	2	3	4	5	[✓ 6]	7
Other rivers in the Northeast	1	2	3	4	5	[✓ 6]	7

6. Please complete the following table indicating when you think flows should be released over the Rumford Falls for aesthetic viewing.

Month *(Please check all that apply.)*	**Start Date During Month**	**End Date During Month**	**Day of Week During Identified Period** *(Please check all that apply.)*		**Time of Day During Identified Period** *(Please check all that apply.)*	
☐ January			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☐ Friday ☐ Saturday ☐ Sunday	☐ Dawn ☐ Morning ☐ Midday ☐ Afternoon	☐ Evening ☐ Dusk ☐ Night
☐ February			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☐ Friday ☐ Saturday ☐ Sunday	☐ Dawn ☐ Morning ☐ Midday ☐ Afternoon	☐ Evening ☐ Dusk ☐ Night
☐ March			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☐ Friday ☐ Saturday ☐ Sunday	☐ Dawn ☐ Morning ☐ Midday ☐ Afternoon	☐ Evening ☐ Dusk ☐ Night
☒ April			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☐ Friday ☒ Saturday ☒ Sunday	☐ Dawn ☐ Morning ☐ Midday ☒ Afternoon	☐ Evening ☐ Dusk ☒ Night
☒ May			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☐ Friday ☒ Saturday ☒ Sunday	☐ Dawn ☐ Morning ☐ Midday ☒ Afternoon	☐ Evening ☐ Dusk ☒ Night
☒ June			☐ Monday ☐ Tuesday ☒ Wednesday ☐ Thursday	☐ Friday ☒ Saturday ☒ Sunday	☐ Dawn ☐ Morning ☐ Midday ☒ Afternoon	☐ Evening ☐ Dusk ☒ Night
☒ July			☐ Monday ☐ Tuesday ☒ Wednesday ☐ Thursday	☐ Friday ☒ Saturday ☒ Sunday	☐ Dawn ☐ Morning ☐ Midday ☒ Afternoon	☐ Evening ☐ Dusk ☒ Night
☒ August			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☐ Friday ☒ Saturday ☒ Sunday	☐ Dawn ☐ Morning ☐ Midday ☒ Afternoon	☐ Evening ☐ Dusk ☒ Night
☐ September			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☐ Friday ☐ Saturday ☐ Sunday	☐ Dawn ☐ Morning ☐ Midday ☐ Afternoon	☐ Evening ☐ Dusk ☐ Night
☐ October			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☐ Friday ☐ Saturday ☐ Sunday	☐ Dawn ☐ Morning ☐ Midday ☐ Afternoon	☐ Evening ☐ Dusk ☐ Night
☐ November			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☐ Friday ☐ Saturday ☐ Sunday	☐ Dawn ☐ Morning ☐ Midday ☐ Afternoon	☐ Evening ☐ Dusk ☐ Night
☐ December			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☐ Friday ☐ Saturday ☐ Sunday	☐ Dawn ☐ Morning ☐ Midday ☐ Afternoon	☐ Evening ☐ Dusk ☐ Night

7. Please provide any additional comments or relevant information regarding the scenic views and flows that you observed today.

Boivin Park provides best access for public, but distance mutes all roar/sound/ power of flows at observed levels

THANK YOU FOR YOUR PARTICIPATION!

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

Thank you for participating in the Aesthetic Flow Study controlled flow assessment for the Rumford Falls Hydroelectric Project. This controlled flow assessment will include evaluating four different established flows (i.e., 500 cfs, 1,000 cfs, 1,500 cfs, and 2,000 cfs) over the Rumford Falls at Key Observation Point (KOP) locations. KOP locations will include J. Eugene Boivin Park, the West Viewing Area, and Rumford Falls Trail. A map is provided with these forms and identifies the Rumford Falls as well as the KOP locations. These data will be used for analysis in the Aesthetic Flow Study and we request that forms are filled out clearly and completely. Please do not hesitate to ask questions at any time during your assessment.

I. GENERAL INFORMATION

Date: 1/18/22

Participant Name: Todd Papianou

Affiliation: Inland Woods + Trails / RSU#10

Home or Affiliation Zip Code: 04276

Participant Email: tpapianou@rsu10.org

GENERAL QUESTIONS

1. Prior to this Project, have you ever participated in an aesthetic flow assessment?

☒ Yes ☐ No

2. Have you ever visited any of the following KOP locations to view the Rumford Falls? (*Check all that apply.*)

☑ J. Eugene Boivin Park	Approximately, how many times per year? 12
N/A West Viewing Area	Approximately, how many times per year? N/A – currently closed
N/A Rumford Falls Trail	Approximately, how many times per year? N/A – currently closed

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: RFT **Flow:** 500

Weather:

☐ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location:

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	[✓ 5]	6	7	
Amount of exposed rock at falls	1	2	3	4	[✓ 5]	6	7	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	4	5	6	7	NA
Contrast between pools and moving water	1	2	3	[✓ 4]	5	6	7	
Amount of pools/still water in channel	1	2	3	4	5	[✓ 6]	7	
Amount of turbulence (visibly moving water in channel)	1	2	3	4	[✓ 5]	6	7	
Amount of exposed rocks/ streambed downstream	1	2	3	[✓ 4]	5	6	7	
Sound level	1	2	3	4	5	[✓ 6]	7	
Overall Aesthetic Rating	1	2	3	4	[✓ 5]	6	7	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☐ Slightly lower flow
☐ About the same flow
☐ Slightly higher flow
☒ Much higher flow
☐ Does not matter

4. List specific positive attributes of this flow level: Pool Hoping - Angling Catching Trapped Fish in Deep Pools Being dawn in The RiverBed is almost prehistoric

During June after the Spring Freshets have passed and the Pools are Deep and Full of Fish.

5. List specific negative attributes of this flow level: No Rainbow Mist effect.

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience? Improved walk ~~[illegible]~~ ways and Open access. Reduced Industrial Components Gas Tanks and other Non Natural Refuse.

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: west View **Flow:** 500

Weather:

☐ Sunny ☐ Light Rain
☐ Partly Cloudy ☐ Heavy Rain
☐ Cloudy

1. Please identify any unique aesthetic features of this KOP viewing location: Straight on View

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	5	6	[✓ 7]	
Amount of exposed rock at falls	1	2	3	4	5	[✓ 6]	7	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	4	5	6	7	NA
Contrast between pools and moving water	1	2	3	4	5	6	[✓ 7]	
Amount of pools/still water in channel	1	2	3	4	5	6	[✓ 7]	
Amount of turbulence (visibly moving water in channel)	1	2	3	4	[✓ 5]	6	7	
Amount of exposed rocks/ streambed downstream	1	2	3	4	5	[✓ 6]	7	
Sound level	1	2	3	4	5	[✓ 6]	7	
Overall Aesthetic Rating	1	2	3	4	5	[✓ 6]	7	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow ☐ Slightly higher flow
☐ Slightly lower flow ☒ Much higher flow
☐ About the same flow ☐ Does not matter

4. List specific positive attributes of this flow level: The catrast of the white water over last drop and Channel leading to Drop with the Dark water in River Ⓡ Eddy and the Stillness of that eddy Cumpared to the froth of fall

5. List specific negative attributes of this flow level: No Mist

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience? Rehab the old Rock Turretts

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: Boivin **Flow:** 500

Weather:

☐ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location: ____________

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	[✓ 3]	4	5	6	7	
Amount of exposed rock at falls	1	[✓ 2]	3	4	5	6	7	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	4	5	6	7	NA
Contrast between pools and moving water	1	2	3	[✓ 4]	5	6	7	
Amount of pools/still water in channel	1	2	3	[✓ 4]	5	6	7	
Amount of turbulence (visibly moving water in channel)	1	2	3	[✓ 4]	5	6	7	
Amount of exposed rocks/ streambed downstream	1	2	[✓ 3]	4	5	6	7	
Sound level	1	2	3	4	[✓ 5]	6	7	
Overall Aesthetic Rating	1	2	[✓ 3]	4	5	6	7	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☐ Slightly lower flow
☐ About the same flow
☐ Slightly higher flow
☐ Much higher flow
☐ Does not matter

4. List specific positive attributes of this flow level: ____________

5. List specific negative attributes of this flow level: Not impressive or ~~iAte~~ intimate

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience? ____________

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: RFT **Flow:** 1000

Weather:

☐ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location:

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	5	6	[✓ 7]	
Amount of exposed rock at falls	1	2	3	4	5	[✓ 6]	7	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	4	5	6	7	NA
Contrast between pools and moving water	1	2	3	4	[✓ 5]	6	7	
Amount of pools/still water in channel	1	2	3	4	[✓ 5]	6	7	
Amount of turbulence (visibly moving water in channel)	1	2	3	4	5	[✓ 6]	7	
Amount of exposed rocks/ streambed downstream	1	2	3	4	5	[✓ 6]	7	
Sound level	1	2	3	4	5	[✓ 6]	7	
Overall Aesthetic Rating	1	2	3	4	5	[✓ 6]	7	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☐ Slightly lower flow
☐ About the same flow
☐ Slightly higher flow
☒ Much higher flow
☐ Does not matter

4. List specific positive attributes of this flow level: The eye has more options to wander to. | the Sense of Flow has more to offer.

5. List specific negative attributes of this flow level: None

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience? Reduce the excess industrial materials

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: West View **Flow:** 1000

Weather:

☐ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location:

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	5	[✓ 6]	7	
Amount of exposed rock at falls	1	2	3	4	5	[✓ 6]	7	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	4	5	6	7	NA
Contrast between pools and moving water	1	2	[✓ 3]	4	5	6	7	
Amount of pools/still water in channel	1	2	[✓ 3]	4	5	6	7	
Amount of turbulence (visibly moving water in channel)	1	2	3	4	5	6	[✓ 7]	
Amount of exposed rocks/ streambed downstream	1	2	3	[✓ 4]	5	6	7	
Sound level	1	2	3	4	5	[✓ 6]	7	
Overall Aesthetic Rating	1	2	3	4	5	[✓ 6]	7	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☐ Slightly lower flow
☐ About the same flow
☐ Slightly higher flow
☒ Much higher flow
☐ Does not matter

4. List specific positive attributes of this flow level: the Flow and turbulence is starting to be impressive for its Power

5. List specific negative attributes of this flow level: electric wires.

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience? Re open and Rehab the Classic Stonework Viewing Benches + Turrets.

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: Boiven Park **Flow:** 1000

Weather:

☐ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location:

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	5	[✓ 6]	7	
Amount of exposed rock at falls	1	2	3	4	[✓ 5]	6	7	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	4	5	6	7	NA
Contrast between pools and moving water	1	2	3	[✓ 4]	5	6	7	
Amount of pools/still water in channel	1	2	3	[✓ 4]	5	[✓ 6]	7	
Amount of turbulence (visibly moving water in channel)	1	2	3	4	5	6	7	
Amount of exposed rocks/ streambed downstream	1	2	3	[✓ 4]	5	6	7	
Sound level	1	2	3	4	5	6	[✓ 7]	
Overall Aesthetic Rating	1	2	3	4	5	[✓ 6]	7	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☐ Slightly lower flow
☐ About the same flow
☐ Slightly higher flow
☒ Much higher flow
☐ Does not matter

4. List specific positive attributes of this flow level: Starting to Develop "Mist Plume"

5. List specific negative attributes of this flow level: No

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience?

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: RFT **Flow:** 1500

Weather:

☐ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location: Intimate Proximity

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	5	6	[✓ 7]	
Amount of exposed rock at falls	1	2	3	4	5	[✓ 6]	7	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	4	5	6	7	NA
Contrast between pools and moving water	1	2	3	4	5	6	[✓ 7]	
Amount of pools/still water in channel	1	2	3	4	[✓ 5]	6	7	
Amount of turbulence (visibly moving water in channel)	1	2	3	4	5	6	[✓ 7]	
Amount of exposed rocks/ streambed downstream	1	2	3	4	[✓ 5]	6	7	
Sound level	1	2	3	4	5	[✓ 6]	7	
Overall Aesthetic Rating	1	2	3	4	5	6	[✓ 7]	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☐ Slightly lower flow
☐ About the same flow
☐ Slightly higher flow
☒ Much higher flow
☐ Does not matter

4. List specific positive attributes of this flow level: The increased Channelizing Allows viewer to easily Detect the Angles and Slope of Different Ledge Segments.

Angle + Aspect.

5. List specific negative attributes of this flow level:

Says to Anglers Don't Go Down There

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience?

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: West View **Flow:** 1500

Weather:

☐ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location:

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	5	6	[✓ 7]	
Amount of exposed rock at falls	1	2	3	4	5	[✓ 6]	7	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	4	[✓ 5]	6	7	
Contrast between pools and moving water	1	2	3	4	[✓ 5]	6	7	
Amount of pools/still water in channel	1	2	3	[✓ 4]	5	6	7	
Amount of turbulence (visibly moving water in channel)	1	2	3	4	5	6	[✓ 7]	
Amount of exposed rocks/ streambed downstream	1	2	3	4	[✓ 5]	6	7	
Sound level	1	2	3	4	5	6	[✓ 7]	
Overall Aesthetic Rating	1	2	3	4	5	6	[✓ 7]	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☐ Slightly lower flow
☐ About the same flow
☐ Slightly higher flow
☒ Much higher flow
☐ Does not matter

4. List specific positive attributes of this flow level: Beginning to have the Feel of the Power And Elevation Drop of this Falls.

5. List specific negative attributes of this flow level: Nothing —

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience?

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: Boivin Park **Flow:** 1500

Weather:

☐ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location: ____________

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	5	[✓ 6]	7	
Amount of exposed rock at falls	1	2	3	4	5	[✓ 6]	7	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	4	5	6	7	NA
Contrast between pools and moving water	1	2	3	[✓ 4]	5	6	7	
Amount of pools/still water in channel	1	2	3	4	[✓ 5]	6	7	
Amount of turbulence (visibly moving water in channel)	1	2	3	4	[✓ 5]	6	7	
Amount of exposed rocks/ streambed downstream	1	2	3	[✓ 4]	5	6	7	
Sound level	1	2	3	4	5	6	[✓ 7]	
Overall Aesthetic Rating	1	2	3	4	5	[✓ 6]	7	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☐ Slightly lower flow
☐ About the same flow
☐ Slightly higher flow
☐ Much higher flow
☐ Does not matter

4. List specific positive attributes of this flow level: More Impressive

5. List specific negative attributes of this flow level: 0

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience? 0

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: RFT **Flow:** 2000

Weather:

☐ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location: ____________

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	5	6	[✓ 7]	
Amount of exposed rock at falls	1	2	3	4	5	6	[✓ 7]	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	4	5	6	7	NA
Contrast between pools and moving water	1	2	3	4	5	[✓ 6]	7	
Amount of pools/still water in channel	1	2	[✓ 3]	4	5	6	7	
Amount of turbulence (visibly moving water in channel)	1	2	3	4	5	6	[✓ 7]	
Amount of exposed rocks/ streambed downstream	1	2	3	4	5	[✓ 6]	7	
Sound level	1	2	3	4	5	6	[✓ 7]	
Overall Aesthetic Rating	1	2	3	4	5	6	[✓ 7]	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☐ Slightly lower flow
☐ About the same flow
☐ Slightly higher flow
☒ Much higher flow
☐ Does not matter

4. List specific positive attributes of this flow level: The Steepness of the middle drop Starts to get Impressive and the Volume Cascades in explosive CRashing Sensation.

5. List specific negative attributes of this flow level: The Flow now Reaches the old Rock Stone wall and cement Wall on River (L) that Draws your eye to the ManMade Structure whereas before

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience? Your eye was Content to Focus on the simple channels. The Blackwater Pool Fills Dry open Rock ~~Connect~~ Connecting your line of Sight upto the Man Made Feature.

(6) Improvments would be Re conditioning Stained Surface of cement.

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: West Veiw **Flow:** 2000

Weather:

☐ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location:

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	5	6	[✓ 7]	
Amount of exposed rock at falls	1	2	3	4	5	6	[✓ 7]	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	4	5	6	7	NA
Contrast between pools and moving water	1	2	3	4	5	6	[✓ 7]	
Amount of pools/still water in channel	1	2	3	[✓ 4]	5	6	7	
Amount of turbulence (visibly moving water in channel)	1	2	3	4	5	6	[✓ 7]	
Amount of exposed rocks/ streambed downstream	1	2	3	4	[✓ 5]	6	7	
Sound level	1	2	3	4	5	6	[✓ 7]	
Overall Aesthetic Rating	1	2	3	4	5	6	[✓ 7]	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☐ Slightly lower flow
☐ About the same flow
☐ Slightly higher flow
☐ Much higher flow
☐ Does not matter

4. List specific positive attributes of this flow level: River Ⓛ Eddy Below Last Drop is Now Fully established and Rotating with a Slow Subtle vortex.

5. List specific negative attributes of this flow level:

Ø

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience?

Ø

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: BorVih **Flow:** 2000

Weather:

☐ Sunny ☐ Light Rain
☐ Partly Cloudy ☐ Heavy Rain
☐ Cloudy

1. Please identify any unique aesthetic features of this KOP viewing location: ____________

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	5	6	[✓ 7]	
Amount of exposed rock at falls	1	2	3	4	5	6	[✓ 7]	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	4	5	6	[✓ 7]	
Contrast between pools and moving water	1	2	3	4	[✓ 5]	6	7	
Amount of pools/still water in channel	1	2	3	4	5	[✓ 6]	7	
Amount of turbulence (visibly moving water in channel)	1	2	3	4	5	[✓ 6]	7	
Amount of exposed rocks/ streambed downstream	1	2	3	4	[✓ 5]	6	7	
Sound level	1	2	3	4	5	6	[✓ 7]	
Overall Aesthetic Rating	1	2	3	4	5	6	[✓ 7]	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow ☐ Slightly higher flow
☐ Slightly lower flow ☒ Much higher flow
☐ About the same flow ☐ Does not matter

4. List specific positive attributes of this flow level: The Split Rock with two obvious Chanells River (R) Major River (L) Minor established

5. List specific negative attributes of this flow level: Ø

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience? Ø

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

III. SUMMARY COMPARATIVE FLOW EVALUATION

1. Which flows did you participate in? (*Check all that apply.*)

☑ 500 cfs
☑ 1,000 cfs
☑ 1,500 cfs
☑ 2,000 cfs

2. Please provide an overall evaluation for the following flows at the Rumford Falls based on your experience during the controlled flow releases (*Circle one number for each item*).

Flow	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing
500 cfs	1	2	3	4	5	6	[✓ 7]
1,000 cfs	1	2	3	4	5	[✓ 6]	7
1,500 cfs	1	2	3	4	5	[✓ 6]	7
2,000 cfs	1	2	3	4	5	6	[✓ 7]

3. Please answer the following questions based on your experience during the controlled flow releases. You may specify flows not observed during the controlled flow releases.

What is the lowest flow that you consider acceptable for a quality aesthetic viewing experience? 200 Flow in cfs

What flow provides the highest quality (i.e., optimal flow) aesthetic viewing experience? 22000 to 44,000 Flow in cfs

4. Based on your evaluation of the controlled flow releases, please indicate the optimal flow for aesthetic viewing opportunities for the following KOP locations. Please consider all of the flow-dependent characteristics that contribute to the aesthetic experience (e.g., sound, rock exposure, flow in channel, volume of flow over falls). (*Please check one flow for each KOP location.*)

KOP Location	500 cfs	1,000 cfs	1,500 cfs	2,000 cfs	Other (please specify)	Don't Know
J. Eugene Boivin Park				✓		
West Viewing Are		✓				
Rumford Falls Trail	✓				But Also Over 20,000	

→ Potential vs ~~Avaitable~~ Available

5. Compared to other rivers with comparable scenic viewing locations, how would you rate the aesthetic viewing opportunity at the Rumford Falls (assume optimal flows). (*Circle one number for each.*)

Compared to river reaches of similar aesthetic quality	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing
Other rivers within a one-hour drive	1	2	3	4	5	6	[✓ 7]
Other rivers in Maine	1	2	3	4	5	[✓ 6]	7
Other rivers in the Northeast	1	2	3	4	[✓ 5]	[✓ 6]	7

6. Please complete the following table indicating when you think flows should be released over the Rumford Falls for aesthetic viewing.

Month (*Please check all that apply.*)	Start Date During Month	End Date During Month	Day of Week During Identified Period (*Please check all that apply.*)		Time of Day During Identified Period (*Please check all that apply.*)	
☐ ~~January~~			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☐ Friday ☐ Saturday ☐ Sunday	☐ Dawn ☐ Morning ☐ Midday ☐ Afternoon	☐ Evening ☐ Dusk ☐ Night
☐ ~~February~~			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☐ Friday ☐ Saturday ☐ Sunday	☐ Dawn ☐ Morning ☐ Midday ☐ Afternoon	☐ Evening ☐ Dusk ☐ Night
☐ ~~March~~			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☐ Friday ☐ Saturday ☐ Sunday	☐ Dawn ☐ Morning ☐ Midday ☐ Afternoon	☐ Evening ☐ Dusk ☐ Night
☑ April			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☑ Friday ☑ Saturday ☑ Sunday	☑ Dawn ☑ Morning ☑ Midday ☑ Afternoon	☐ Evening ☐ Dusk ☐ Night
☑ May			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☑ Friday ☑ Saturday ☑ Sunday	☑ Dawn ☑ Morning ☑ Midday ☑ Afternoon	☐ Evening ☐ Dusk ☐ Night

Month (*Please check all that apply.*)	Start Date During Month	End Date During Month	Day of Week During Identified Period (*Please check all that apply.*)		Time of Day During Identified Period (*Please check all that apply.*)	
☐ [✓ June]			☑ Monday ☑ Tuesday ☑ Wednesday ☑ Thursday	☑ Friday ☑ Saturday ☑ Sunday	☐ Dawn ☐ Morning ☐ Midday ☐ Afternoon	☐ Evening ☑ Dusk ☐ Night
☐ [✓ July]			☑ Monday ☑ Tuesday ☑ Wednesday ☑ Thursday	☑ Friday ☑ Saturday ☑ Sunday	☐ Dawn ☐ Morning ☑ Midday ☐ Afternoon	☐ Evening ☑ Dusk ☑ Night
☐ [✓ August]			☑ Monday ☑ Tuesday ☑ Wednesday ☑ Thursday	☑ Friday ☑ Saturday ☑ Sunday	☐ Dawn ☐ Morning ☑ Midday ☐ Afternoon	☐ Evening ☑ Dusk ☐ Night
☐ September			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☐ Friday ☐ Saturday ☐ Sunday	☐ Dawn ☐ Morning ☐ Midday ☐ Afternoon	☐ Evening ☐ Dusk ☐ Night
☐ October			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☐ Friday ☐ Saturday ☐ Sunday	☐ Dawn ☐ Morning ☐ Midday ☐ Afternoon	☐ Evening ☐ Dusk ☐ Night
☐ November			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☐ Friday ☐ Saturday ☐ Sunday	☐ Dawn ☐ Morning ☐ Midday ☐ Afternoon	☐ Evening ☐ Dusk ☐ Night
☐ December			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☐ Friday ☐ Saturday ☐ Sunday	☐ Dawn ☐ Morning ☐ Midday ☐ Afternoon	☐ Evening ☐ Dusk ☐ Night

7. Please provide any additional comments or relevant information regarding the scenic views and flows that you observed today.

Question 5 → The particular Combination of Elevation Drop + Volume are two coinciding variables very unique to Rumford Falls - or also channalized compared to spread out or diffused like Great Falls in Auburn

THANK YOU FOR YOUR PARTICIPATION!

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

Thank you for participating in the Aesthetic Flow Study controlled flow assessment for the Rumford Falls Hydroelectric Project. This controlled flow assessment will include evaluating four different established flows (i.e., 500 cfs, 1,000 cfs, 1,500 cfs, and 2,000 cfs) over the Rumford Falls at Key Observation Point (KOP) locations. KOP locations will include J. Eugene Boivin Park, the West Viewing Area, and Rumford Falls Trail. A map is provided with these forms and identifies the Rumford Falls as well as the KOP locations. These data will be used for analysis in the Aesthetic Flow Study and we request that forms are filled out clearly and completely. Please do not hesitate to ask questions at any time during your assessment.

I. GENERAL INFORMATION

Date: 01/17/2022

Participant Name: John Prebb

Affiliation: Inland Woods & Trails

Home or Affiliation Zip Code: 04276

Participant Email: jnprebb69@gmail.com

GENERAL QUESTIONS

1. Prior to this Project, have you ever participated in an aesthetic flow assessment?

   ☐ Yes ☒ No

2. Have you ever visited any of the following KOP locations to view the Rumford Falls? (*Check all that apply.*)

   ☒ J. Eugene Boivin Park — Approximately, how many times per year? 20

   N/A West Viewing Area — Approximately, how many times per year? N/A – currently closed

   N/A Rumford Falls Trail — Approximately, how many times per year? N/A – currently closed

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low

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: Trail **Flow:** 500 CFS

Weather:

☒ Sunny ☐ Light Rain
☐ Partly Cloudy ☐ Heavy Rain
☐ Cloudy

1. Please identify any unique aesthetic features of this KOP viewing location:

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	[✓ 1]	2	3	4	5	6	7	
Amount of exposed rock at falls	1	[✓ 2]	3	4	5	6	7	
Downstream wetted channel width (area of the river channel filled with water)	1	[✓ 2]	3	4	5	6	7	
Contrast between pools and moving water	1	[✓ 2]	3	4	5	6	7	
Amount of pools/still water in channel	1	[✓ 2]	3	4	5	6	7	
Amount of turbulence (visibly moving water in channel)	1	[✓ 2]	3	4	5	6	7	
Amount of exposed rocks/ streambed downstream	[✓ 1]	2	3	4	5	6	7	
Sound level	1	2	3	4	5	6	7	
Overall Aesthetic Rating	[✓ 1]	2	3	4	5	6	7	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

- ☐ Much lower flow
- ☐ Slightly lower flow
- ☐ About the same flow
- ☐ Slightly higher flow
- ☒ Much higher flow
- ☐ Does not matter

4. List specific positive attributes of this flow level: None

5. List specific negative attributes of this flow level: too low

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience? Removal of a few sight line trees

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AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: West

Flow: 500

Weather:

- ☒ Sunny
- ☐ Partly Cloudy
- ☐ Cloudy
- ☐ Light Rain
- ☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location:

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	5	[✓ 6]	7	
Amount of exposed rock at falls	1	2	3	4	[✓ 5]	6	7	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	4	5	[✓ 6]	7	
Contrast between pools and moving water	1	2	3	4	[✓ 5]	6	7	
Amount of pools/still water in channel	1	2	3	4	[✓ 5]	6	7	
Amount of turbulence (visibly moving water in channel)	1	2	3	4	[✓ 5]	6	7	
Amount of exposed rocks/ streambed downstream	1	2	3	4	[✓ 5]	6	7	
Sound level	1	2	3	4	[✓ 5]	6	7	
Overall Aesthetic Rating	1	2	3	4	[✓ 5]	6	7	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☐ Slightly lower flow
☐ About the same flow
☐ Slightly higher flow
☒ Much higher flow
☐ Does not matter

4. List specific positive attributes of this flow level: Big improvement over low flow

5. List specific negative attributes of this flow level: not memorable

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience? Trim brush excess to view platform with parking and picnic facility

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AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: Bovin Park **Flow:** 500

Weather:

☒ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location:

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	[✓ 5]	6	7	
Amount of exposed rock at falls	1	2	[✓ 3]	4	5	6	7	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	[✓ 4]	5	6	7	
Contrast between pools and moving water	1	2	3	[✓ 4]	5	6	7	
Amount of pools/still water in channel	1	2	3	[✓ 4]	5	6	7	
Amount of turbulence (visibly moving water in channel)	1	2	3	[✓ 4]	5	6	7	
Amount of exposed rocks/ streambed downstream	1	2	[✓ 3]	4	5	6	7	
Sound level	1	2	[✓ 3]	4	5	6	7	
Overall Aesthetic Rating	1	2	[✓ 3]	4	5	6	7	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☐ Slightly lower flow
☐ About the same flow
☐ Slightly higher flow
☒ Much higher flow
☐ Does not matter

4. List specific positive attributes of this flow level: N/A

5. List specific negative attributes of this flow level: None of note

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience?

None

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: Trail **Flow:** 1000 CFS

Weather:

☒ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location:

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	[✓ 5]	6	7	
Amount of exposed rock at falls	1	2	3	4	[✓ 5]	6	7	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	4	[✓ 5]	6	7	
Contrast between pools and moving water	1	2	3	4	[✓ 5]	6	7	
Amount of pools/still water in channel	1	2	3	4	[✓ 5]	6	7	
Amount of turbulence (visibly moving water in channel)	1	2	3	4	[✓ 5]	6	7	
Amount of exposed rocks/ streambed downstream	1	2	3	4	[✓ 5]	6	7	
Sound level	1	2	3	4	[✓ 5]	6	7	
Overall Aesthetic Rating	1	2	3	4	[✓ 5]	6	7	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☐ Slightly lower flow
☐ About the same flow
☐ Slightly higher flow
☒ Much higher flow
☐ Does not matter

4. List specific positive attributes of this flow level:

5. List specific negative attributes of this flow level:

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience? Thin same growth trees

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AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: West **Flow:** 1,000

Weather:

☒ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location: Viewing platform

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	5	[✓ 6]	7	
Amount of exposed rock at falls	1	2	3	4	5	[✓ 6]	7	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	4	[✓ 5]	6	7	
Contrast between pools and moving water	1	2	3	4	[✓ 5]	6	7	
Amount of pools/still water in channel	1	2	3	4	[✓ 5]	6	7	
Amount of turbulence (visibly moving water in channel)	1	2	3	4	[✓ 5]	6	7	
Amount of exposed rocks/ streambed downstream	1	2	3	4	[✓ 5]	6	7	
Sound level	1	2	3	[✓ 4]	5	6	7	
Overall Aesthetic Rating	1	2	3	4	[✓ 5]	6	7	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☐ Slightly lower flow
☐ About the same flow
☒ Slightly higher flow
☐ Much higher flow
☐ Does not matter

4. List specific positive attributes of this flow level: Photographic

5. List specific negative attributes of this flow level: None of note

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience? Parking - Remove small growth trees

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AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: Bovin **Flow:** 1000

Weather:

☒ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location:

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	[✓ 5]	6	7	
Amount of exposed rock at falls	1	2	3	4	[✓ 5]	6	7	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	4	[✓ 5]	6	7	
Contrast between pools and moving water	1	2	3	4	[✓ 5]	6	7	
Amount of pools/still water in channel	1	2	3	4	[✓ 5]	6	7	
Amount of turbulence (visibly moving water in channel)	1	2	3	4	[✓ 5]	6	7	
Amount of exposed rocks/ streambed downstream	1	2	3	4	[✓ 5]	6	7	
Sound level	1	2	3	4	[✓ 5]	6	7	
Overall Aesthetic Rating	1	2	3	4	[✓ 5]	6	7	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☐ Slightly lower flow
☐ About the same flow
☐ Slightly higher flow
☒ Much higher flow
☐ Does not matter

4. List specific positive attributes of this flow level:

5. List specific negative attributes of this flow level: - modest improvement

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience? N/A

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: Trail **Flow:** 1,500

Weather:

☒ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location:

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	5	[✓ 6]	7	
Amount of exposed rock at falls	1	2	3	4	5	[✓ 6]	7	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	4	5	[✓ 6]	7	
Contrast between pools and moving water	1	2	3	4	5	[✓ 6]	7	
Amount of pools/still water in channel	1	2	3	4	5	[✓ 6]	7	
Amount of turbulence (visibly moving water in channel)	1	2	3	4	5	[✓ 6]	7	
Amount of exposed rocks/ streambed downstream	1	2	3	4	5	[✓ 6]	7	
Sound level	1	2	3	4	5	[✓ 6]	7	
Overall Aesthetic Rating	1	2	3	4	5	[✓ 6]	7	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☐ Slightly lower flow
☐ About the same flow
☒ Slightly higher flow
☐ Much higher flow
☐ Does not matter

4. List specific positive attributes of this flow level: Covers more ledge

5. List specific negative attributes of this flow level: N/A

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience? Same as other Flows

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AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: West **Flow:** 1,500

Weather:

☒ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location:

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	5	[✓ 6]	7	
Amount of exposed rock at falls	1	2	3	4	5	6	[✓ 7]	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	4	5	6	[✓ 7]	
Contrast between pools and moving water	1	2	3	4	5	[✓ 6]	7	
Amount of pools/still water in channel	1	2	3	4	5	[✓ 6]	7	
Amount of turbulence (visibly moving water in channel)	1	2	3	4	5	[✓ 6]	7	
Amount of exposed rocks/ streambed downstream	1	2	3	4	5	6	[✓ 7]	
Sound level	1	2	3	4	5	[✓ 6]	7	
Overall Aesthetic Rating	1	2	3	4	5	[✓ 6]	7	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☐ Slightly lower flow
☐ About the same flow
☒ Slightly higher flow
☐ Much higher flow
☐ Does not matter

4. List specific positive attributes of this flow level: Photographic

5. List specific negative attributes of this flow level: N/A

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience? Same as previous

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AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: Bovin Park **Flow:** 1,500

Weather:

☒ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location:

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	5	6	[✓ 7]	
Amount of exposed rock at falls	1	2	3	4	5	6	[✓ 7]	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	4	5	6	[✓ 7]	
Contrast between pools and moving water	1	2	3	4	5	6	[✓ 7]	
Amount of pools/still water in channel	1	2	3	4	5	6	[✓ 7]	
Amount of turbulence (visibly moving water in channel)	1	2	3	4	5	6	[✓ 7]	
Amount of exposed rocks/ streambed downstream	1	2	3	4	5	6	[✓ 7]	
Sound level	1	2	3	4	5	6	[✓ 7]	
Overall Aesthetic Rating	1	2	3	4	5	6	[✓ 7]	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow	☒ Slightly higher flow
☐ Slightly lower flow	☐ Much higher flow
☐ About the same flow	☐ Does not matter

4. List specific positive attributes of this flow level: Pleasing and photographic

5. List specific negative attributes of this flow level: None

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience? None

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AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: Trail **Flow:** 2,000

Weather:

☒ Sunny	☐ Light Rain
☐ Partly Cloudy	☐ Heavy Rain
☐ Cloudy	

1. Please identify any unique aesthetic features of this KOP viewing location:

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	5	6	[✓ 7]	
Amount of exposed rock at falls	1	2	3	4	5	6	[✓ 7]	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	4	5	6	[✓ 7]	
Contrast between pools and moving water	1	2	3	4	5	6	[✓ 7]	
Amount of pools/still water in channel	1	2	3	4	5	6	[✓ 7]	
Amount of turbulence (visibly moving water in channel)	1	2	3	4	5	6	[✓ 7]	
Amount of exposed rocks/ streambed downstream	1	2	3	4	5	6	[✓ 7]	
Sound level	1	2	3	4	5	6	[✓ 7]	
Overall Aesthetic Rating	1	2	3	4	5	6	[✓ 7]	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☐ Slightly lower flow
☒ About the same flow
☐ Slightly higher flow
☐ Much higher flow
☐ Does not matter

4. List specific positive attributes of this flow level: Nice -

5. List specific negative attributes of this flow level: None

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience? Same as previous

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AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: West

Flow: 2,000

Weather:

☒ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location: Viewing Platform

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	5	6	[✓ 7]	
Amount of exposed rock at falls	1	2	3	4	5	6	[✓ 7]	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	4	5	6	[✓ 7]	
Contrast between pools and moving water	1	2	3	4	5	6	[✓ 7]	
Amount of pools/still water in channel	1	2	3	4	5	6	[✓ 7]	
Amount of turbulence (visibly moving water in channel)	1	2	3	4	5	6	[✓ 7]	
Amount of exposed rocks/ streambed downstream	1	2	3	4	5	6	[✓ 7]	
Sound level	1	2	3	4	5	6	[✓ 7]	
Overall Aesthetic Rating	1	2	3	4	5	6	[✓ 7]	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☐ Slightly lower flow
☒ About the same flow
☐ Slightly higher flow
☐ Much higher flow
☐ Does not matter

4. List specific positive attributes of this flow level: More Flow dynamics & hydraulics

5. List specific negative attributes of this flow level: None

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience? None

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AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: Bovin **Flow:** 2,000

Weather:

☒ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location:

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	5	6	[✓ 7]	
Amount of exposed rock at falls	1	2	3	4	5	6	[✓ 7]	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	4	5	6	[✓ 7]	
Contrast between pools and moving water	1	2	3	4	5	6	[✓ 7]	
Amount of pools/still water in channel	1	2	3	4	5	6	[✓ 7]	
Amount of turbulence (visibly moving water in channel)	1	2	3	4	5	6	[✓ 7]	
Amount of exposed rocks/ streambed downstream	1	2	3	4	5	6	[✓ 7]	
Sound level	1	2	3	4	5	6	[✓ 7]	
Overall Aesthetic Rating	1	2	3	4	5	6	[✓ 7]	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☐ Slightly lower flow
☒ About the same flow
☐ Slightly higher flow
☐ Much higher flow
☐ Does not matter

4. List specific positive attributes of this flow level: just right

5. List specific negative attributes of this flow level: None

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience? None

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Pick 6

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

III. SUMMARY COMPARATIVE FLOW EVALUATION

1. Which flows did you participate in? (*Check all that apply.*)

☒ 500 cfs
☒ 1,000 cfs
☒ 1,500 cfs
☒ 2,000 cfs

2. Please provide an overall evaluation for the following flows at the Rumford Falls based on your experience during the controlled flow releases (*Circle one number for each item*).

Flow	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing
500 cfs	1	[✓ 2]	3	4	5	6	7
1,000 cfs	1	2	3	4	[✓ 5]	6	7
1,500 cfs	1	2	3	4	5	[✓ 6]	7
2,000 cfs	1	2	3	4	5	6	[✓ 7]

3. Please answer the following questions based on your experience during the controlled flow releases. You may specify flows not observed during the controlled flow releases.

What is the lowest flow that you consider acceptable for a quality aesthetic viewing experience? 1,500 **Flow in cfs**

What flow provides the highest quality (i.e., optimal flow) aesthetic viewing experience? 2,000 **Flow in cfs**

4. Based on your evaluation of the controlled flow releases, please indicate the optimal flow for aesthetic viewing opportunities for the following KOP locations. Please consider all of the flow-dependent characteristics that contribute to the aesthetic experience (e.g., sound, rock exposure, flow in channel, volume of flow over falls). (*Please check one flow for each KOP location.*)

KOP Location	500 cfs	1,000 cfs	1,500 cfs	2,000 cfs	Other (please specify)	Don't Know
J. Eugene Boivin Park				X		
West Viewing Are				X		
Rumford Falls Trail				X		

5. Compared to other rivers with comparable scenic viewing locations, how would you rate the aesthetic viewing opportunity at the Rumford Falls (assume optimal flows). (*Circle one number for each.*)

Compared to river reaches of similar aesthetic quality	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing
Other rivers within a one-hour drive	1	2	3	4	5	6	[✓ 7]
Other rivers in Maine	1	2	3	4	5	6	[✓ 7]
Other rivers in the Northeast	1	2	3	4	5	[✓ 6]	7

6. Please complete the following table indicating when you think flows should be released over the Rumford Falls for aesthetic viewing.

Month (*Please check all that apply.*)	Start Date During Month	End Date During Month	Day of Week During Identified Period (*Please check all that apply.*)		Time of Day During Identified Period (*Please check all that apply.*)	
☐ January			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☐ Friday ☐ Saturday ☐ Sunday	☐ Dawn ☐ Morning ☐ Midday ☐ Afternoon	☐ Evening ☐ Dusk ☐ Night
☐ February			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☐ Friday ☐ Saturday ☐ Sunday	☐ Dawn ☐ Morning ☐ Midday ☐ Afternoon	☐ Evening ☐ Dusk ☐ Night
☐ March			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☐ Friday ☐ Saturday ☐ Sunday	☐ Dawn ☐ Morning ☐ Midday ☐ Afternoon	☐ Evening ☐ Dusk ☐ Night
☐ April			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☐ Friday ☐ Saturday ☐ Sunday	☐ Dawn ☐ Morning ☐ Midday ☐ Afternoon	☐ Evening ☐ Dusk ☐ Night
☐ May			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☐ Friday ☐ Saturday ☐ Sunday	☐ Dawn ☐ Morning ☐ Midday ☐ Afternoon	☐ Evening ☐ Dusk ☐ Night
☐ June			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☐ Friday ☐ Saturday ☐ Sunday	☐ Dawn ☐ Morning ☐ Midday ☐ Afternoon	☐ Evening ☐ Dusk ☐ Night
☒ July			☒ Monday ☒ Tuesday ☒ Wednesday ☒ Thursday	☒ Friday ☒ Saturday ☒ Sunday	☐ Dawn ☒ Morning ☒ Midday ☒ Afternoon	☒ Evening ☐ Dusk ☐ Night
☒ August			☒ Monday ☒ Tuesday ☒ Wednesday ☒ Thursday	☒ Friday ☒ Saturday ☒ Sunday	☒ Dawn ☒ Morning ☒ Midday ☒ Afternoon	☒ Evening ☐ Dusk ☐ Night
☒ September			☒ Monday ☒ Tuesday ☒ Wednesday ☒ Thursday	☒ Friday ☒ Saturday ☒ Sunday	☐ Dawn ☒ Morning ☒ Midday ☒ Afternoon	☒ Evening ☐ Dusk ☐ Night
☒ October			☒ Monday ☒ Tuesday ☒ Wednesday ☒ Thursday	☒ Friday ☒ Saturday ☒ Sunday	☐ Dawn ☐ Morning ☒ Midday ☒ Afternoon	☐ Evening ☐ Dusk ☐ Night
☐ November			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☐ Friday ☐ Saturday ☐ Sunday	☐ Dawn ☐ Morning ☐ Midday ☐ Afternoon	☐ Evening ☐ Dusk ☐ Night
☐ December			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☐ Friday ☐ Saturday ☐ Sunday	☐ Dawn ☐ Morning ☐ Midday ☐ Afternoon	☐ Evening ☐ Dusk ☐ Night

7. Please provide any additional comments or relevant information regarding the scenic views and flows that you observed today.

Potential 1,500 CFS M - Thurs
2,000 Fri - Sun

THANK YOU FOR YOUR PARTICIPATION!

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

Thank you for participating in the Aesthetic Flow Study controlled flow assessment for the Rumford Falls Hydroelectric Project. This controlled flow assessment will include evaluating four different established flows (i.e., 500 cfs, 1,000 cfs, 1,500 cfs, and 2,000 cfs) over the Rumford Falls at Key Observation Point (KOP) locations. KOP locations will include J. Eugene Boivin Park, the West Viewing Area, and Rumford Falls Trail. A map is provided with these forms and identifies the Rumford Falls as well as the KOP locations. These data will be used for analysis in the Aesthetic Flow Study and we request that forms are filled out clearly and completely. Please do not hesitate to ask questions at any time during your assessment.

I. GENERAL INFORMATION

Date: 1/18/22

Participant Name: Karen Wilson

Affiliation: Inland Woods + Trails

Home or Affiliation Zip Code: 04276

Participant Email: Karensusanwilson@gmail.com

GENERAL QUESTIONS

1. Prior to this Project, have you ever participated in an aesthetic flow assessment?

☒ Yes ☐ No

2. Have you ever visited any of the following KOP locations to view the Rumford Falls? (*Check all that apply.*)

☒ J. Eugene Boivin Park — Approximately, how many times per year? 6
N/A West Viewing Area — Approximately, how many times per year? N/A – currently closed
N/A Rumford Falls Trail — Approximately, how many times per year? N/A – currently closed

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: Rumford Falls Trail **Flow:** 500

Weather:

☒ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location: Rock Ledge

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	[✓ 3]	4	5	6	7	
Amount of exposed rock at falls	1	[✓ 2]	3	4	5	6	7	
Downstream wetted channel width (area of the river channel filled with water)	1	[✓ 2]	3	4	5	6	7	
Contrast between pools and moving water	1	[✓ 2]	3	4	5	6	7	
Amount of pools/still water in channel	1	[✓ 2]	3	4	5	6	7	
Amount of turbulence (visibly moving water in channel)	1	[✓ 2]	3	4	5	6	7	
Amount of exposed rocks/ streambed downstream	1	[✓ 2]	3	4	5	6	7	
Sound level	1	2	3	[✓ 4]	5	6	7	
Overall Aesthetic Rating	1	2	[✓ 3]	4	5	6	7	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☐ Slightly lower flow
☐ About the same flow
☐ Slightly higher flow
☒ Much higher flow
☐ Does not matter

4. List specific positive attributes of this flow level: You can see water in the pools, but no real flow

5. List specific negative attributes of this flow level: There isn't enough moving water to really see it.

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience? More water, so it can actually be seen

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: West Viewing Area **Flow:** 500

Weather:

☒ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location: Reflection Pool and ledge falls

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	5	[✓ 6]	7	
Amount of exposed rock at falls	1	2	3	4	5	[✓ 6]	7	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	4	[✓ 5]	6	7	
Contrast between pools and moving water	1	2	3	4	5	[✓ 6]	7	
Amount of pools/still water in channel	1	2	3	4	[✓ 5]	6	7	
Amount of turbulence (visibly moving water in channel)	1	2	3	4	[✓ 5]	6	7	
Amount of exposed rocks/ streambed downstream	1	2	3	4	[✓ 5]	6	7	
Sound level	1	2	3	[✓ 4]	5	6	7	
Overall Aesthetic Rating	1	2	3	4	[✓ 5]	6	7	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☐ Slightly lower flow
☐ About the same flow
☒ Slightly higher flow
☐ Much higher flow
☐ Does not matter

4. List specific positive attributes of this flow level: It looks like a waterfall, and ~~expt~~ and is nice to look at

5. List specific negative attributes of this flow level: I The water does not take up much of the channel

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience? None, except more water.

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: Boivin Park **Flow:** 500

Weather:

☒ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location: reflection pool flow in distance

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	[✓ 5]	6	7	
Amount of exposed rock at falls	1	2	[✓ 3]	4	5	6	7	
Downstream wetted channel width (area of the river channel filled with water)	1	2	[✓ 3]	4	5	6	7	
Contrast between pools and moving water	1	2	[✓ 3]	4	5	6	7	
Amount of pools/still water in channel	1	2	[✓ 3]	4	5	6	7	
Amount of turbulence (visibly moving water in channel)	1	2	[✓ 3]	4	5	6	7	
Amount of exposed rocks/ streambed downstream	1	2	[✓ 3]	4	5	6	7	
Sound level	1	2	[✓ 3]	4	5	6	7	
Overall Aesthetic Rating	1	2	[✓ 3]	4	5	6	7	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☐ Slightly lower flow
☐ About the same flow
☐ Slightly higher flow
☒ Much higher flow
☐ Does not matter

4. List specific positive attributes of this flow level: There is water, but its so minimal its hard to see the falls.

5. List specific negative attributes of this flow level: Its so far away the flow is too low.

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience? More water!

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: Rumford Falls Trail **Flow:** 1000

Weather:

☒ Sunny ☐ Light Rain
☐ Partly Cloudy ☐ Heavy Rain
☐ Cloudy

1. Please identify any unique aesthetic features of this KOP viewing location: The reflection pool below is viewable

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	5	[✓ 6]	7	
Amount of exposed rock at falls	1	2	3	4	5	[✓ 6]	7	✓
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	4	5	[✓ 6]	7	
Contrast between pools and moving water	1	2	3	4	5	[✓ 6]	7	
Amount of pools/still water in channel	1	2	3	4	5	[✓ 6]	7	
Amount of turbulence (visibly moving water in channel)	1	2	3	4	5	[✓ 6]	7	
Amount of exposed rocks/ streambed downstream	1	2	3	4	5	[✓ 6]	7	
Sound level	1	2	3	4	5	[✓ 6]	7	
Overall Aesthetic Rating	1	2	3	4	5	[✓ 6]	7	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow ☒ Slightly higher flow
☐ Slightly lower flow ☐ Much higher flow
☐ About the same flow ☐ Does not matter

4. List specific positive attributes of this flow level: Water is visible in all areas. Pools are filled.

5. List specific negative attributes of this flow level: None

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience? Just a bit more water would fill the pools. Remove small trees

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: West Viewing Area **Flow:** 1000

Weather:

☒ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location: dam on the right

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	5	[✓ 6]	7	
Amount of exposed rock at falls	1	2	3	4	5	[✓ 6]	7	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	4	5	[✓ 6]	7	
Contrast between pools and moving water	1	2	3	4	5	[✓ 6]	7	
Amount of pools/still water in channel	1	2	3	4	5	[✓ 6]	7	
Amount of turbulence (visibly moving water in channel)	1	2	3	4	5	[✓ 6]	7	
Amount of exposed rocks/ streambed downstream	1	2	3	4	5	[✓ 6]	7	
Sound level	1	2	3	4	5	[✓ 6]	7	
Overall Aesthetic Rating	1	2	3	4	5	[✓ 6]	7	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☐ Slightly lower flow
☐ About the same flow
☒ Slightly higher flow
☐ Much higher flow
☐ Does not matter

4. List specific positive attributes of this flow level: The water fills the channel. Its easy to see. Water is coming down other channels

5. List specific negative attributes of this flow level: None

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience? None

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: Boivin Park **Flow:** 1000

Weather:

☒ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location: power station on right

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	[✓ 5]	6	7	
Amount of exposed rock at falls	1	2	3	4	[✓ 5]	6	7	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	4	[✓ 5]	6	7	
Contrast between pools and moving water	1	2	3	4	[✓ 5]	6	7	
Amount of pools/still water in channel	1	2	3	4	[✓ 5]	6	7	
Amount of turbulence (visibly moving water in channel)	1	2	3	4	[✓ 5]	6	7	
Amount of exposed rocks/ streambed downstream	1	2	3	4	[✓ 5]	6	7	
Sound level	1	2	3	[✓ 4]	5	6	7	
Overall Aesthetic Rating	1	2	3	4	[✓ 5]	6	7	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☐ Slightly lower flow
☐ About the same flow
☐ Slightly higher flow
☒ Much higher flow
☐ Does not matter

4. List specific positive attributes of this flow level: There is visible spray

5. List specific negative attributes of this flow level: The falls are hard to see still

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience? More water!

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: Rumford Falls Trail **Flow:** 1500

Weather:

☒ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location:

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	5	6	[✓ 7]	
Amount of exposed rock at falls	1	2	3	4	5	6	7	✓
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	4	5	6	[✓ 7]	
Contrast between pools and moving water	1	2	3	4	5	6	[✓ 7]	
Amount of pools/still water in channel	1	2	3	4	5	6	[✓ 7]	
Amount of turbulence (visibly moving water in channel)	1	2	3	4	5	6	[✓ 7]	
Amount of exposed rocks/ streambed downstream	1	2	3	4	5	6	[✓ 7]	
Sound level	1	2	3	[✓ 4]	5	6	7	
Overall Aesthetic Rating	1	2	3	4	5	6	[✓ 7]	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☐ Slightly lower flow
☐ About the same flow
☐ Slightly higher flow
☐ Much higher flow
☒ Does not matter

4. List specific positive attributes of this flow level:
The pools are filled and the visible area has plenty of water.

5. List specific negative attributes of this flow level:
None

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience?
Removal of lone tree river right.

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: West Viewing area **Flow:** 1500

Weather:

☒ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location: dam on the right

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	5	6	[✓ 7]	
Amount of exposed rock at falls	1	2	3	4	5	6	[✓ 7]	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	4	5	6	[✓ 7]	
Contrast between pools and moving water	1	2	3	4	5	6	[✓ 7]	
Amount of pools/still water in channel	1	2	3	4	5	6	[✓ 7]	
Amount of turbulence (visibly moving water in channel)	1	2	3	4	5	6	[✓ 7]	
Amount of exposed rocks/ streambed downstream	1	2	3	4	5	6	[✓ 7]	
Sound level	1	2	3	4	5	6	[✓ 7]	
Overall Aesthetic Rating	1	2	3	4	5	6	[✓ 7]	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☐ Slightly lower flow
☐ About the same flow
☐ Slightly higher flow
☐ Much higher flow
☒ Does not matter

4. List specific positive attributes of this flow level: Very appealing all around. It's peaceful and warrants stopping bc of the various river channels.

5. List specific negative attributes of this flow level: None

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience? None

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: Boivin **Flow:** 1500

Weather:

☒ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location: dam on right

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	5	6	[✓ 7]	
Amount of exposed rock at falls	1	2	3	4	5	6	[✓ 7]	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	4	5	6	[✓ 7]	
Contrast between pools and moving water	1	2	3	4	5	6	[✓ 7]	
Amount of pools/still water in channel	1	2	3	4	5	6	[✓ 7]	
Amount of turbulence (visibly moving water in channel)	1	2	3	4	5	6	[✓ 7]	
Amount of exposed rocks/ streambed downstream	1	2	3	4	5	6	[✓ 7]	
Sound level	1	2	3	[✓ 4]	5	6	7	
Overall Aesthetic Rating	1	2	3	4	5	6	[✓ 7]	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☐ Slightly lower flow
☐ About the same flow
☐ Slightly higher flow
☐ Much higher flow
☒ Does not matter

4. List specific positive attributes of this flow level:
The full width of the falls has water

5. List specific negative attributes of this flow level:
None

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience?
None

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: Rumford Falls Trail **Flow:** 2000

Weather:

☒ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location: dam on river left

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	5	6	[✓ 7]	
Amount of exposed rock at falls	1	2	3	4	5	6	[✓ 7]	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	4	5	6	7	✓
Contrast between pools and moving water	1	2	3	4	5	6	[✓ 7]	
Amount of pools/still water in channel	1	2	3	4	5	6	[✓ 7]	
Amount of turbulence (visibly moving water in channel)	1	2	3	4	5	6	[✓ 7]	
Amount of exposed rocks/ streambed downstream	1	2	3	4	5	6	[✓ 7]	
Sound level	1	2	3	[✓ 4]	5	6	7	
Overall Aesthetic Rating	1	2	3	4	5	6	[✓ 7]	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☐ Slightly lower flow
☐ About the same flow
☐ Slightly higher flow
☐ Much higher flow
☑ Does not matter

4. List specific positive attributes of this flow level: The river width is full

5. List specific negative attributes of this flow level: None

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience? Removal of small trees on river bed

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: West viewing Area **Flow:** 2000

Weather:

☒ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location: ______

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	5	6	[✓ 7]	
Amount of exposed rock at falls	1	2	3	4	5	6	[✓ 7]	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	4	5	6	[✓ 7]	
Contrast between pools and moving water	1	2	3	4	5	6	[✓ 7]	
Amount of pools/still water in channel	1	2	3	4	5	6	[✓ 7]	
Amount of turbulence (visibly moving water in channel)	1	2	3	4	5	6	[✓ 7]	
Amount of exposed rocks/ streambed downstream	1	2	3	4	5	6	[✓ 7]	
Sound level	1	2	3	[✓ 4]	5	6	7	
Overall Aesthetic Rating	1	2	3	4	5	6	[✓ 7]	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☐ Slightly lower flow
☐ About the same flow
☐ Slightly higher flow
☐ Much higher flow
☒ Does not matter

4. List specific positive attributes of this flow level:

The various channels of water are nice,

5. List specific negative attributes of this flow level:

None

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience?

None

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

II. AESTHETIC CHARACTERISTICS

KOP Location: Boivin **Flow:** 2000

Weather:

☒ Sunny
☐ Partly Cloudy
☐ Cloudy
☐ Light Rain
☐ Heavy Rain

1. Please identify any unique aesthetic features of this KOP viewing location:

2. Please evaluate each of the following attributes under this flow (*Circle one number for each item*).

Attribute	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing	N/A
Water fall size/volume (amount of water going over the falls)	1	2	3	4	5	6	[✓ 7]	
Amount of exposed rock at falls	1	2	3	4	5	6	[✓ 7]	
Downstream wetted channel width (area of the river channel filled with water)	1	2	3	4	5	6	[✓ 7]	
Contrast between pools and moving water	1	2	3	4	5	6	[✓ 7]	
Amount of pools/still water in channel	1	2	3	4	5	6	[✓ 7]	
Amount of turbulence (visibly moving water in channel)	1	2	3	4	5	6	[✓ 7]	
Amount of exposed rocks/ streambed downstream	1	2	3	4	5	6	[✓ 7]	
Sound level	1	2	3	4	5	6	[✓ 7]	
Overall Aesthetic Rating	1	2	3	4	5	6	[✓ 7]	

3. In general, would you prefer a flow that was higher, lower, or about the same as this one (*Check one*):

☐ Much lower flow
☐ Slightly lower flow
☐ About the same flow
☐ Slightly higher flow
☐ Much higher flow
☒ Does not matter

4. List specific positive attributes of this flow level:

The river is full, which is very appealling to look at.

5. List specific negative attributes of this flow level:

None

6. Are there any enhancements that could be implemented at this viewpoint to improve the aesthetic viewing experience?

None

AESTHETIC FLOW ASSESSMENT FORM
RUMFORD FALLS HYDROELECTRIC PROJECT (FERC NO. 2333)

III. SUMMARY COMPARATIVE FLOW EVALUATION

1. Which flows did you participate in? (*Check all that apply.*)

☒ 500 cfs
☒ 1,000 cfs
☒ 1,500 cfs
☒ 2,000 cfs

2. Please provide an overall evaluation for the following flows at the Rumford Falls based on your experience during the controlled flow releases (*Circle one number for each item*).

Flow	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing
500 cfs	1	2	[✓ 3]	4	5	6	7
1,000 cfs	1	2	3	4	[✓ 5]	6	7
1,500 cfs	1	2	3	4	5	[✓ 6]	7
2,000 cfs	1	2	3	4	5	6	[✓ 7]

3. Please answer the following questions based on your experience during the controlled flow releases. You may specify flows not observed during the controlled flow releases.

What is the lowest flow that you consider acceptable for a quality aesthetic viewing experience? 1000 **Flow in cfs**

What flow provides the highest quality (i.e., optimal flow) aesthetic viewing experience? 2000 **Flow in cfs**

4. Based on your evaluation of the controlled flow releases, please indicate the optimal flow for aesthetic viewing opportunities for the following KOP locations. Please consider all of the flow-dependent characteristics that contribute to the aesthetic experience (e.g., sound, rock exposure, flow in channel, volume of flow over falls). (*Please check one flow for each KOP location.*)

KOP Location	500 cfs	1,000 cfs	1,500 cfs	2,000 cfs	Other (please specify)	Don't Know
J. Eugene Boivin Park				✓		
West Viewing Are			✓			
Rumford Falls Trail				✓		

5. Compared to other rivers with comparable scenic viewing locations, how would you rate the aesthetic viewing opportunity at the Rumford Falls (assume optimal flows). (*Circle one number for each.*)

Compared to river reaches of similar aesthetic quality	Very Unappealing	Unappealing	Slightly Unappealing	Neutral	Slightly Appealing	Appealing	Very Appealing
Other rivers within a one-hour drive	1	2	3	4	5	6	[✓ 7]
Other rivers in Maine	1	2	3	4	5	6	[✓ 7]
Other rivers in the Northeast	1	2	3	4	5	6	[✓ 7]

6. Please complete the following table indicating when you think flows should be released over the Rumford Falls for aesthetic viewing.

Month (*Please check all that apply.*)	Start Date During Month	End Date During Month	Day of Week During Identified Period (*Please check all that apply.*)		Time of Day During Identified Period (*Please check all that apply.*)	
☒ January	1/1	1/30	☒ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☒ Friday ☒ Saturday ☒ Sunday	☐ Dawn ☒ Morning ☒ Midday ☒ Afternoon	☐ Evening ☐ Dusk ☐ Night
☒ February	2/1	2/28	☒ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☒ Friday ☒ Saturday ☒ Sunday	☐ Dawn ☒ Morning ☒ Midday ☒ Afternoon	☐ Evening ☐ Dusk ☐ Night
☐ March	3/1	3/31	☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☐ Friday ☐ Saturday ☐ Sunday	☐ Dawn ☐ Morning ☐ Midday ☐ Afternoon	☐ Evening ☐ Dusk ☐ Night
☐ April	4/1	4/30	☒ Monday ☒ Tuesday ☒ Wednesday ☒ Thursday	☒ Friday ☒ Saturday ☒ Sunday	☐ Dawn ☒ Morning ☒ Midday ☒ Afternoon	☒ Evening ☒ Dusk ☐ Night
☐ May	5/1	5/31	☒ Monday ☒ Tuesday ☒ Wednesday ☒ Thursday	☒ Friday ☒ Saturday ☒ Sunday	☒ Dawn ☒ Morning ☒ Midday ☒ Afternoon	☒ Evening ☒ Dusk ☒ Night

Month (Please check all that apply.)	Start Date During Month	End Date During Month	Day of Week During Identified Period (Please check all that apply.)		Time of Day During Identified Period (Please check all that apply.)	
☒ June	6/1	6/30	☒ Monday ☒ Tuesday ☒ Wednesday ☒ Thursday	☒ Friday ☒ Saturday ☒ Sunday	☒ Dawn ☒ Morning ☒ Midday ☒ Afternoon	☒ Evening ☒ Dusk ☒ Night
☒ July	7/1	7/31	☒ Monday ☒ Tuesday ☒ Wednesday ☒ Thursday	☒ Friday ☒ Saturday ☒ Sunday	☒ Dawn ☒ Morning ☒ Midday ☒ Afternoon	☒ Evening ☒ Dusk ☒ Night
☒ August	8/1	8/31	☒ Monday ☒ Tuesday ☒ Wednesday ☒ Thursday	☒ Friday ☒ Saturday ☒ Sunday	☒ Dawn ☒ Morning ☒ Midday ☑ Afternoon	☒ Evening ☒ Dusk ☒ Night
☒ September	9/1	9/30	☒ Monday ☒ Tuesday ☒ Wednesday ☒ Thursday	☒ Friday ☒ Saturday ☒ Sunday	☐ Dawn ☒ Morning ☒ Midday ☒ Afternoon	☒ Evening ☒ Dusk ☐ Night
☒ October	10/1	10/31	☒ Monday ☒ Tuesday ☒ Wednesday ☒ Thursday	☒ Friday ☒ Saturday ☒ Sunday	☐ Dawn ☒ Morning ☒ Midday ☒ Afternoon	☒ Evening ☐ Dusk ☐ Night
☐ November			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☐ Friday ☐ Saturday ☐ Sunday	☐ Dawn ☐ Morning ☐ Midday ☐ Afternoon	☐ Evening ☐ Dusk ☐ Night
☐ December			☐ Monday ☐ Tuesday ☐ Wednesday ☐ Thursday	☐ Friday ☐ Saturday ☐ Sunday	☐ Dawn ☐ Morning ☐ Midday ☐ Afternoon	☐ Evening ☐ Dusk ☐ Night

7. Please provide any additional comments or relevant information regarding the scenic views and flows that you observed today.

It was difficult to choose times. I decided based on water availability or tourist potential. Any night flows should be showcased by the lights from the hydro station

THANK YOU FOR YOUR PARTICIPATION!

ATTACHMENT 6

AESTHETIC FLOW STUDY

FOCUS GROUP MEETING PRESENTATION

Brookfield
Renewable

Rumford Falls Hydroelectric Project (FERC No. 2333)

Aesthetic Flow Study – Controlled Flow Assessment Meeting

LUKE ANDERSON
MANAGER, LICENSING

FEBRUARY 17, 2022

Meeting Agenda

- Introductions
- Purpose of Meeting
- Project Overview
- Aesthetic Flow Study
  - Study Overview
  - Methodology
  - Preliminary Results
- Next Steps

Introductions

Focus Group Participants

- Inland Woods + Trails
  - John Preble (Resident Rumford)
  - Karen Wilson (Resident Rumford)
  - Todd Papianou (Resident Rumford)
- Maine Bureau of Parks and Lands
  - Jim Vogel, Senior Planner
- Maine Department of Inland Fisheries & Wildlife
  - Jim Pellerin, Regional Fisheries Biologist
- Town of Rumford
  - Stacey Carter, Town Manager
  - George O’Keefe, Economic Development Director

Licensee

- Luke Anderson, Manager, Licensing
  - Project Manager

HDR

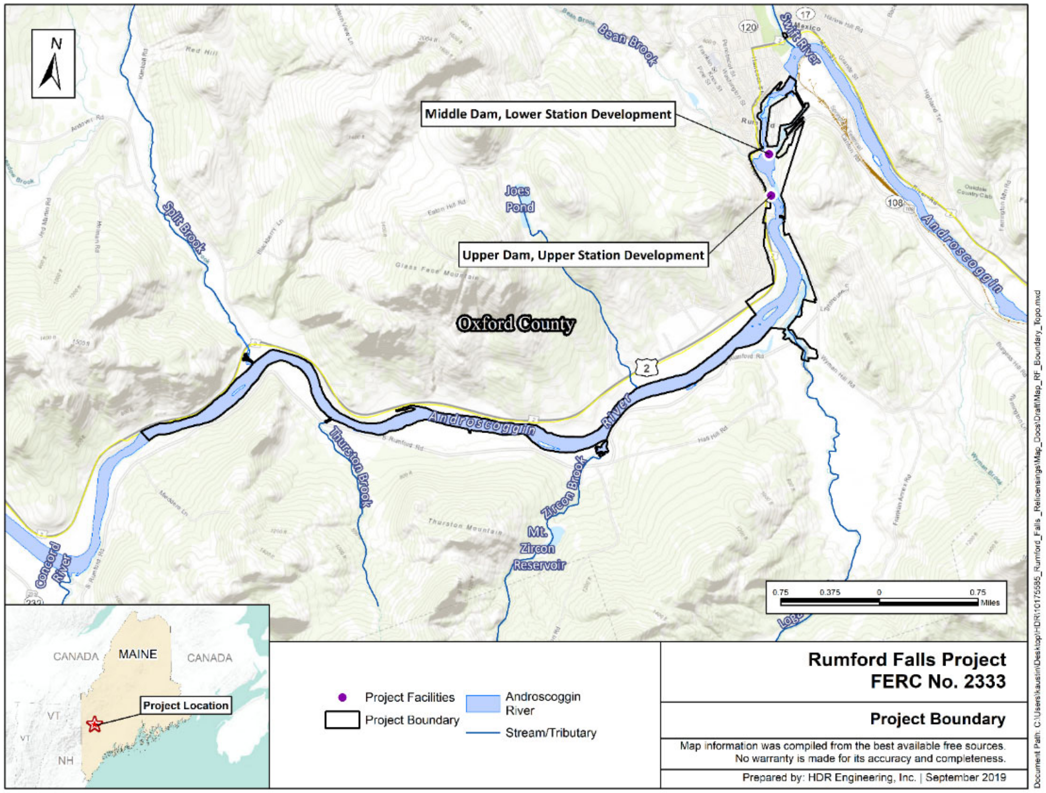
- Jim Gibson
  - Meeting Facilitator
- Dawn Cousens
  - Assistant Project Manager

Purpose of Meeting

- Review the preliminary results of the controlled flow assessment conducted for the Aesthetic Flow Study at Rumford Falls.

Project Overview

- Town of Rumford, Oxford County, ME
- River mile 80 on Androscoggin River
- Two discrete developments:
  - Upper Station
    - 29.3 MW
  - Lower Station
    - 15.2 MW



Project Overview

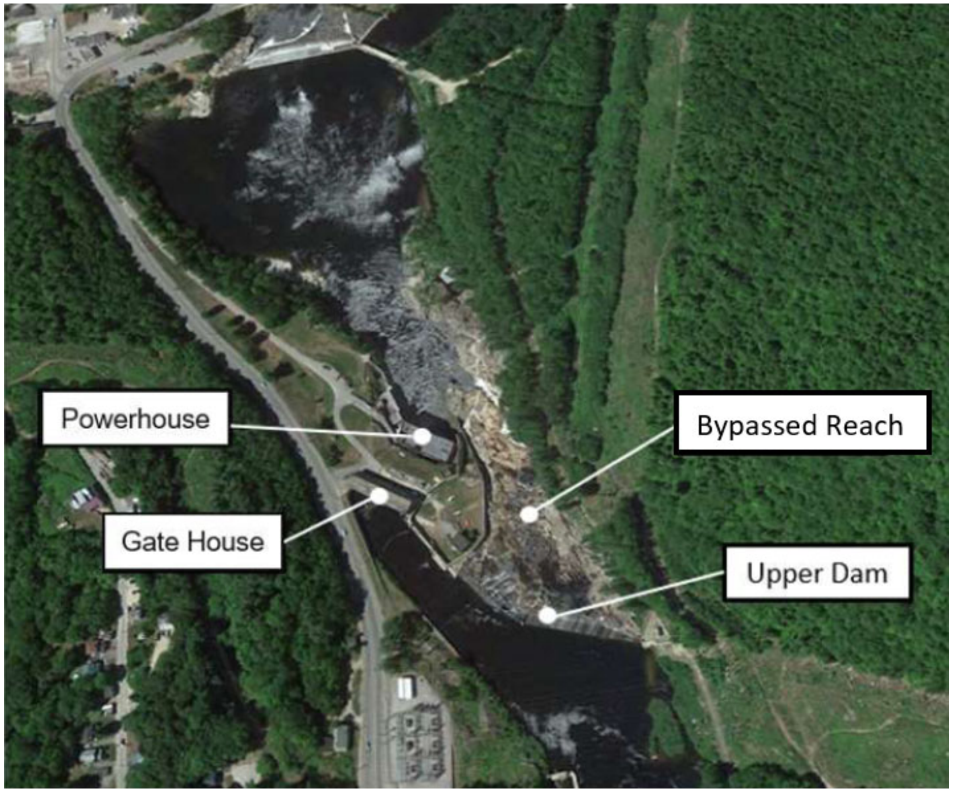
Upper Development

- Impoundment
  - 419 acres
  - No usable storage capacity
  - Normal upper surface elevation of 601.24 ft

- 464-foot-long Upper Dam
  - 271-foot-long Obermeyer
  - 193-foot-long flashboard section

- Powerhouse
  - 4 turbines
  - Combined maximum hydraulic capacity of 4,550 cfs

- Bypassed Reach (i.e., Rumford Falls)
  - 650 feet long



Project Overview

Flows on the Androscoggin River are regulated by upstream non-project and non-Rumford Falls Hydro storage reservoirs established by the Androscoggin River Company Headwater Benefits Agreement (ARCO HBA, 1909 / 1983).

FERC-Issued License Articles:

- Article 401
  - Licensee required to operate the Project in a run-of-river mode for the protection of water quality and aquatic resources
  - Licensee required to maintain the Upper and Middle Dam impoundments within 1 foot of full pond elevation (601.24 feet at the upper impoundment and 502.74 feet at the middle impoundment)
  - Licensee shall at all times act to minimize the fluctuations of the reservoir surface elevations (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 inflows to the Project reservoirs)
- Article 402
  - Licensee required to release a minimum flow of 1 cfs from the Upper Dam and 21 cfs from the Middle Dam into the bypassed reaches for the protection of aquatic resources and water quality

Comments and Questions

Aesthetic Flow Study

Overview

- Background
  - Study requested by FERC and supported by MDIFW and other stakeholders
  - Per FERC request, the study plan was developed using:
    - *Flows and Aesthetics: A Guide to Concepts and Methods* (Whittaker and Shelby 2017)
  - Aesthetic Flow Study Plan in the Revised Study Plan was approved in the FERC Study Plan Determination issued on August 6, 2020

Aesthetic Flow Study

Methodology

- **Phase 1 – Desktop Analysis**
  - Assessed and summarized the timing and ranges of historic flows to determine existing flow conditions
    - Existing FERC license
    - Natural river hydrology

- **Phase 2 – Identified KOPs, Key Viewing Characteristics, Target Flows and Evaluation Form**
  - Assembled focus group (April 2021)
    - 12 stakeholders invited
  - Focus group meetings:
    - May 25, 2021 – Conference Call
      - Reviewed the FERC-approved Aesthetic Flow Study Plan
      - Received input on:
        - Proposed KOPs (i.e., Veteran's Park, J. Eugene Boivin Park, West Viewing Area, Rumford Falls Trail)
        - Proposed flows (i.e., 500 cfs, 1,000 cfs, 1,500 cfs, and 2,000 cfs)
        - Evaluation form
    - June 10, 2021 – On-site visit
      - Visited KOPs and identified viewing locations with each KOP
        - Veteran's Park removed as KOP due to insufficient views

- **Phase 3 – Conducted the Controlled Flow Assessment**
  - December 14, 2021
    - Focus group participants reviewed each of the targeted flows at each KOP and completed the evaluation forms
      - Desktop assessment scheduled for individuals in the focus group that were unable to attend the flow assessment and expressed interest in conducting the assessment via video
    - Flows were documented with photos and video (with sound)
  - **Off-site discussion with focus group to review the preliminary results of the flow assessment**

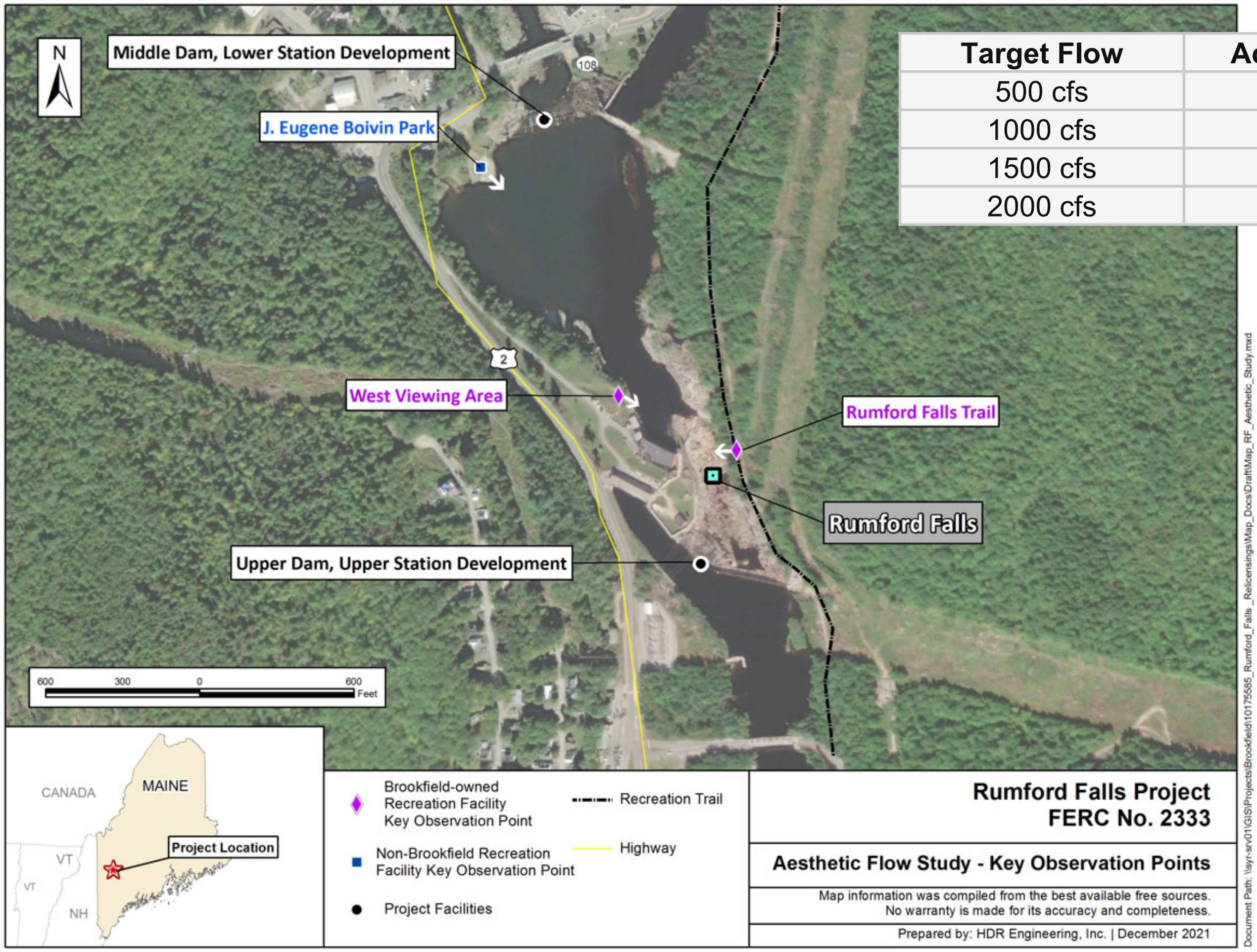
Brookfield
Renewable

Comments and Questions

Aesthetic Flow Study

Preliminary Results

- December 14, 2021 – Controlled Flow Assessment



Target Flow	Actual Flow
500 cfs	488 cfs
1000 cfs	895 cfs
1500 cfs	1423 cfs
2000 cfs	2150 cfs

Aesthetic Flow Study

Preliminary Results

- Unique aesthetic features of KOPs identified by participants:
  - Rumford Falls Trail
    - View of Black Mountain and “Reflection Pool”
    - Rockledge
    - Elevated views
    - Intimate proximity
    - Upper portion of falls at the dam/flashboards
  - West Viewing Area
    - View of channel and Reflection Pool
    - Ledge falls
    - Direct view and proximity to base of falls
    - Viewing platform
    - Upper Dam
  - J. Eugene Boivin Park
    - View of Reflection Pool
    - Power Station

Aesthetic Flow Study

Preliminary Results – Rumford Falls Trail


Rumford Falls Trail: 500 cfs


Rumford Falls Trail: 1,000 cfs


Rumford Falls Trail: 1,500 cfs


Rumford Falls Trail: 2,000 cfs

Aesthetic Flow Study

Brookfield
Renewable

Preliminary Results – West Viewing Area


West Viewing Area: 500 cfs


West Viewing Area: 1,000 cfs


West Viewing Area: 1,500 cfs


West Viewing Area: 2,000 cfs

Aesthetic Flow Study

Preliminary Results – J. Eugene Boivin Park


J. Eugene Boivin Park: 500 cfs

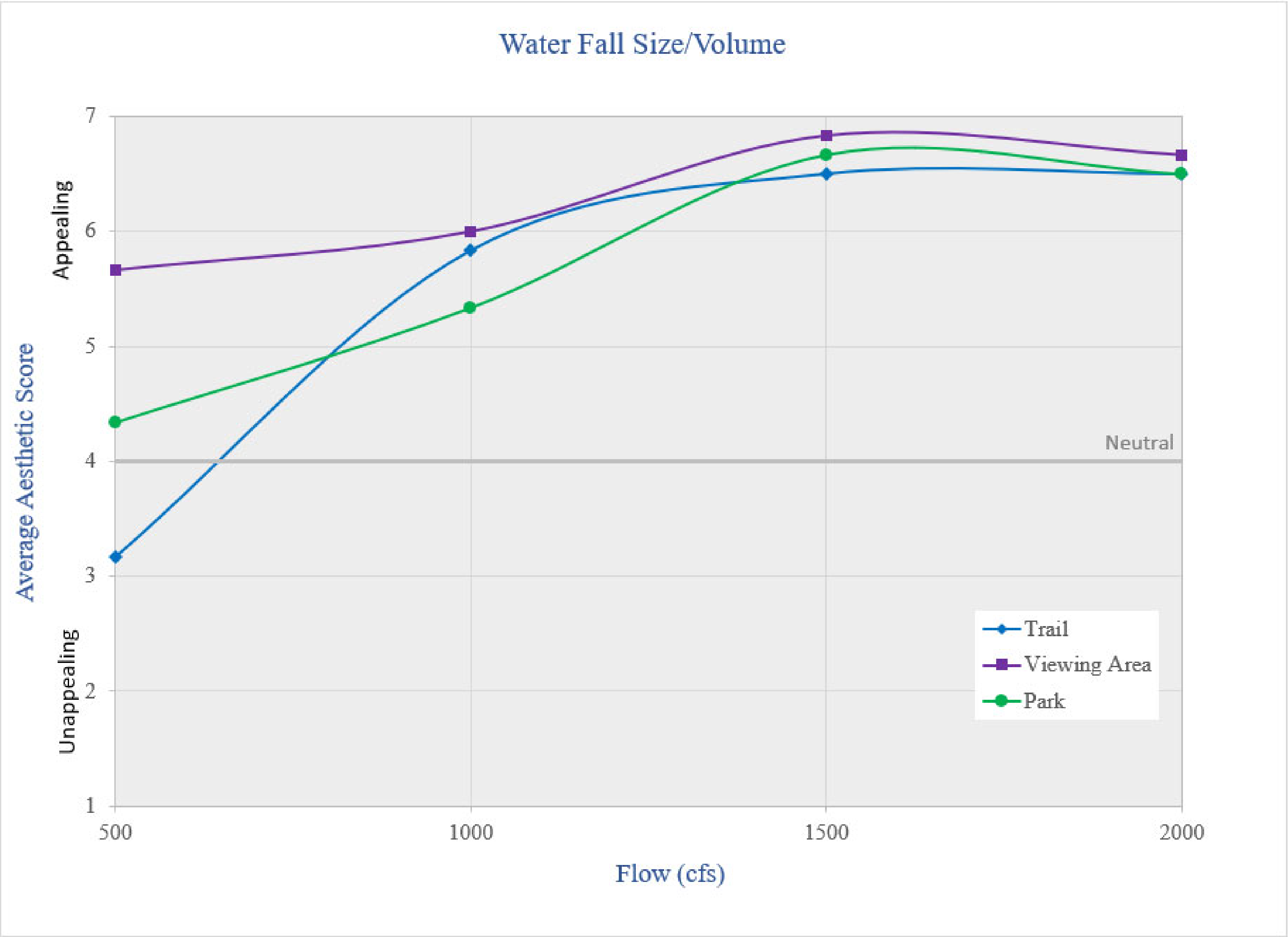

J. Eugene Boivin Park: 1,000 cfs


J. Eugene Boivin Park: 1,500 cfs


J. Eugene Boivin Park: 2,000 cfs

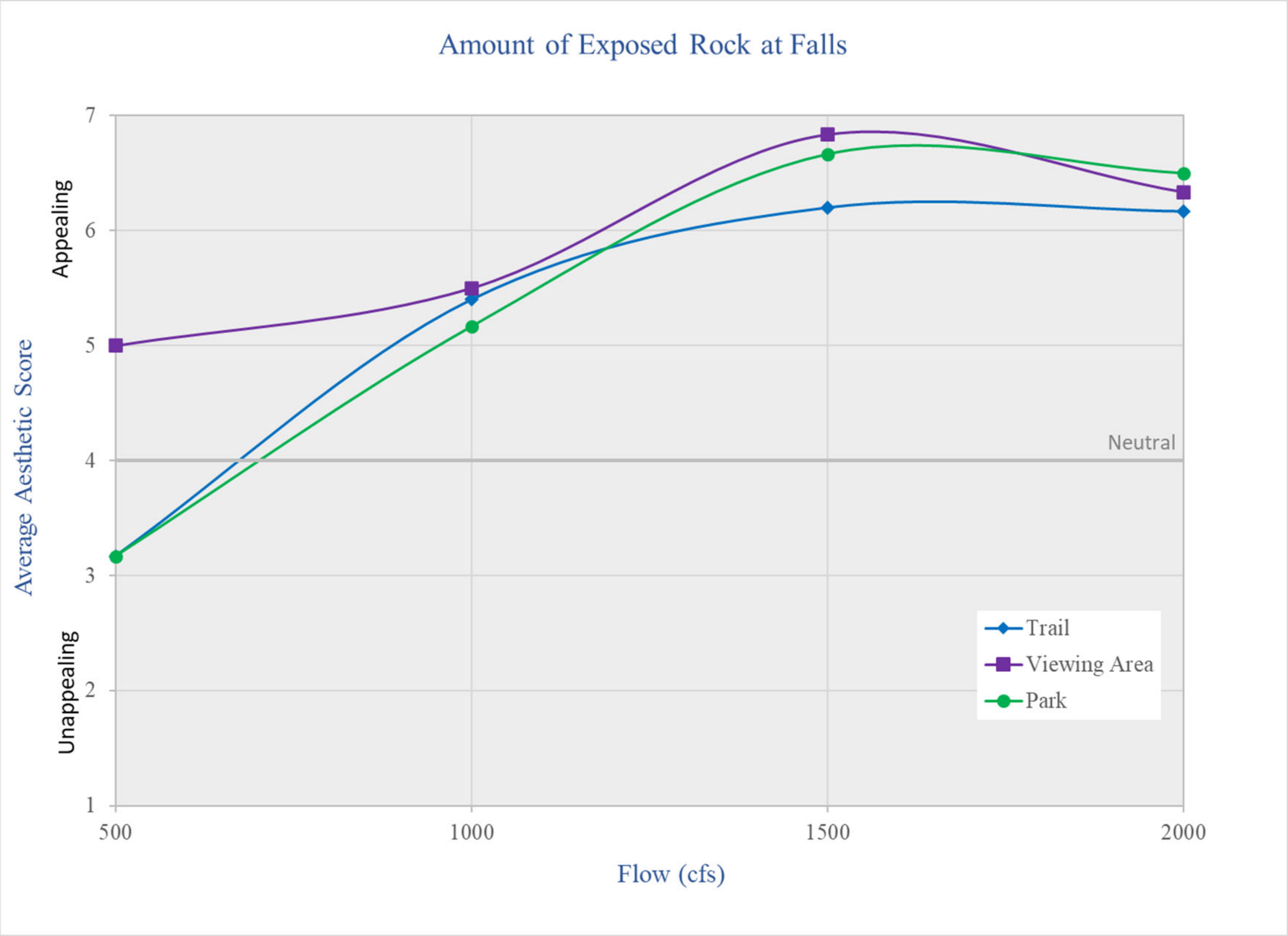
Aesthetic Flow Study

Preliminary Results



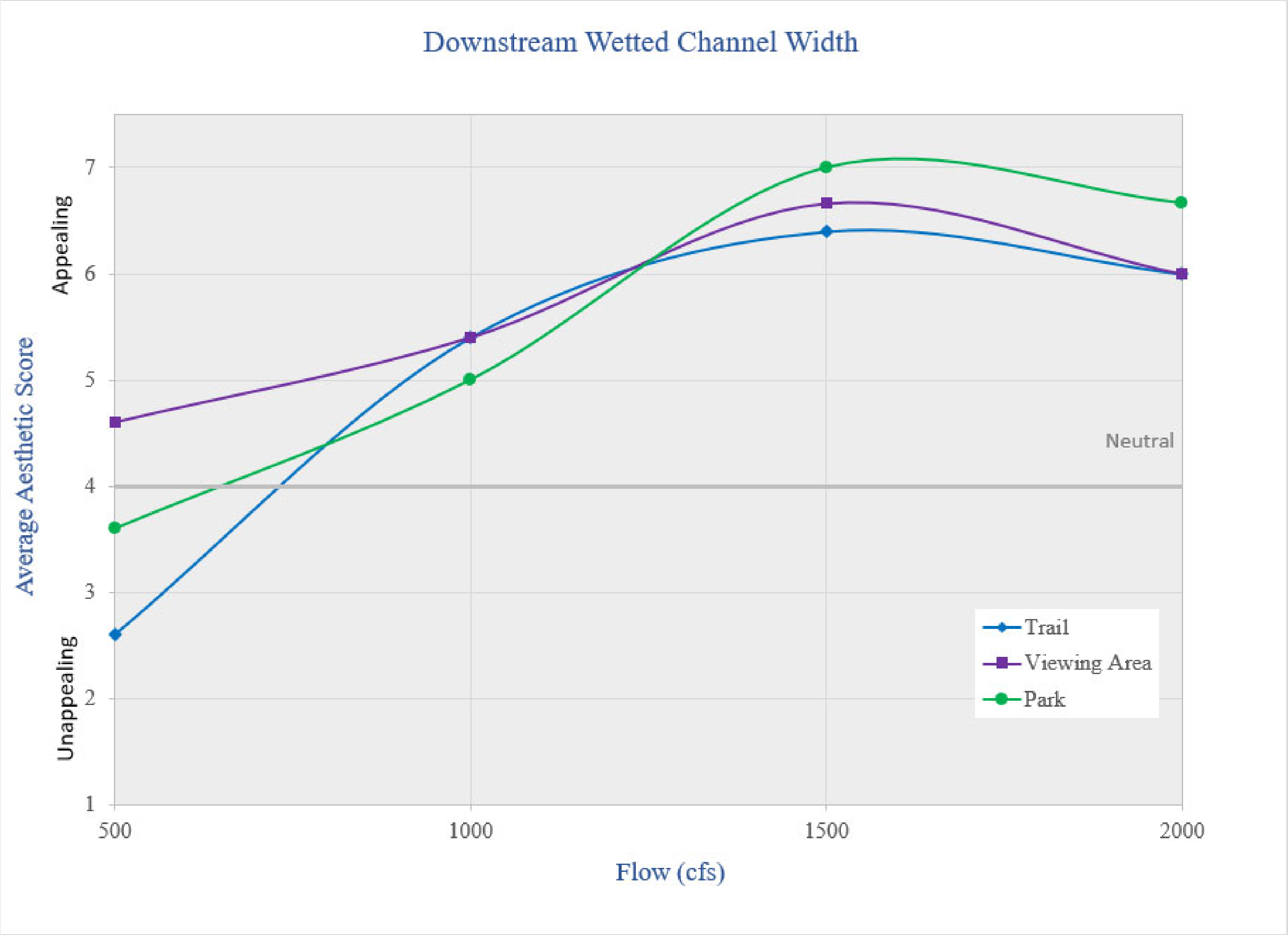
Aesthetic Flow Study

Preliminary Results



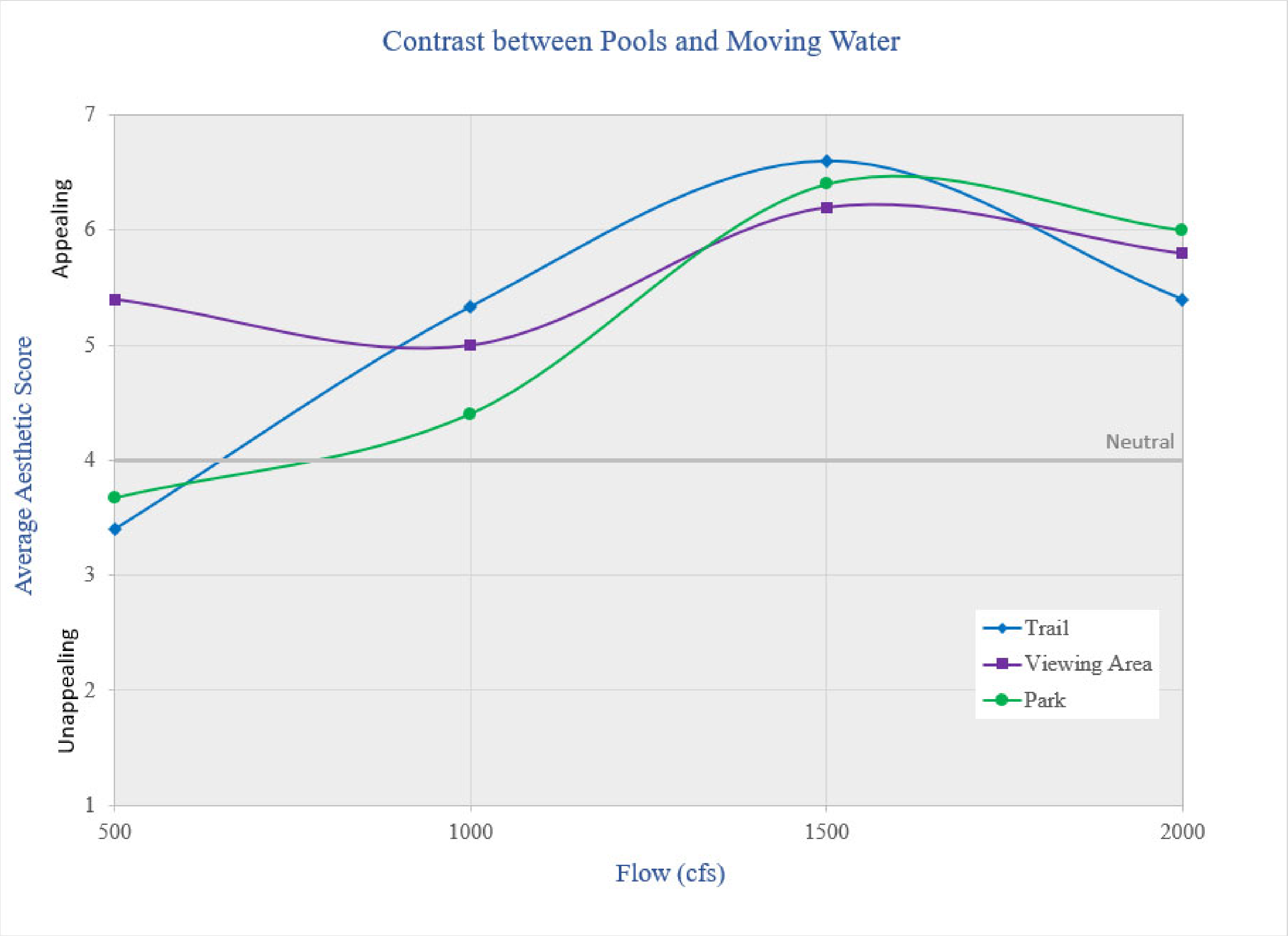
Aesthetic Flow Study

Preliminary Results



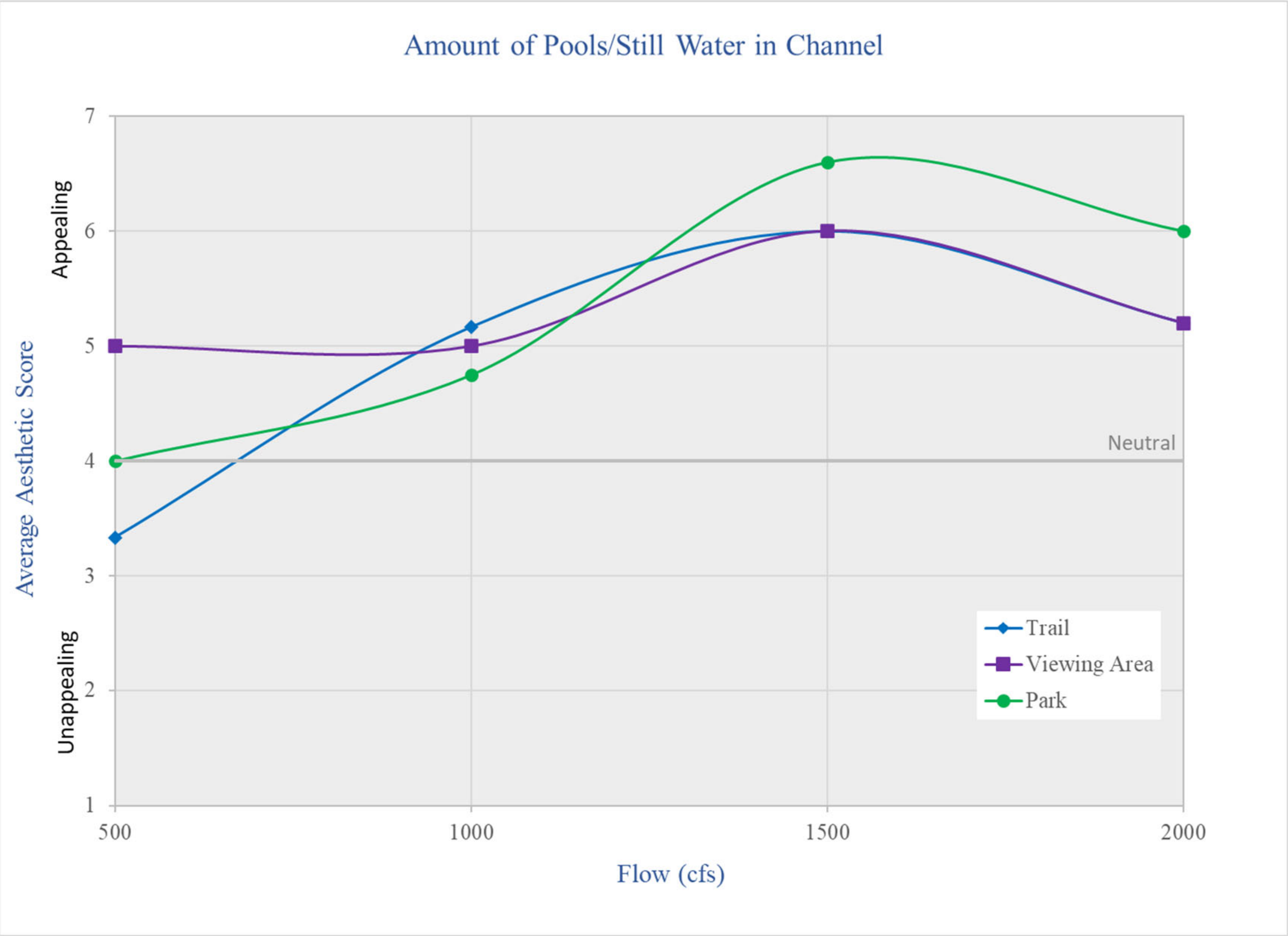
Aesthetic Flow Study

Preliminary Results



Aesthetic Flow Study

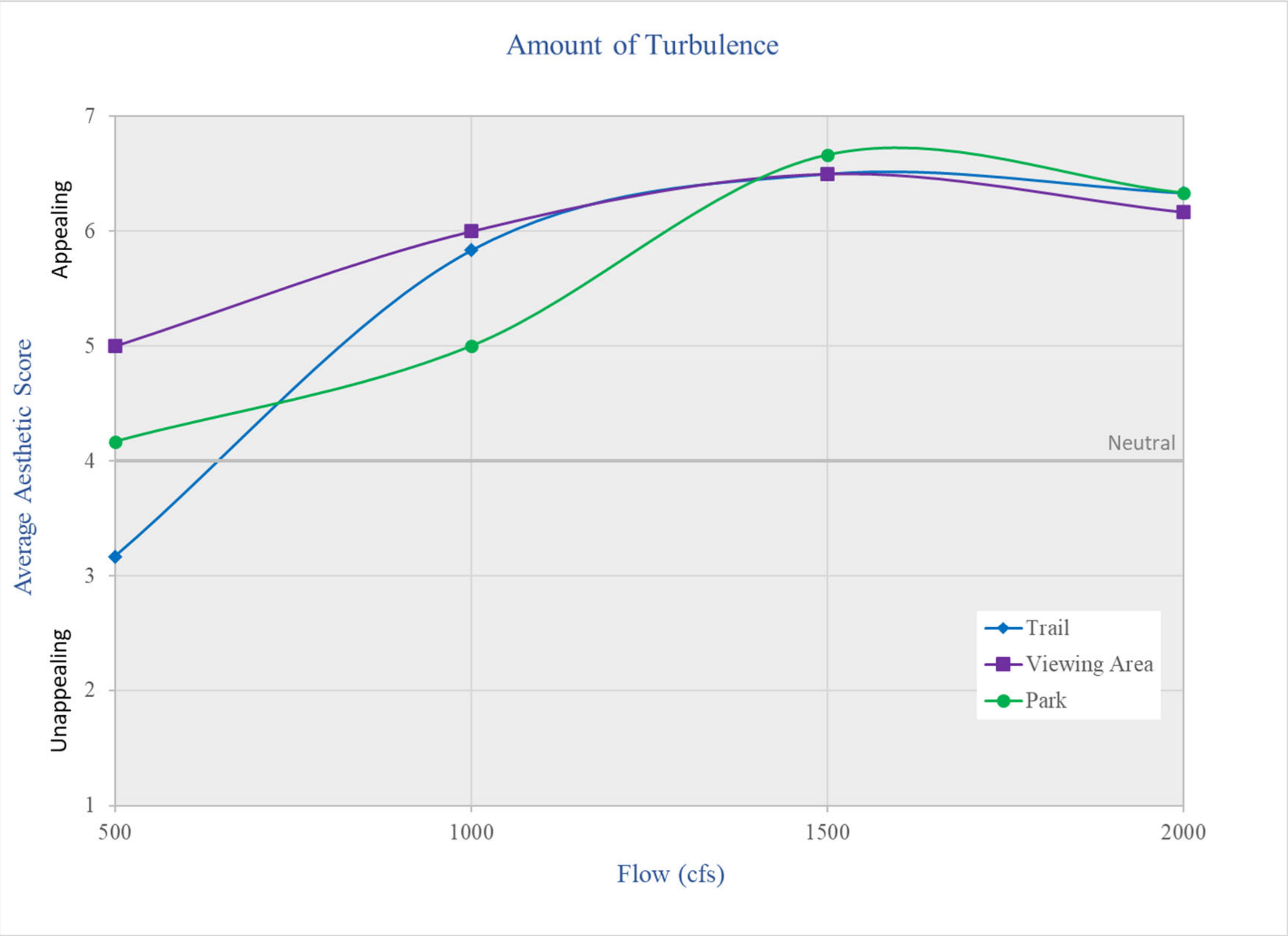
Preliminary Results



Aesthetic Flow Study

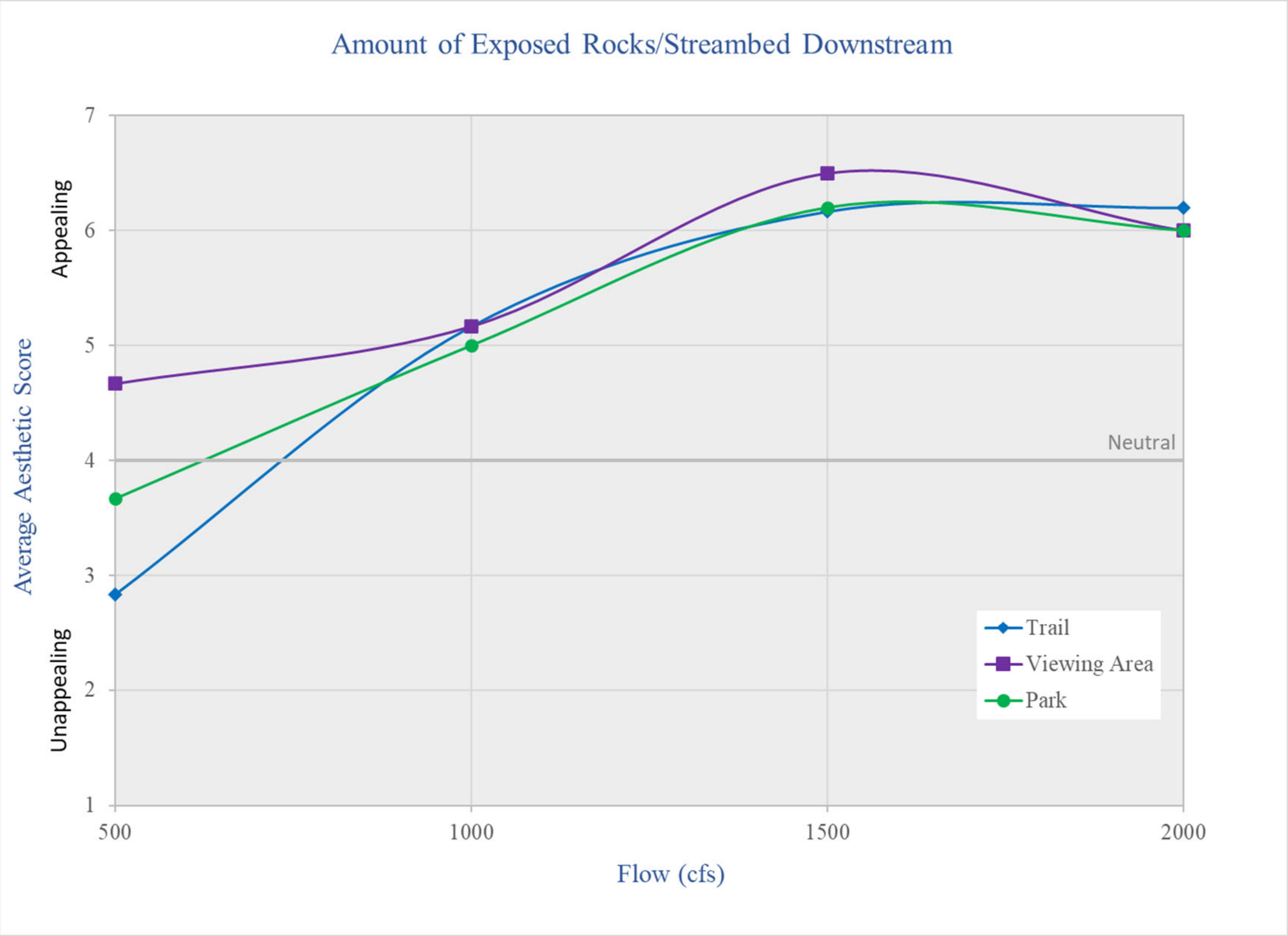
Preliminary Results

Brookfield
Renewable



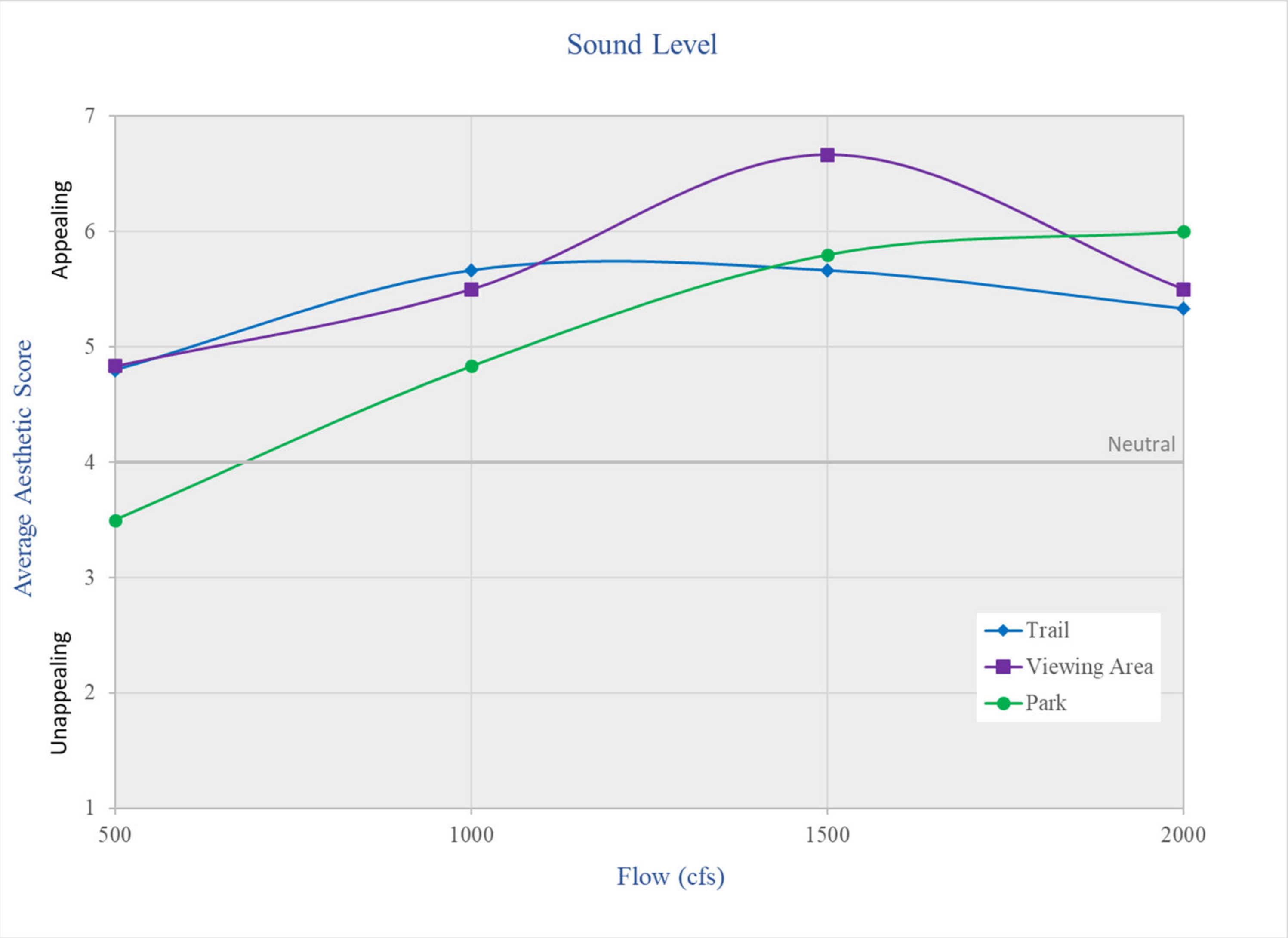
Aesthetic Flow Study

Preliminary Results



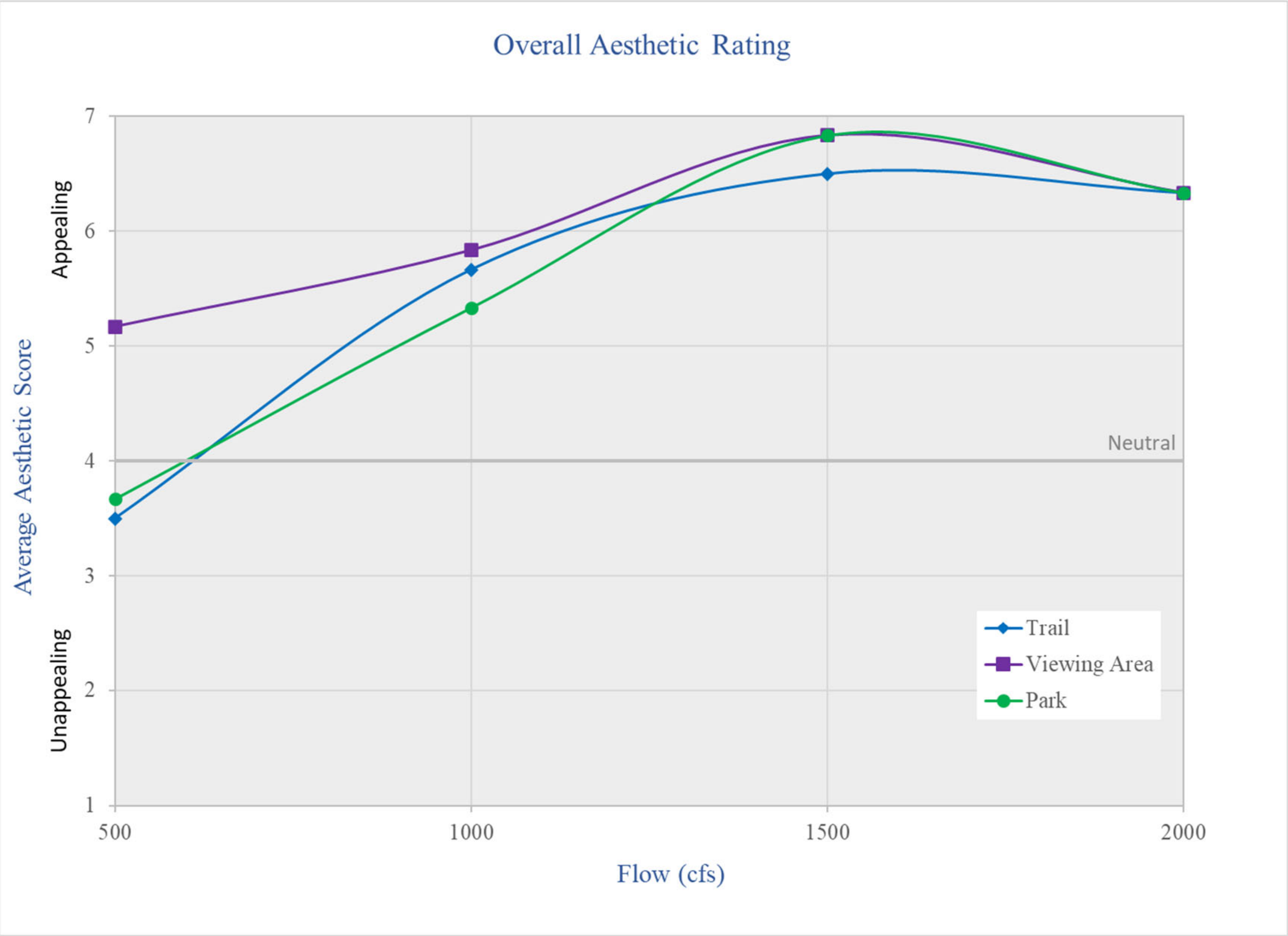
Aesthetic Flow Study

Preliminary Results



Aesthetic Flow Study

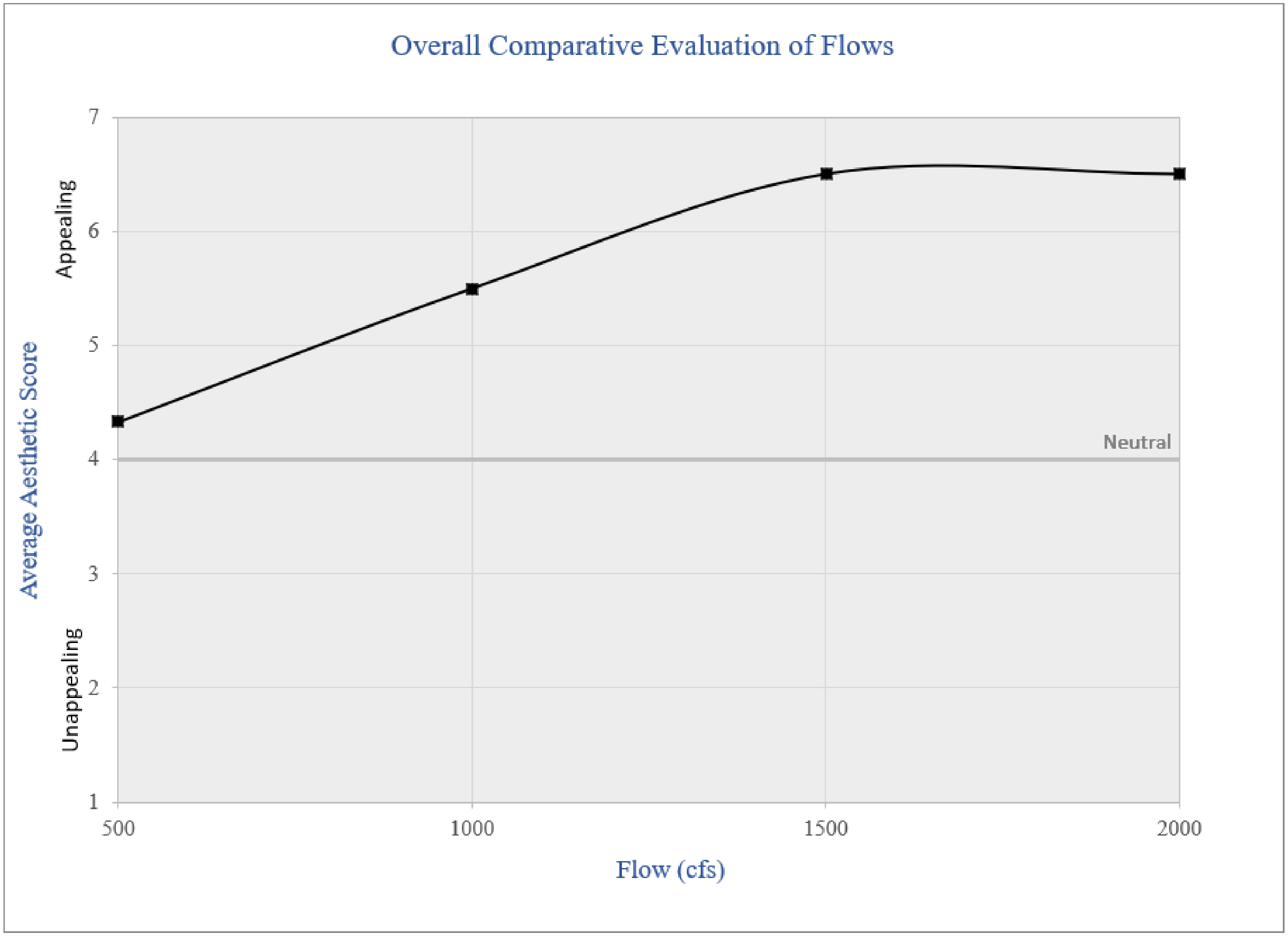
Preliminary Results



Aesthetic Flow Study

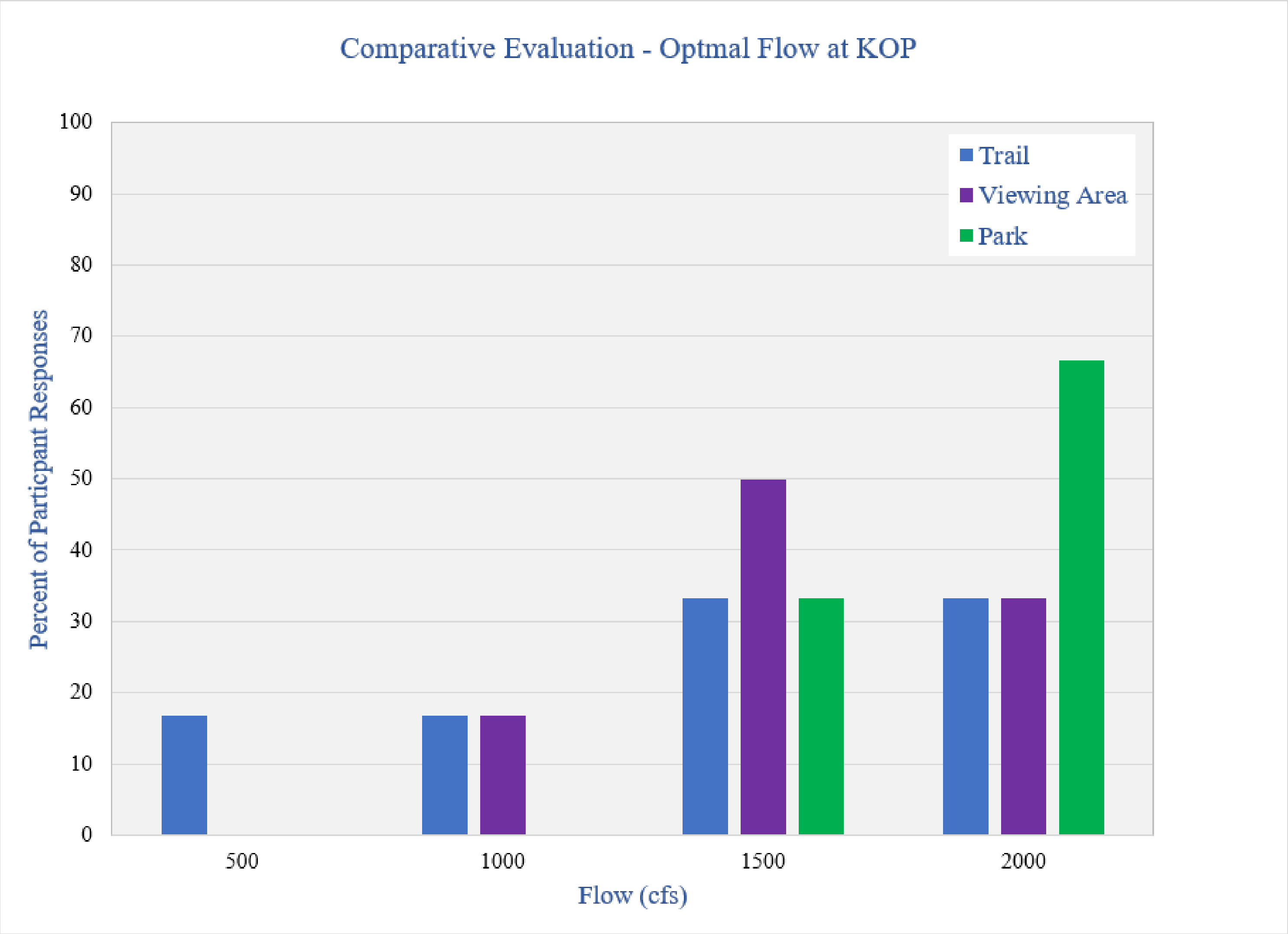
Preliminary Results

Brookfield Renewable



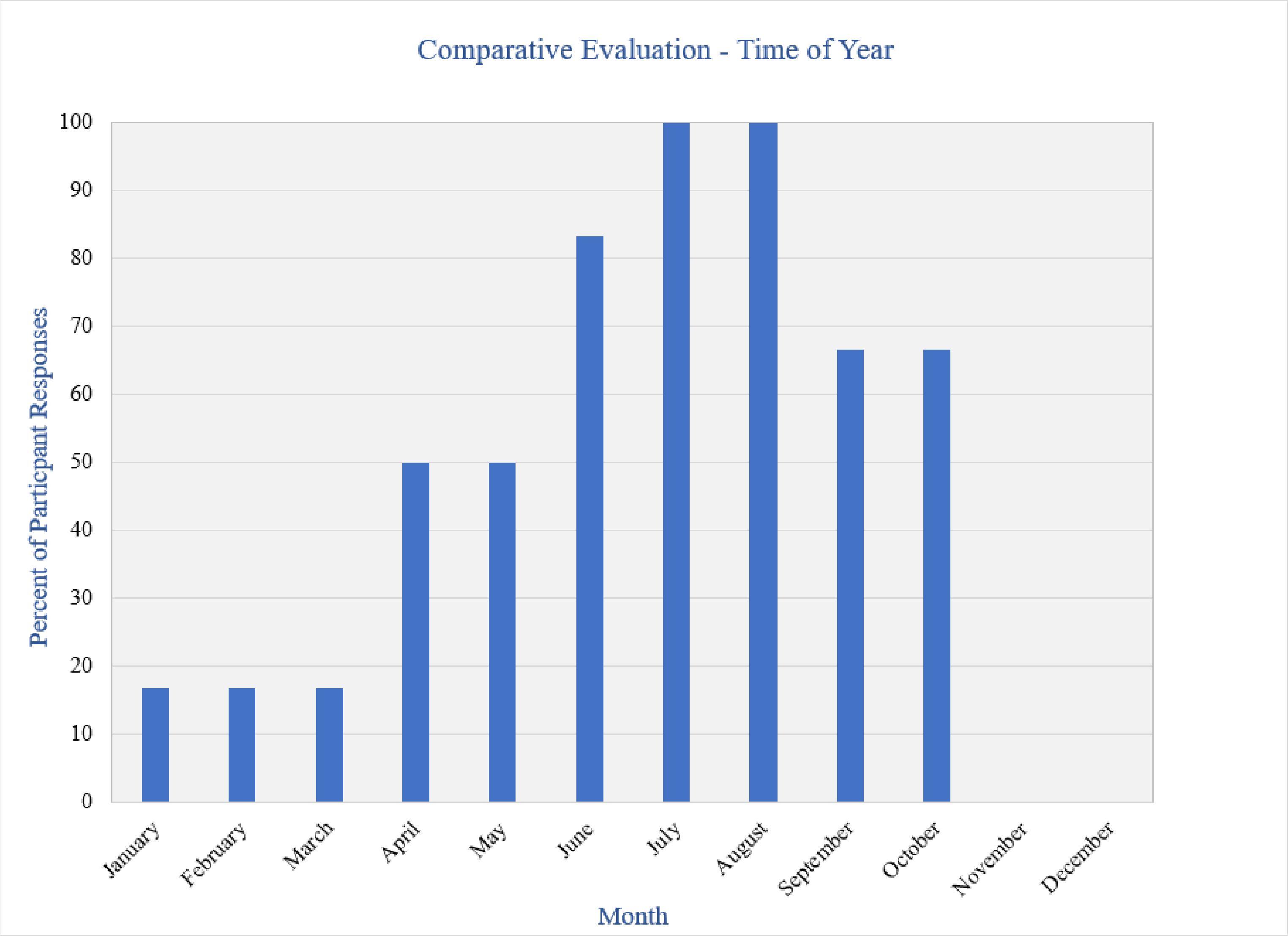
Aesthetic Flow Study

Preliminary Results



Aesthetic Flow Study

Preliminary Results



Aesthetic Flow Study

Preliminary Results

- During the months identified by participants, the preferred day of the week/time of day for potential aesthetic flow releases varied
  - Day of week
    - Common responses:
      - Weekend (i.e., Friday, Saturday, Sunday)
      - Every day of the week (i.e., Monday – Sunday)
    - Others
  - Time of Day
    - Varied considerably (i.e., dawn to night)
  - Additional comments:
    - Schedule in conjunction with or in addition to potential whitewater releases
    - Nigh time flow releases should be showcased by lights at the Upper Station

Aesthetic Flow Study

Preliminary Results

- Potential enhancements of KOPs identified by participants:
  - Rumford Falls Trail
    - Removal of a few trees in sight line
    - Improve walkways
    - Reduce industrial components (gas tanks, other non-natural items)
    - Reconditioning stained surface of cement
    - Reopen trail
  - West Viewing Area
    - Trim excess vegetation
    - Provide parking and picnic facilities
    - Rehab stonework viewing benches and turrets
    - Reopen
  - J. Eugene Boivin Park
    - None identified

Comments and Questions

Next Steps

Study Schedule

- Aesthetic Study Report
  - Potential effects of providing aesthetic flows on other resources:
    - Recreation opportunities (including public safety)
    - Aquatic resources
    - Project power generation (i.e., operational feasibility, effects on generation, and cost of providing aesthetic flow releases)

- FERC Schedule – USR
  - August 7, 2022 – RFH files USR
  - August 22, 2022 – RFH holds USR Meeting
  - September 6, 2022 – RFH files USR Meeting Summary

Comments and Questions

Further Information

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APPENDIX B

FLOW STUDY FOR AQUATIC HABITAT EVALUATION REPORT

Flow Study for Aquatic Habitat Evaluation

1.0 Introduction

Rumford Falls Hydro LLC (RFH or Licensee) conducted a Flow Study for Aquatic Habitat Evaluation pursuant to RFH's July 7, 2020 Revised Study Plan (RSP), as approved in the Federal Energy Regulatory Commission's (FERC) August 6, 2020 Study Plan Determination (SPD).

2.0 Goals and Objectives

As described in the RSP, the goal of this study was to inform the decision process for determining the appropriate timing and magnitude of minimum flow releases to optimize fisheries resources in terms of both aquatic habitat and safe recreational fishing opportunities. Specific objectives of the study were to:

- Evaluate the relationship between flow and available habitat within the Middle Dam bypass reach;
- Evaluate the relationship between flow and safe recreational fishing opportunities within the Middle Dam bypass reach; and
- Inform the flow needed to optimize aquatic habitat and safe recreational fishing opportunities within the Middle Dam bypass reach.

3.0 Study Area

The study was conducted in the Middle Dam bypass reach, which extends downstream from the Middle Dam to the upstream extent of the tailwater effects from the Lower Powerhouse, a distance of approximately 2,800 feet. The bypass reach is composed of alternating lengths of bedrock-dominated pool and cascade habitat and boulder/cobble dominated riffle and run habitat (see Habitat Mapping, Section 4.1). The existing project license requires a minimum flow through the Middle Dam bypass reach of 21 cfs[1]. High flows through the bypass reach occur during periods of

---

[1] Although the minimum flow pipes release 21 cfs, additional leakage from flashboards and pressure release vertical drain holes resulted in a total base flow of approximately 54 cfs during this study.

spill when the projects maximum capacity of approximately 3,100 cfs is exceeded, which typically occurs during spring snowmelt (Rumford Falls Hydro 2019).

4.0 Methodology

Components of the study described in this report include 1) habitat mapping, 2) transect selection, 3) target flow identification, 4) development of habitat suitability criteria for target species and 5) life-stages, and analysis of the flow-habitat relationship using (a) a Demonstration Flow Analysis (DFA) and (b) a one-dimensional (1-D) hydraulic modeling approach. The DFA was also used to assess the wadeability of the bypass reach for angling under alternative flow releases. Methodology for the DFA was outlined in the FERC-approved RSP. Subsequent to issuance of the Commission’s SPD and associated with consultation with the Maine Department of Inland Fisheries and Wildlife (MDIFW) and the Maine Department of Environmental Protection (MDEP) regarding transect placement and target flow identification, RFH agreed to construct a 1-D hydraulic model to inform on aquatic habitat availability under a range of flow conditions for the target fish species. At the request of MDEP, habitat suitability criteria for macroinvertebrates were included as part of the 1-D model effort to provide the Department with site-specific data to aid in the demonstration that the Project meets aquatic life and habitat standards.

4.1 Habitat Mapping

Mesohabitat mapping of the Middle Dam bypass reach was conducted by Normandeau staff on June 8, 2021, and a preliminary summary of findings was provided to representatives from MDIFW and MDEP on July 26, 2021. On the date of mapping, discharge through the Middle Dam bypass reach was set at the required minimum flow. A total of nine unique habitat map units (HMUs) were visually identified and are presented in Figure 1 and Table 1. The Middle Dam bypass reach was characterized by a long upper pool segment (i.e., Pool 1) starting immediately downstream of Middle Dam. From Pool 1, flow proceeded downstream through an alternating series of high gradient cascade and pocket-pool HMUs prior to discharging into a lower gradient area of pool, run, and riffle habitat immediately upstream of the confluence with the Lower Powerhouse tailrace.

The approximate length of the mapped reach from the top of the uppermost HMU (i.e., Pool 1) to the bottom of the lowermost HMU (i.e., Riffle 1) was measured at approximately 2,600 feet. Pool 1 comprised approximately 53% of the linear reach length and the high gradient, bedrock-dominated, cascade-pool complex (i.e., Cascade 1 downstream through Cascade 3) comprised approximately 35% of the linear reach length (Figure 1). The cascade section included two short bedrock pocket-pool habitats that would be expected to possess rapid velocities and little or no habitat under spill conditions.

Visual observations of relative water depths and bottom substrates were made during the mesohabitat mapping effort and are summarized in Table 2. In general, substrate in Pool 1 consisted of large and small boulder, cobble, and gravel with varying degrees of sediment embeddedness. Under the existing minimum flow condition, water depths along the thalweg of Pool 1 prevented cross-channel wading at all locations. The cascade and smaller pool HMUs located immediately downstream of Pool 1 were predominantly bedrock. This reach was high gradient and consisted of relatively shallow depths and high velocities. Riffle 1, located downstream of the cascade complex, consisted of boulder and cobble substrates and were more wadeable. Representative photographs of HMUs are provided as Attachment 1.

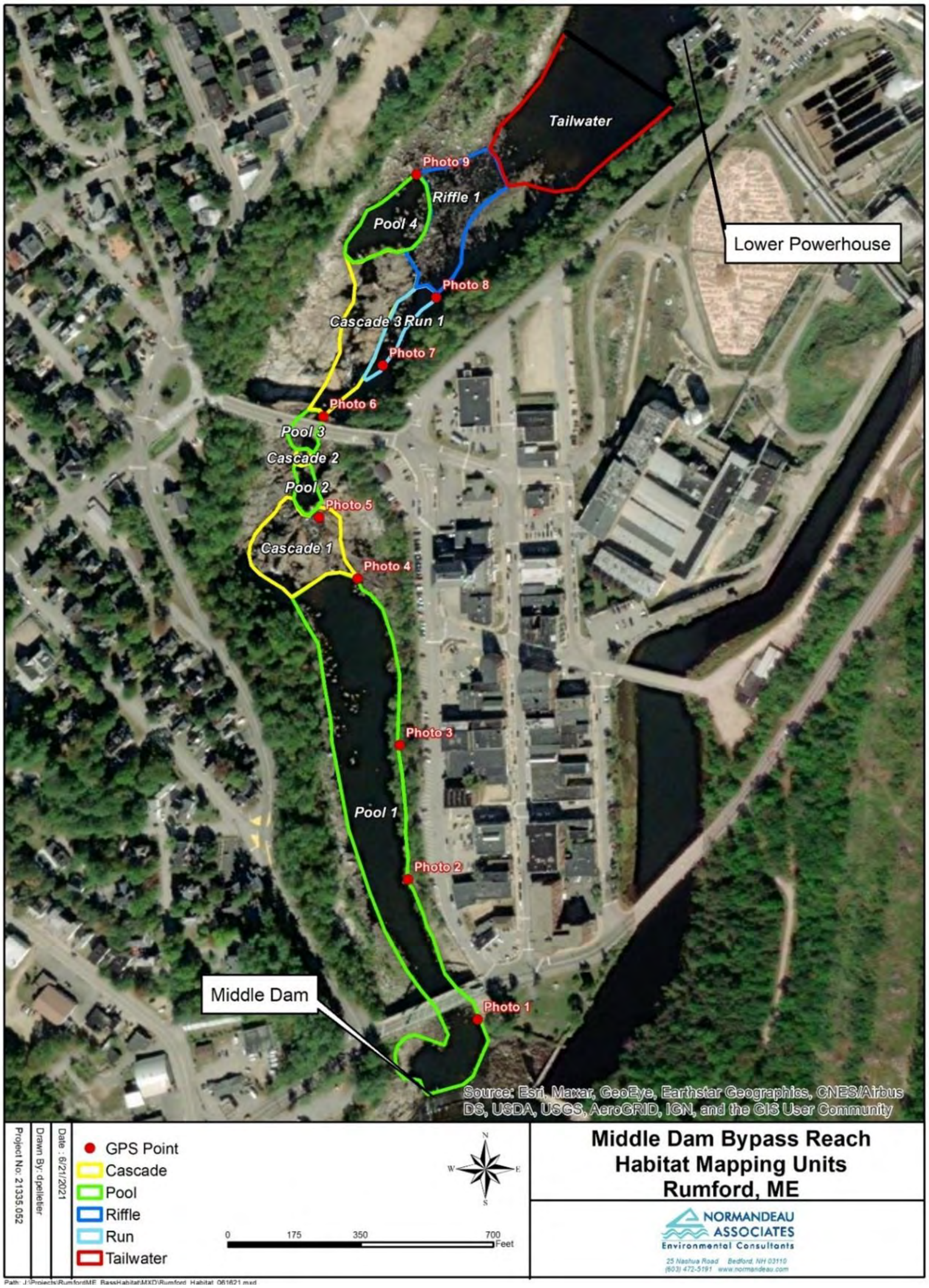
Table 1
Middle Dam bypass reach Habitat Mapping Units and approximate length (ft) and area (ft^2) as characterized during mesohabitat mapping on June 8, 2021

Habitat Mapping Unit	Approximate Length (ft)	Approximate Area (ft^2)
Pool 1	1,373	210,960
Cascade 1	181	44,245
Pool 2	134	6,775
Cascade 2	44	1,579
Pool 3	112	7,046
Cascade 3	473	47,858
Run 1	301	13,150
Riffle 1	381	47,505
Pool 4	287	29,350

Table 2
General substrate observations for Middle Dam bypass reach Habitat Mapping Units as characterized during mesohabitat mapping on June 8, 2021

Habitat Mapping Unit	General Substrate
Pool 1	Boulder, cobble, gravel with some areas of embeddedness
Cascade 1	Bedrock
Pool 2	Bedrock, boulder
Cascade 2	Bedrock
Pool 3	Bedrock
Cascade 3	Bedrock
Run 1	Bedrock
Riffle 1	Boulder, cobble
Pool 4	Bedrock, boulder

Figure 1
Middle Dam bypass reach Habitat Mapping Units as characterized during mesohabitat mapping on June 8, 2021



Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

4.2 Transect Selection

RFH met with representatives from MDIFW and MDEP at the Middle Dam bypass reach on August 24, 2021, to seek input on the placement of cross-sectional transects for detailed flow and habitat data collection. A total of seven preliminary locations were identified during that site visit and all observations took place from bridge and bank locations. Preliminary transects were identified within the reaches from the Middle Dam to the downstream end of Pool 1 and downstream of Cascade 3. Consensus was reached between RFH, MDIFW, and MDEP that there was no added value to the study to place any cross-sectional transects within the cascade complex at the center of the reach due to the expectation that little or no habitat would be present during most flow conditions.

Prior to collecting flow and habitat data at any of the cross-sections, Normandeau conducted an in-river survey to address the feasibility and safety of data collection at each preliminary transect location. Following that review, a total of five cross-sectional transects were selected in the Middle Dam bypass reach to assess the flow-habitat relationship using the DFA and 1-D modeling approaches (Figure 2). The five transects were selected roughly proportional to the availability of each habitat type by length (Table 1[2]), after excluding cascade habitats which are not feasible or safe for modeling at high flows. Accordingly, two pool transects were selected representing 40% of the available habitat in the bypass reach, along with two riffle transects representing 45% of the available habitat. The fifth transect crossed a transition of slow riffle and shallow pool habitats, which for the purposes of this analysis was classified as run habitat, which represents 15% of the available habitat. Photographs of each transect at each of the four calibration flows are provided as Attachment 2. As described below, these locations were discussed with MDIFW and MDEP.

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[2] Habitat type percentages were nearly identical using unit length or unit area

Figure 2
Middle Dam bypass reach cross-sectional transects 1 and 2 in the upstream end of the reach (bottom image) and 3, 4, and 5 in the downstream end of the reach (top image)

4.3 Target Flows

As described in the RSP, a four-flow assessment approach was utilized for the aquatic habitat evaluation study. The RSP identified the existing 21 cfs minimum flow for the Middle Dam bypass reach as the base flow for this study. RFH provides the existing minimum flow via a 12-inch-diameter and 18-inch-diameter pipe located near the center of the dam, which is combined with leakage from the flashboards and pressure release vertical drain holes. The RSP specified that three additional target flow values would be identified through consultation with MDIFW. To better define the upper bound of the proposed study flow range, available flow duration curves for the Middle Dam bypass reach were reviewed[3]. The median flow condition in the Middle Dam bypass reach for the annual period (i.e., January through December) is 240 cfs. When examined on a monthly basis, 240 cfs is exceeded by the monthly median condition during the months of November through June. Median conditions during the traditionally lower flow and higher recreational activity months of July through September do not achieve 240 cfs. As a result, a discharge of 240 cfs was identified as the approximate upper bound for the bypass reach flow assessment.

Based on this upper bound, the following approximate discharges were proposed for evaluation during the study: (a) 21 cfs, (b) 95 cfs, (c) 165 cfs, and (d) 240 cfs. RFH provided these approximate discharges and selection rationale to MDIFW and MDEP on July 26, 2021 along with the preliminary summary of findings for mesohabitat mapping within the Middle Dam bypass reach. Consensus on the four preliminary study discharges was reached among RFH, MDIFW, and MDEP during the August 24, 2021 site visit. On that date MDIFW requested inclusion of a fifth flow of approximately 400 cfs. During subsequent correspondence, RFH committed to assessing a 400 cfs flow condition in the Middle Dam bypass reach using the 1-D modeling approach.[4]

Discharges measured at the five transects during field data collection in October 2021 produced estimated flows ranging from 46 cfs at low flow to 285 cfs at the highest flow (Table 3). The wide

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[3] Appendix D: September 27, 2019 Preliminary Application Document

[4] In response to an email request from Jim Pellerin (MDIFW; dated October 18, 2021), Drew Trested (Normandeau; email dated October 18, 2021) indicated RFH would evaluate a 400 cfs condition through the Middle Dam bypass reach using the 1-D flow model.

range in flows between transects was due to the high complexity of most transects, however, estimated flows based on Transect 5 provided the best calibration results and consequently the DFA and 1-D modeling results utilized those flows.

Table 3
Calculated flows at transects and Middle Dam Impoundment water surface elevations. The DFA and 1-D assessments referenced flows measured at Transect 5.

	Flow (cfs)						Middle Impoundment WSE (feet)
Date	**T1**	**T2**	**T3**	**T4**	**T5**	**Average**	
14-Oct	64	94	46	46	54	61	502.48
15-Oct	76	105	99	88	90	92	502.80
19-Oct	199	161	235	187	193	195	502.90
20-Oct	282	285	249	269	265	270	502.96

4.4 Habitat Suitability Criteria (HSC)

Habitat suitability criteria (HSC) are models representing a target species and life-stage’s preference for specific habitat attributes (Bovee 1986). For aquatic species, the habitat attributes typically modeled include water depth, mean column water velocity, and substrate or cover. HSC are essential and influential biological components of both the DFA and 1-D hydraulic modeling approaches. The following target species and life-stages were selected for assessing the flow-habitat relationships in the bypass reach:

1. Adult smallmouth bass (*Micropterus dolomieui*);
2. Adult rainbow trout (*Oncorhynchus mykiss*);
3. Adult brown trout (*Salmo trutta*); and
4. Benthic macroinvertebrates.

Adult smallmouth bass, rainbow trout, and brown trout were requested for evaluation by MDIFW as part of their original study request filed with FERC on January 28, 2020. These species were included to assess the effects of flow on recreational fishing opportunities. Although smallmouth bass are a naturally occurring species in the Project area, rainbow and brown trout are sustained by a put-and-take stocking program (MDIFW 2014). Inclusion of habitat suitability criteria for benthic macroinvertebrates was not identified in the RSP but was added following consultation (July 1, 2021) with MDEP to contribute to the understanding of varied bypass flows on the existing macroinvertebrate community. In addition to the HSC for aquatic species, HSC were also developed and applied to assess the wadeability of the bypass reach for anglers under the target flow conditions.

4.4.1 HSC for the DFA

One assessment of the relationship between bypass flows and aquatic habitat for target species was conducted using a DFA. The DFA combined on-site measurement of habitat characteristics at selected cross-sectional transects with HSC for the target species. HSC used in DFAs are traditionally binary in nature, e.g., a given range of a habitat variable is classified as either 1.0 or 0.0. The definition of 1.0 vs. 0.0 can vary and take the form of “suitable” vs. “unsuitable” habitat, or else can be defined as “optimal” vs “usable” habitat (Thomas and Bovee 1993, Groshens and Orth 1994). The specific ranges encompassed by either “suitable” or “optimal” habitat depends upon the target species and life-stage in question, and on the methods used to estimate the appropriate ranges.

Determining the ranges to define the binary HSC used in this study involved collating existing HSC from previous studies, and then choosing a range of depth, velocity, and substrate or cover to represent either suitable/unsuitable or optimal/usable habitat. The choice of which existing HSC datasets are most appropriate to the study in question affects the final form of the binary HSC, consequently the choice of candidate HSC was an important step in the development of binary HSC. Because site-specific HSC were not available from the project area, the Normandeau HSC database was filtered to select candidate HSC that were found to be most representative of the project habitat.

The Normandeau database contained 17 HSC datasets for adult smallmouth bass, 49 datasets for adult rainbow trout, 15 datasets for adult brown trout, and 3 datasets (with 8 curves) for benthic macroinvertebrates (BMI). Each of these datasets were filtered to remove datasets that met one of more of the following conditions:

1. Datasets with small sample sizes insufficient to provide robust HSC;
2. Datasets from very small streams not representative of large rivers with greater depths;

3. Datasets from far larger rivers not representative of channels the size of the project area (e.g., Saint Lawrence River, Snake River);
4. Datasets from outside North America (e.g., some European brown trout HSC);
5. Datasets that also represented small juvenile fish as well as adult life-stages;
6. Datasets based on judgment and not containing actual habitat measurements.

This filtering process resulted in a final set of 10 HSC datasets to represent adult smallmouth bass, 13 datasets for adult rainbow trout, and 4 datasets for adult brown trout. All the available BMI HSC were included. Because existing HSC are typically continuous in nature and not binary, these HSC were not directly transferable to the DFA without conversion into a binary form. The HSC developed for this assessment were derived using a visual, subjective approach to define suitable vs. unsuitable HSC, whereas a more quantitative and objective approach was used to define optimal vs. usable HSC.

Suitable habitat was defined as per Groshens and Orth (1994) as any range in habitat variables having a non-zero HSC value. However, given the very broad range in non-zero suitability for many candidate datasets (e.g., see for example the long tail of low suitability in velocity for brown trout adults, Attachment 3), the filtered datasets were visually examined to exclude extreme values when defining the upper or lower limits of suitable habitat. Such extreme values were judged to be non-representative of the central tendency of the suite of candidate HSC curves. A more objective approach was employed when defining optimal habitat, which did not display the level of extreme values seen in the range of non-zero suitabilities. The upper and lower limits of optimal habitat were determined by recording, for each candidate dataset, the range in habitat attribute encompassed by suitability's of 0.8 or higher (e.g., the range of maximum suitability). The mean value for the lower limit and the mean value for the upper limit was calculated from the candidate datasets and used to define the HSC representing optimal habitat for each target species (Table 4). This definition of optimal is slightly higher than used by Groshens and Orth (1994) who defined optimal habitat as the range in attributes with suitability's of 0.7 or higher.

For substrate, binary HSC used the classifications and associated suitability values listed in Table 5. The final binary HSC values are listed in Table 6; figures showing the candidate HSC datasets for each of the target species, along with the calculated binary HSC (and continuous HSC, see below) are presented as Attachment 3.

Table 4
HSC datasets used to calculate ranges of optimal habitat for depth and mean column velocity, based on suitability values >0.8

Species	HSC Dataset	Velocity (fps)		Depth (ft)	
		Low	High	Low	High
Smallmouth Bass (adult)	Bovee	0.50	2.20	3.40	∞
	Feather	0.10	0.75	5.60	10.30
	Susq	0.00	0.40	1.10	∞
	OK	0.00	0.20	3.40	∞
	VA	0.25	0.85	3.30	4.75
	Huron	0.30	1.70	2.70	5.40
	W VA	0.00	0.15	1.50	2.50
	SoCal	0.00	0.20	3.50	8.50
	Minn	0.25	1.50	2.70	5.75
	Baron Fork	0.25	1.05	1.40	5.40
	Average:	**0.17**	**0.90**	**2.86**	**6.09**
Rainbow Trout (adult)	Bovee	0.95	1.65	1.52	∞
	Raleigh	0.00	2.40	1.20	∞
	Up Klam	0.80	1.80	3.20	∞
	NF Stan	0.35	1.10	2.00	3.80
	Stan HiQ	0.60	1.20	2.10	3.35
	LNFFR PrAb	1.20	2.35	2.10	3.30
	Pit	0.80	1.45	2.60	∞
	SFAR Lrg	0.60	1.30	1.90	3.50
	Battle	0.15	0.80	1.65	3.55
	Deer Use	0.80	1.55	1.70	3.30
	Clavey	0.00	0.70	1.70	2.80
	UNFFR comp	0.45	1.30	2.85	5.20
	UARP lrg	0.20	1.30	1.90	∞
	YubaBear lrg	0.50	1.50	1.90	3.45
	Average:	**0.53**	**1.46**	**2.02**	**3.58**
Brown Trout (adult)	Bovee	0.00	1.05	2.15	∞
	Raleigh	0.20	0.85	1.50	3.70
	MF Stan	0.20	0.90	2.00	3.90
	Kananaskis	0.00	0.60	2.55	∞
	Average:	**0.10**	**0.85**	**2.05**	**3.80**
Benthic Macro invertebrates	Bovee Coll/Gath	3.05	3.68	1.35	∞
	Bovee NetSpin1	0.70	1.25	0.35	1.05
	Bovee NetSpin2	1.25	2.85	1.05	1.45
	Gore	1.30	2.40	0.58	0.95
	Platte Plecop	0.12	0.30	1.35	∞
	Platte Tricop	0.10	1.50	1.35	3.15
	Platte Ephem	0.10	0.90	0.95	2.45
	Platte Simulid	0.12	1.25	1.35	∞
	Average:	**0.84**	**1.77**	**1.04**	**1.81**

∞ *depth HSC remains at 1.0 into deep water (no limit)*

Table 5
Proposed HSC values for substrate/cover for adult smallmouth bass (SMB), rainbow trout (RBT), brown trout (BRN), and benthic macroinvertebrates (BMI)

Substrate/Cover	SMB	RBT/BRN	BMI
Fines	suitable, usable	unsuitable	unsuitable
Gravel	suitable, usable	suitable, usable	suitable, usable
Cobble	suitable, optimal	suitable, optimal	suitable, optimal
Boulder	suitable, optimal	suitable, optimal	suitable, optimal
Bedrock	suitable, usable	unsuitable	unsuitable

Table 6
HSC values representing suitable and optimal velocities (fps) and depths (ft) for adult smallmouth bass, rainbow trout, brown trout and BMI

	Suitable Habitat *(HSC>0.0)*				**Optimal Habitat** *(HSC>0.8)*			
Species	**Velocity (fps)**	**HSC**	**Depth (ft)**	**HSC**	**Velocity (fps)**	**HSC**	**Depth (ft)**	**HSC**
Smallmouth	0.00	1.00	1.49	0.00	0.16	0.00	2.85	0.00
Bass	2.50	1.00	1.50	1.00	0.17	1.00	2.86	1.00
(adult)	2.51	0.00	∞	1.00	0.90	1.00	6.09	1.00
					0.91	0.00	6.10	0.00
Rainbow	0.24	0.00	0.99	0.00	0.52	0.00	2.01	0.00
Trout	0.25	1.00	1.00	1.00	0.53	1.00	2.02	1.00
(adult)	3.00	1.00	6.00	1.00	1.46	1.00	3.58	1.00
	3.01	0.00	6.01	0.00	1.47	0.00	3.59	0.00
Brown	0.09	1.00	0.99	0.00	0.09	0.00	2.04	0.00
Trout	2.50	1.00	1.00	1.00	0.10	1.00	2.05	1.00
(adult)	2.51	0.00	6.00	1.00	0.85	1.00	3.80	1.00
			6.01	0.00	0.86	0.00	3.81	0.00
Benthic	0.09	0.00	0.19	0.00	0.83	0.00	1.03	0.00
Macro	0.10	1.00	0.20	1.00	0.84	1.00	1.04	1.00
invertebrates	4.29	1.00	3.29	1.00	1.77	1.00	1.81	1.00
	4.30	0.00	3.30	0.00	1.78	0.00	1.82	0.00

∞ HSC remains at 1.0 into deep water (no limit)

In addition to assessing the relationship between Middle Dam bypass flows and fish habitat, an assessment of the suitability of bypass flows on angling (via wading) was also conducted. This assessment utilized the same cross-sectional transects used for the fish assessment but utilized binary HSC specific for wading anglers. The HSC listed in Table 7 was based on the combined professional judgement of five fly-fisherman, each with decades of fishing and fisheries experience in river environments. The HSC incorporated the interaction between depth and velocity, where wading suitability in deeper water decreases as velocities increase.

Table 7
HSC for the wading suitability assessment

Depth (ft)	**Velocity (**fps)	**HSC**
0.0-1.0	<3.5	1.0
1.0-2.0	<2.5	1.0
2.0-3.0	<1.5	1.0
3.0-3.5	<0.5	1.0
>3.5	all	0.0
all other combinations		0.0

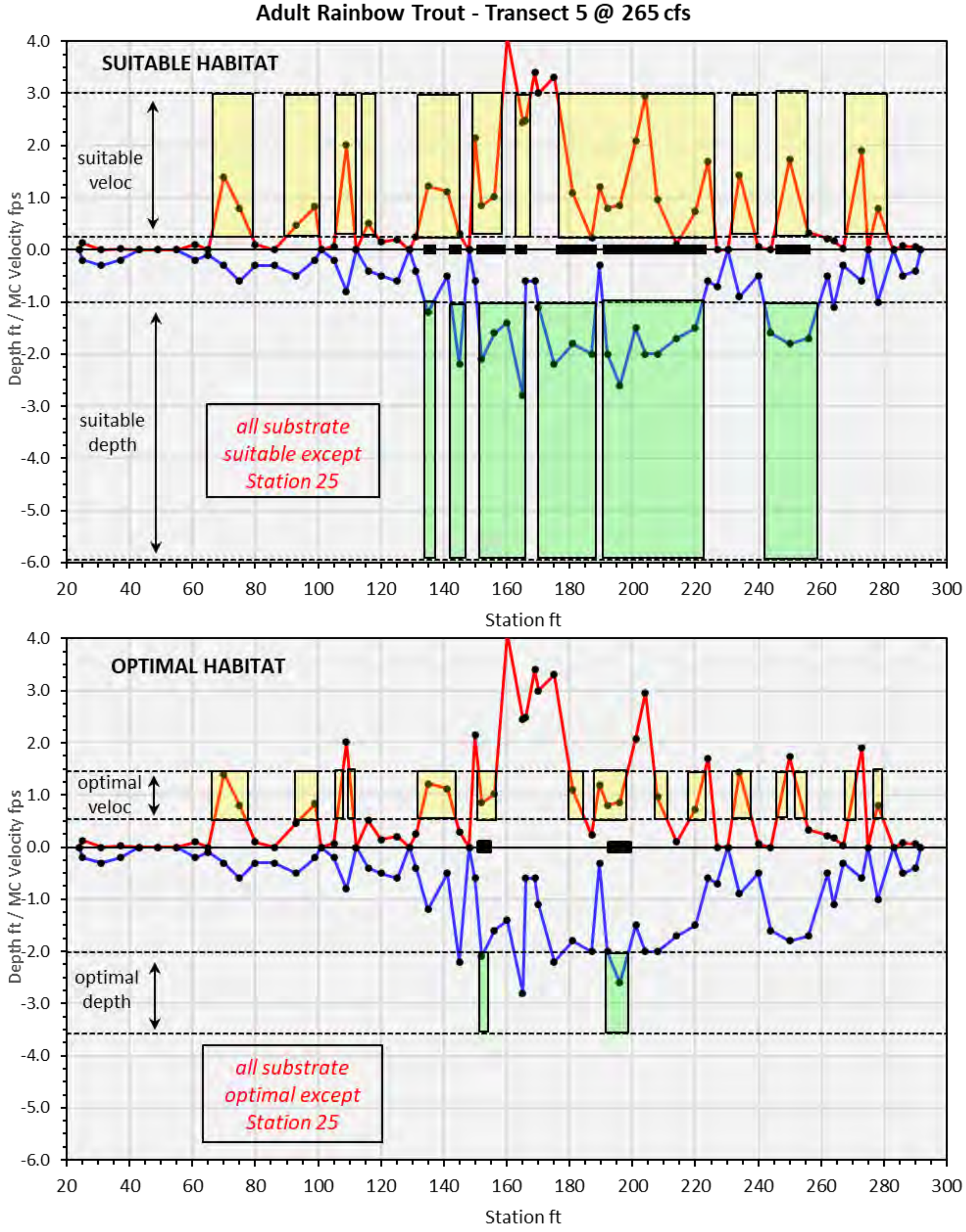
4.4.2 HSC for 1-D Hydraulic Modeling

The HSC used in the 1-D hydraulic modeling assessment were developed for the same species and life-stages and from the same candidate datasets as described above for the HSC used in the DFA. However, unlike the DFA HSC, the 1-D HSC were not binary in nature, but instead utilized a continuous distribution based on the previously defined range of suitable and optimal habitat. For example, using rainbow trout in Table 6, the 1-D HSC for depth went from 0.0 suitability at the lower depth defining suitable depths (at 1.0 ft), to maximum suitability of 1.0 across the range of optimal depths (2.02-3.58 ft), then back down to a suitability of 0.0 at the deepest depth showing suitability (6.0 ft). Thus, each continuous HSC curve was defined by four points, the lower and upper suitable habitat values that bracketed the lower and upper optimal habitat values, as given in Table 6. The HSC values between the suitable and optimal ranges represented intermediate suitability and were interpolated for modeled depths or velocities within the 1-D software. These continuous HSC curves are also shown in the figures in Attachment 3.

4.5 Demonstration Flow Analysis (DFA)

As noted above, the DFA is an empirical habitat assessment approach that does not involve hydraulic modeling of the flow-habitat relationship; instead, it is an empirical method that involves repeated field measurements of habitat characteristics over a suite of test flows to visually compare the relative quantity of suitable or optimal habitat across flows (Railsback and Kadvany 2004). This process involves discrete measurements of depths, velocities, and substrate/cover across transect stations and comparing those measurements to the binary HSC representing either suitable habitat or optimal habitat. Figure 3 shows the depth and velocity profiles for Transect 5 at high flow with depiction of where suitable or optimal habitat occurs along the transect (substrate was fully suitable/optimal) according to binary HSC for adult rainbow trout (Table 6).

Figure 3
Graphical depiction of DFA analysis



Yellow boxes represent suitable (upper graph) or optimal (lower graph) velocities (red line) and green boxes represent suitable or optimal depths (blue line) for adult rainbow trout along Transect 5 at 265 cfs. Thick black lines along zero axis show stations where velocity and depth boxes overlap, representing stations possessing fully suitable or fully optimal habitat.

The length of each transects fully suitable or fully optimal (i.e., station cells where depth, velocity, and substrate were all suitable or optimal) habitat was averaged across all five transects for each of the four flows. Transects were weighted according to the transects habitat type and availability within the bypass reach prior to averaging (e.g., a weighted average). The weighted averages were then plotted against flow to assess the relationship between bypass flow and suitable or optimal habitat for each target species/life-stage, as well as for the suitability of angler wading according to flow.

4.6 One-Dimensional (1-D) Flow Modeling

Hydraulic habitat modeling for habitat assessment was independently developed by the Instream Flow Group of the U.S. Fish and Wildlife Service (now U.S. Geological Survey, Aquatic Systems and Technology Applications Group, Fort Collins Science Center) and by Ian Jowett of the National Atmospheric and Water Institute in New Zealand. PHABSIM and RHYHABSIM, respectively, calculate a habitat index by simulating water depths and velocities along 1-D transects, recording substrate and cover at all measurement points and linking the results to HSC for target species. The System for Environmental Flow Analysis (SEFA) was subsequently developed by Ian Jowett, Robert Milhous (of the Instream Flow Group), Thomas Payne, and (Spanish translation) Juan Manuel Diez Hernandez, which incorporated analytical procedures from PHABSIM and RHYHABSIM as well as several new procedures (Jowett et al. 2014). SEFA version 1.5 build 7 was used for hydraulic model calibration and to generate the flow-habitat relationships described in this study.

4.6.1 Transect Data Collection

Field data collection and the form of data recording for the DFA and 1-D modeling measurements followed the general guidelines established in the Instream Flow Incremental Methodology (IFIM) field techniques manuals (Trihey and Wegner 1981; Milhous et al. 1984; Bovee 1997). The techniques for measuring discharge followed guidelines outlined by the USGS (Rantz 1982). Typically, 30 or more stations were established during the high flow measurement in order to ensure that a minimum of 20 wetted stations occurred at the lowest measured flow. The boundaries of each station along each transect were normally at even increments, but significant changes in velocity, substrate, depth, or other important stream habitat features dictated additional or modified stationing.

The standard method for determining mean column velocity along the transects used a single measurement at six-tenths of the water depth in depths less than 2.5 feet, and a two-tenths and eight-tenths measurement for depths between 2.5 feet and four feet. For transects that could be safely waded, top setting wading rods were used in water up to four feet deep. For transects too deep or unsafe for wading (i.e., the upper 2 bedrock pools), a small boat and an extended wading rod were used to collect velocity and bottom profile data. Complete velocity profiles were acquired at all four flow levels in order to meet DFA protocols. Water surface elevations (WSE) and associated discharge measurements were also made at all calibration flows.

4.6.2 Stage-Discharge Calibration

Stage-discharge relationships for all 1-D transects were developed from measured discharge and water surface elevations using a Stage-of-Zero-Flow (SZF) log/log regression rating formula using the SEFA default method of fitting the rating curve through the survey flow (i.e., the velocity accusation flow). Calibration utilized the estimated flows from Transect 5 (Table 3), which provided the best fit. The SZF method requires a minimum of three sets of stage-discharge measurements and an estimate of SZF for each transect. The quality of the SZF rating relationships was evaluated by examination of mean error (less than 10%), coefficient of determination (R^2) and slope output (generally between 2.0 and 5.0 and similar between transects) from the rating curves (Bovee and Milhous 1978). The SZF is the bottom elevation measured downstream of a transect that would control the water surface elevation if flow dropped to zero (assuming no percolation). It is used as a fourth point in the rating curve to reflect the water surface at zero flow.

The SZF for the upper two deep pool transects was based on the upstream lip of the bedrock cascade, which formed the hydraulic control for the upstream pool. The exact elevation of the bedrock lip was not measured due to hazardous wading conditions at most flows, but instead an eye-estimate of the lip’s depth (and calculated elevation) was used to establish the stage-discharge relationships for pool transects 1 and 2.

4.6.3 Velocity Calibration

A 1-D model represents a stream by means of vertical slices (transects) across the channel. Depths are simulated with the rise and fall of a single, level (in most cases) water surface. The preferred method for simulating water velocities is the “one-flow” option, which uses a single set of measured velocities to predict individual station or vertical velocities over a range of flows. Simulated velocities are based on measured data and a relationship between a fixed roughness coefficient (Manning’s n) derived from the measured velocities and depth. In some cases, calibration roughness values were modified for individual verticals if substantial velocity errors are noted at simulated flows. Predicted velocities were examined to detect any significant and unrealistic deviations and determine if velocities remained consistent with stage and total discharge.

4.6.4 Habitat Suitability Modeling

Combining the hydraulic and HSC components generates the habitat suitability index, historically termed Weighted Usable Area (WUA) but in this report more accurately termed Area Weighted Suitability (AWS). Unlike hydraulic modeling and calibration, there are a limited number of decisions to make prior to AWS production runs. Transects are weighted according to the percentage of habitat types present in the reach. The range of flows modeled (and specific flows within that range) was determined largely by the suitability of the hydraulic data for extrapolation and the range of flows of interest. This 1-D analysis modeled a range of flows from 20 cfs to 400 cfs in 20 cfs increments. The standard option of multiplying individual variable suitabilities (velocity*depth* substrate) for each transect station was used to calculate AWS.

4.7 Quality Control

To assure quality control in the collection of field data for the study, the following data collection procedures and protocols were implemented:

- Staff gauges were established and continually monitored throughout the course of collecting data on each transect. If significant changes occurred, water surface elevations were re-measured following collection of transect water velocity measurements.

- Only high-quality Hach FH950 electromagnetic current meters were used in the collection of velocity data.
- Meters were continually monitored during the daily course of data collection to ensure that they were functioning properly.
- Multiple water surface elevations were measured across each transect. The more complex and uneven the transect water surface, the greater the number of measurement locations. For example, a riffle transect typically required more frequent water surface measurements, while a pool transect required fewer. Water surface elevation measurements at each calibration flow were made at the same location across each transect.
- All pin elevations and water surface elevations were recorded using a Leica GNSS RTK system. Coordinates were collected in Maine state plane with 0.01 m horizontal and 0.02 m vertical accuracy[5].
- Photographs were taken of all transects looking across the transect, upstream of the transect, and downstream of the transect, under each flow regime. Attempts were made to shoot each photograph from the same location at each of the four levels of flow. These photographs provide a valuable record of the streamflow conditions (including velocity and depth), water surface levels, and channel configurations that may have needed confirmation during hydraulic model calibration.

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[5] Measurement accuracy is dependent upon various factors including number of satellites, geometry, obstructions, observation time, ephemeris accuracy, ionospheric conditions, multipath etc. Cited accuracy assumes normal to favorable conditions.

5.0 Results

Comparative results for the relationship between bypass flows and aquatic habitat are presented according to the two assessment methodologies: the DFA and the 1-D hydraulic model.

5.1 Demonstration Flow Analysis (DFA)

The estimated lengths of suitable or optimal habitat for target species and life-stages (and for wading) were calculated for each of the five transects for each of the four flow levels and were combined across transects using a weighted mean. The ranges of depth, velocity, and substrate used to define suitable and optimal habitat are presented in Table 6.

Table 8 presents the DFA results for each transect and the weighted average across all transects for each target species and for wading. Figure 4 shows the weighted averages for both suitable and optimal habitat; figures showing results for each transect are presented in Attachment 4. Figure 4 shows that for most species and for wading the relative amount of habitat classified as suitable increases from the low flow of 54 cfs to the high flow of 265 cfs. The increase in suitable habitat is most pronounced from 54 cfs to 90 cfs, with a reduction in the rate of increase at 193 cfs and 265 cfs. An exception to this result is smallmouth bass, which showed relatively little change across all four flows from a minimum of 73.6 ft to a maximum of 91.5 ft, an increase of just 24%. BMI showed the most pronounced increase in habitat with flow (a 122% increase overall), which is largely due to the increase in wetted area as flows increase and the BMI's high suitability for shallow water and a wide range in suitable velocities (Table 6).

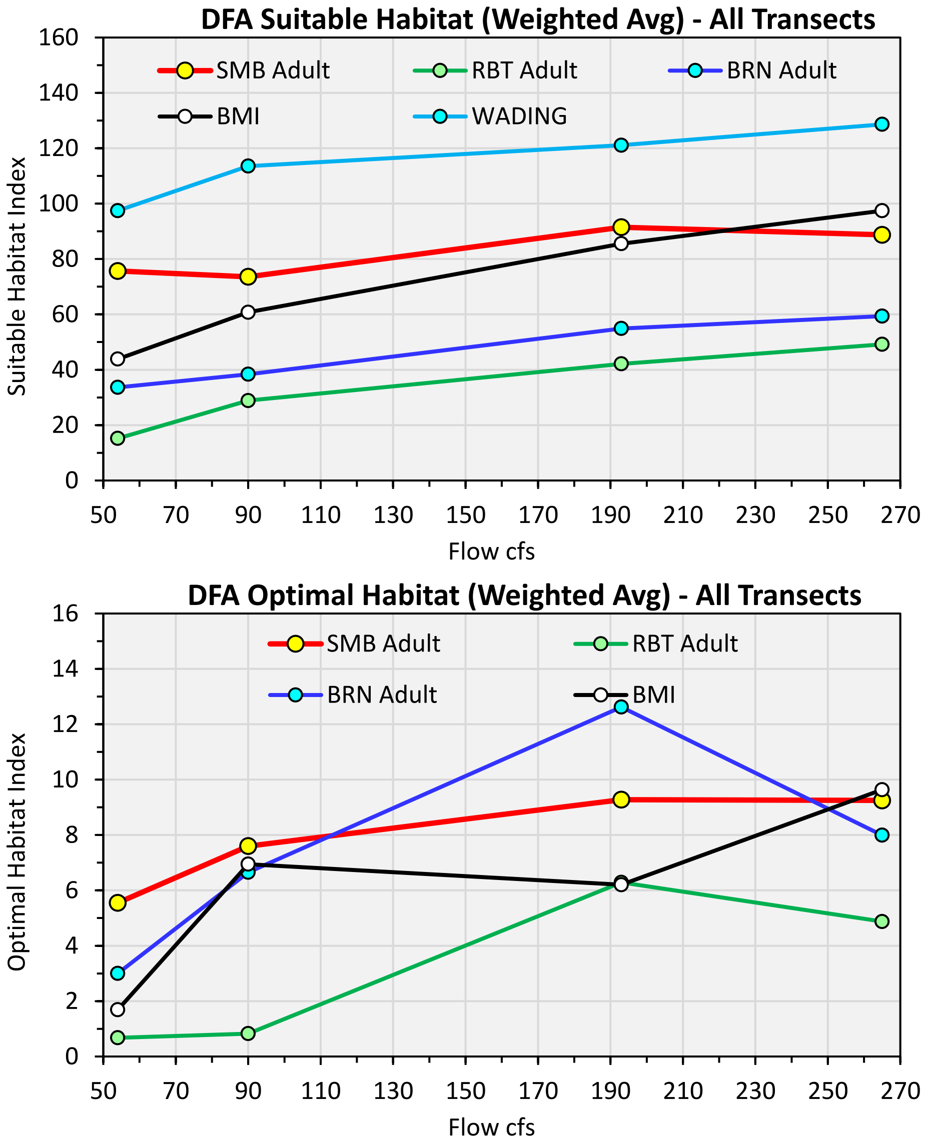
The DFA results for optimal habitat showed much lower habitat indices (Table 8) but also much more variability between flows and species in comparison to the estimates of suitable habitat (Figure 4). BMI, smallmouth bass, and brown trout all showed rapid increases in optimal habitat from 54 cfs to 90 cfs, after which bass and BMI habitat leveled off at higher flows. In contrast, the largest increases in optimal habitat for rainbow trout and brown trout occurred as flows increased from 90 cfs to 193 cfs, with declining optimal habitat at 265 cfs. However, as noted above, the index values for optimal habitat were far less than for suitable habitat. In most cases the amount of optimal habitat was only 10% or less of the amount of suitable habitat, and therefore at those low levels the interpretation of flow-related trends in optimal habitat may be less reliable than interpretations based on suitable habitat.

Table 8

Index (ft) of suitable or optimal habitat according to transect, flow, and species. Transect weights are 0.2 for XS 1 & XS 2, 0.15 for XS 3, and 0.225 for XS 4 and XS 5

	Flow	Smallmouth Bass Adult		Rainbow Trout Adult		Brown Trout Adult		BMI		Wading
Transect	**cfs**	**Suitable**	**Optimal**	**Suitable**	**Optimal**	**Suitable**	**Optimal**	**Suitable**	**Optimal**	**Suitable**
XS 1 - PL	54	66.6	12.0	6.0	0.0	14.0	0.0	0.0	0.0	24.5
	90	70.1	8.0	4.0	0.0	13.5	5.5	3.5	0.0	34.0
	193	74.6	14.5	15.0	2.0	29.0	10.5	9.5	0.0	27.1
	265	77.6	12.5	13.5	0.0	27.1	5.5	13.0	0.0	25.0
XS 2 - PL	54	159.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	40.1
	90	159.8	4.5	0.0	0.0	4.5	0.0	0.0	0.0	37.9
	193	159.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	33.4
	265	159.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	36.4
XS 3 - RN	54	108.0	21.0	10.3	0.0	78.8	20.0	70.3	0.0	153.9
	90	103.7	34.0	65.8	5.5	98.8	37.0	100.5	2.8	191.9
	193	139.5	42.5	99.8	11.5	136.3	39.7	163.4	2.5	196.3
	265	132.5	45.0	124.1	18.3	151.8	36.2	177.3	6.5	220.8
XS 4 - RF	54	7.1	0.0	18.0	0.0	24.0	0.0	71.4	4.0	99.0
	90	6.0	0.0	25.1	0.0	28.6	0.0	91.2	14.0	124.2
	193	31.2	0.0	42.8	2.0	48.8	0.0	113.6	12.1	144.0
	265	34.0	0.0	55.0	2.0	47.1	0.0	127.9	17.5	139.9
XS 5 - RF	54	56.0	0.0	37.3	3.0	60.5	0.0	76.6	3.5	174.1
	90	47.5	0.0	55.8	0.0	60.0	0.0	108.8	15.0	188.7
	193	74.0	0.0	64.6	16.5	78.6	20.3	149.1	13.8	209.5
	265	61.0	0.0	68.8	7.5	91.5	6.5	175.4	21.0	230.0
Weighted Average	54	75.7	5.6	15.2	0.7	33.6	3.0	43.8	1.7	97.5
	90	73.6	7.6	28.9	0.8	38.4	6.7	60.8	6.9	113.6
	193	91.5	9.3	42.1	6.3	54.9	12.6	85.5	6.2	121.1
	265	88.7	9.3	49.2	4.9	59.4	8.0	97.4	9.6	128.6

Figure 4
Weighted average index (ft) of suitable habitat (top graph) or optimal habitat (bottom graph) according to flow and species/life-stage (all 5 transects combined)



5.2 One-Dimensional (1-D) Flow Modeling

The relationship between bypass flow and instream habitat quantity and quality in the Middle Dam bypass reach was also assessed using 1-Dimensional hydraulic modeling, as provided in the SEFA software package. Evaluation of the hydraulic model, including the fit of stage-discharge relationships, and the steps taken during model calibration, are presented followed by the AWS curves for each target species.

5.2.1 1-D Model Calibration

Depths and velocities were measured on each transect at four calibration flows as part of the DFA protocol. For 1D modeling a single set of velocities, generally from the highest available survey flow, was used for hydraulic simulation.

5.2.1.1 Stage-Discharge Relationships

The highest set of WSE and discharge pairs was not used for rating curves on T1 and T2 due to inconsistent stage measurements at the highest flow, which resulted in poor rating curves. This had no effect on the overall ratings or range of potential simulation flows (20 cfs to 400 cfs). For all transects mean error and coefficient of determination (R^2) of rating curves were within normal parameters (Table 9). Estimated SZF for all transects was approximately 1.0 feet less than the lowest measured WSE, indicating the relationship was consistent across transects as would be expected.

Table 9
Rating curve statistics for 1D transects. Mean error (%) and coefficient of determination (R^2) show the goodness of fit of the rating to the calibration flows

			SZF rating				
Cross Section	**Survey Flow (cfs)**	**Survey WSE (ft)**	**exp**	**A**	**SZF**	**R^2**	**Mean error**
T1 - Pool	193	479.48	2.905	61.677	478.0	0.996	3.217
T2 - Pool	193	479.46	2.830	65.742	478.0	0.987	5.599
T3 - Run	265	427.74	2.782	56.392	426.0	0.999	1.095
T4 - Riffle	265	425.23	3.147	47.496	423.5	1.000	1.028
T5 - Riffle	265	422.88	5.590	67.057	421.6	0.999	1.959

Rating Formula: Flow = A x $(WSE - SZF)^{exp}$. Fitted through survey stage and flow with best fit to rating calibration stages and flows, and SZF.
The mean error in Q is the average percentage absolute error in predicted and rating calibration discharges as a % of the rating calibration discharges.
The coefficient of determination (R^2) is derived by comparing measured and predicted stages.

5.2.1.2 Velocity Calibration

In a few instances velocity calibration required adjusting individual point manning's N values to produce realistic velocities at high simulation flows. The general spikiness of velocity profiles for transects T3-T5 is a function of dominant boulder and bedrock substrate in this section of the reach, creating velocity chutes adjacent to and over boulders, and quiet areas behind. Transect bottom profiles with predicted velocities and WSE over a range of flows are presented in Attachment 5.

5.2.2 Area-Weighted Suitability Results

Estimated AWS values ranged from a minimum of 1.1 ft^2/ft for adult rainbow trout at 20 cfs to a maximum of 51.5 ft^2/ft for adult smallmouth bass at 400 cfs (Table 10). In general, AWS values were low for adult rainbow trout and adult brown trout, and relatively high for adult smallmouth bass and BMI (Figure 5). This is likely due to the broader HSC curves for bass and BMI compared to the narrower range of suitable habitat for the two trout species (Attachment 3). AWS values continued to increase up to the highest simulated flow (400 cfs) for all target species, although increases in AWS with flow were diminishing and comparatively minor at higher flows versus the stronger increases in AWS at flows less than 120 cfs. Also shown is the relationship between flow and the cross-sectional area and the wetted perimeter of each transect. These metrics of physical habitat, which are independent of suitability, show comparatively little change in either area or length with increases in flow. These changes in suitable habitat (AWS) or physical habitat (cross-sectional area or wetted perimeter) with flow are illustrated in Figure 6, which shows that gains in AWS over each flow increment of 20 cfs drops rapidly for most species at flows of 100 cfs to 160 cfs. Physical habitat appears even less influenced by flow with less than 5% incremental change in habitat at flows over 80 cfs. Modeling results also revealed that changes in depth were minor over the range of simulated flows, where average depth across all transects only ranged from 2.6 ft at 20 cfs to 3.1 ft at 400 cfs (Table 11). Consequently, the changes in AWS with flow were principally the result of increases in velocities. Mean velocities increased from 0.13 fps at 20 cfs to 0.97 fps at 400 cfs.

Not surprisingly, comparison of AWS curves among each of the five transects showed that AWS for adult smallmouth bass was highly influenced by habitat in the two pool transects, whereas the riffle transects contained little suitable habitat for this species (Figure 7). In contrast, the pool transects provided little suitable habitat for the two trout species, each of which were more influenced by the run transect (T3) and the lower riffle transect (T5). As expected, the AWS relationship for BMI was largely driven by habitat in the two riffle transects as well as the run transect.

Table 10
Area-weighted suitability (ft^2/ft) according to flow for adult smallmouth bass (SMB), adult rainbow trout (RBT), adult brown trout (BRN), benthic macroinvertebrates (BMI), and all species combined (mean value)

Flow (cfs)	SMB Adult	RBT Adult	BRN Adult	BMI	Avg All Species
20	10.6	1.1	2.6	5.4	4.9
40	19.1	3.6	3.8	11.3	9.4
60	24.9	5.9	4.5	16.1	12.9
80	29.6	8.6	5.0	20.0	15.8
100	33.6	11.1	5.4	23.3	18.3
120	36.7	13.4	5.7	26.3	20.5
140	39.3	15.2	6.0	28.8	22.3
160	41.4	16.5	6.3	31.2	23.8
180	42.9	17.7	6.5	33.2	25.1
200	44.2	18.7	6.7	35.2	26.2
220	45.3	19.7	6.9	37.0	27.2
240	46.3	20.5	7.1	38.6	28.1
260	47.2	21.4	7.3	40.1	29.0
280	48.1	22.3	7.4	41.5	29.8
300	48.8	23.2	7.6	42.7	30.6
320	49.5	24.0	7.7	43.9	31.3
340	50.1	24.8	7.8	45.0	31.9
360	50.6	25.5	7.9	46.0	32.5
380	51.0	26.2	8.0	46.9	33.0
400	51.5	26.8	8.1	47.8	33.5

Figure 5
Area-weighted suitability (ft^2/ft) according to flow for adult SMB, adult RBT, adult BRN, BMI, and all species combined. Cross-sectional area and wetted perimeter are also shown.

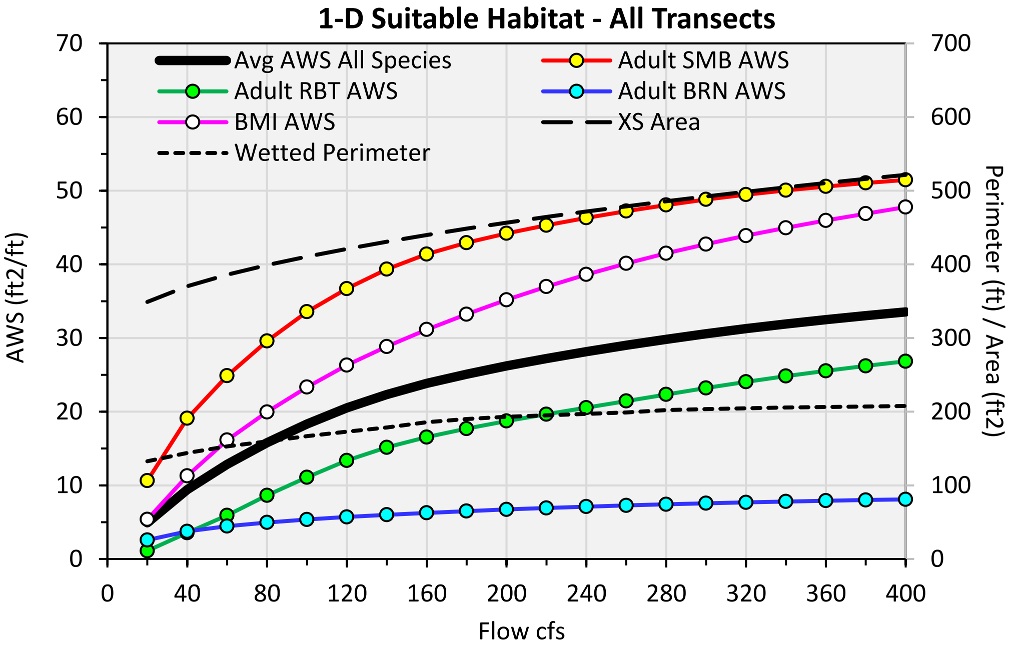


Figure 6
Percent increase in AWS per 20 cfs flow increment for adult SMB, adult RBT, adult BRN, BMI, and all species combined. Percent changes in cross-sectional area and wetted perimeter are also shown.

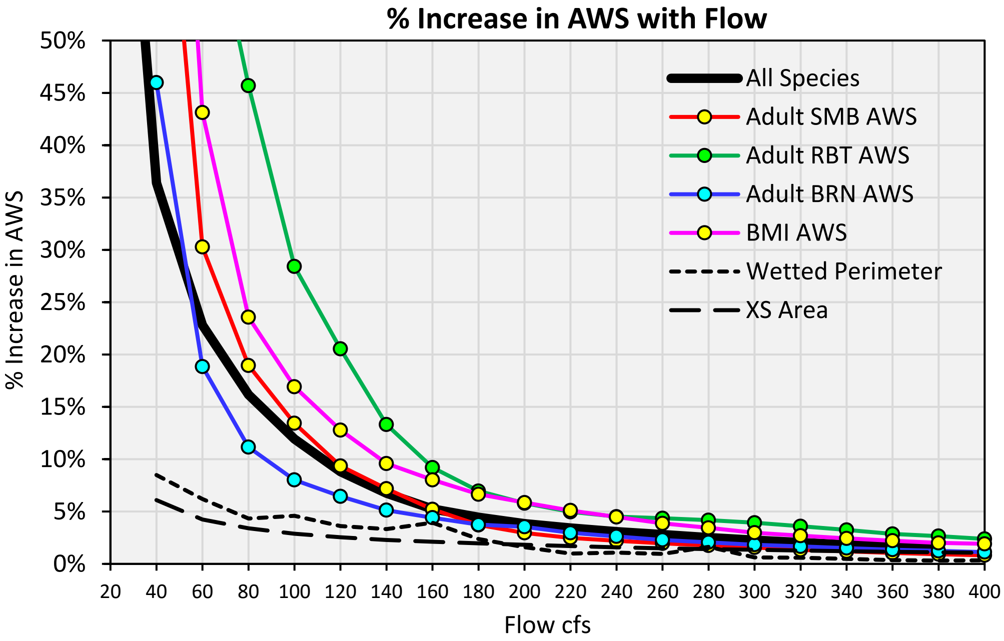
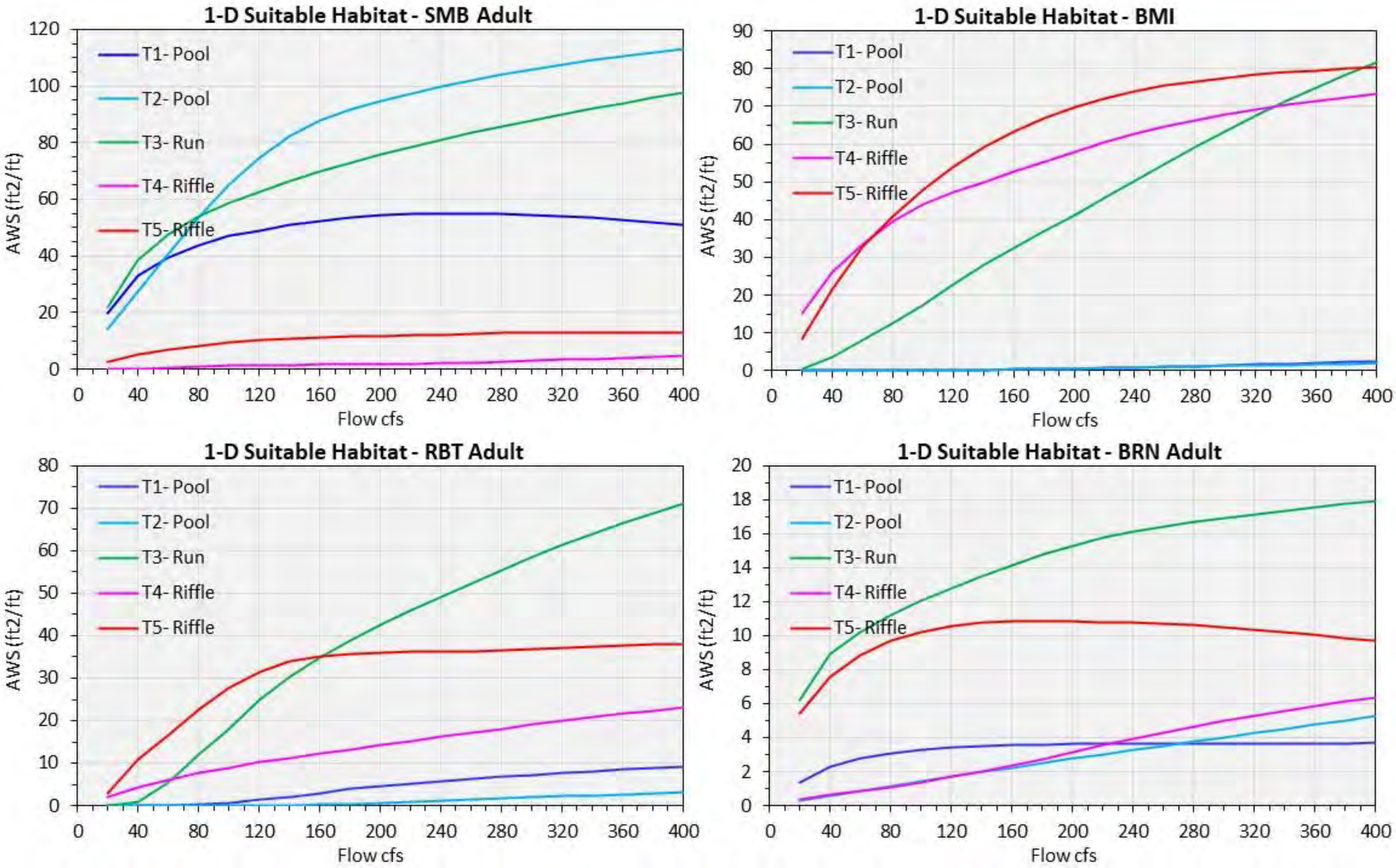


Table 11
Physical habitat characteristics averaged across transects according to flow

Flow (cfs)	Width (ft)	Cross-Sectional Area (ft2)	Wetted Perimeter (ft)	Depth (ft)	Velocity (fps)
20	124	349	133	2.6	0.13
40	135	370	144	2.7	0.21
60	144	386	153	2.8	0.27
80	150	399	160	2.8	0.33
100	157	411	167	2.8	0.36
120	163	421	173	2.9	0.41
140	168	431	179	2.9	0.45
160	175	440	186	2.9	0.49
180	179	448	190	2.9	0.54
200	182	457	193	2.9	0.59
220	184	464	195	2.9	0.63
240	186	472	197	3.0	0.67
260	188	479	199	3.0	0.71
280	191	486	202	3.0	0.74
300	192	492	203	3.0	0.78
320	193	498	205	3.1	0.82
340	194	504	206	3.1	0.86
360	195	510	206	3.1	0.89
380	195	516	207	3.1	0.93
400	196	521	208	3.1	0.97

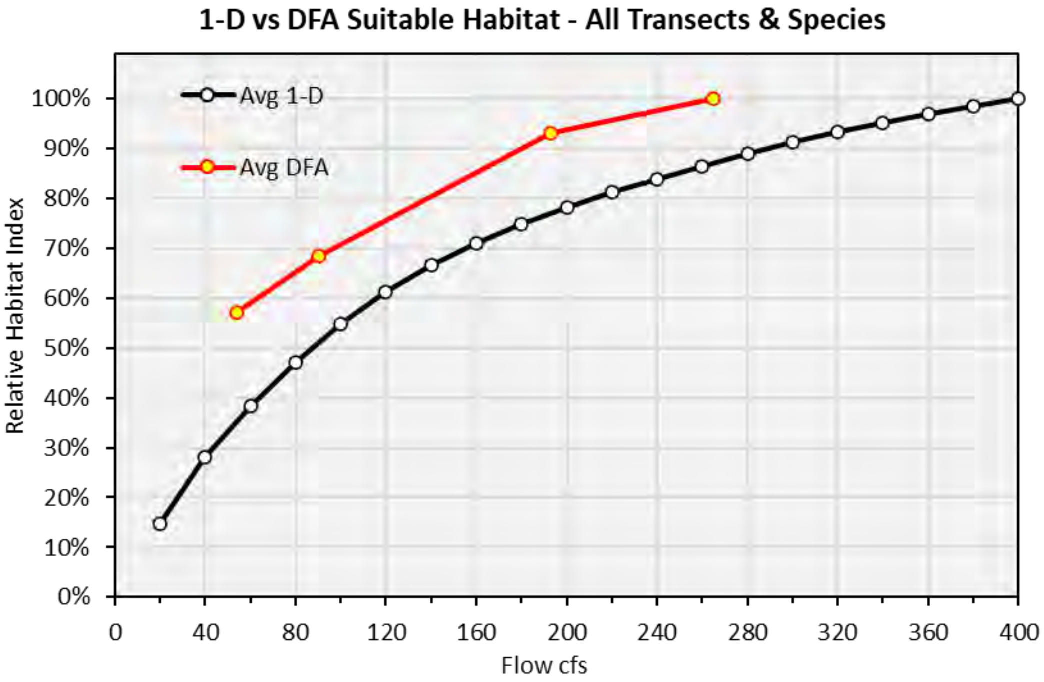
Figure 7
Area-weighted suitability (ft^2/ft) according to flow and transect for adult SMB, adult RBT, adult BRN, and BMI



6.0 Summary

Directly comparing the flow-habitat relationship according to methodology shows similar trends in habitat indexes using the 1-D hydraulic modeling and the DFA approaches after combining all transects and aquatic species (Figure 8). Both methods showed an increase in the amount of suitable habitat as flows increase up to the maximum measured or modeled flows. The greater level of detail in the flow-habitat relationship provided by the 1-D model shows that gains in habitat are much more rapid at lower flows whereas gains in habitat are more minor at higher flows and significantly diminish as flows exceed 100 cfs to 150 cfs. For example, each species' gains in AWS per 20 cfs increment drop to 10% or less at flows of 100 cfs to 150 cfs (Figure 6). An evaluation of physical habitat alone (i.e., not accounting for suitability) by cross-sectional area and wetted perimeter both show very minor changes in either metric as flows increase, with changes less than 5% per 20 cfs flow increment for all flows over 80 cfs. In addition to the aquatic habitat results, the DFA assessment of wading suitability showed a minor increase (6.6%) in wadeability from 90 cfs to 193 cfs.

Figure 8
Comparison of relative habitat indexes according to the 1-D or the DFA (suitable habitat) approach, all species (wading not included) and transects combined.



7.0 Variances from FERC-Approved Study Plan

The RSP stated that the study would involve application of a DFA, as described above. The MDIFW requested that the flow-habitat relationship also be assessed using the PHABSIM (or equivalent) 1-D hydraulic model. Although FERC did not require a 1-D habitat model to be employed, RFH agreed to add that task to the flow-habitat relationship as a complimentary analysis to the DFA. Consequently, the 1-D model application and results are discussed above.

8.0 References

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ATTACHMENT 1

REPRESENTATIVE PHOTOGRAPHS OF THE MIDDLE DAM BYPASS REACH

June 8, 2021 Mesohabitat Mapping Photographs

Photo 1 – Right bank, Pool 1 – upper end (looking across, downstream)

Photo 2 – Right bank, Pool 1 – upper middle (looking - upstream, across, downstream)

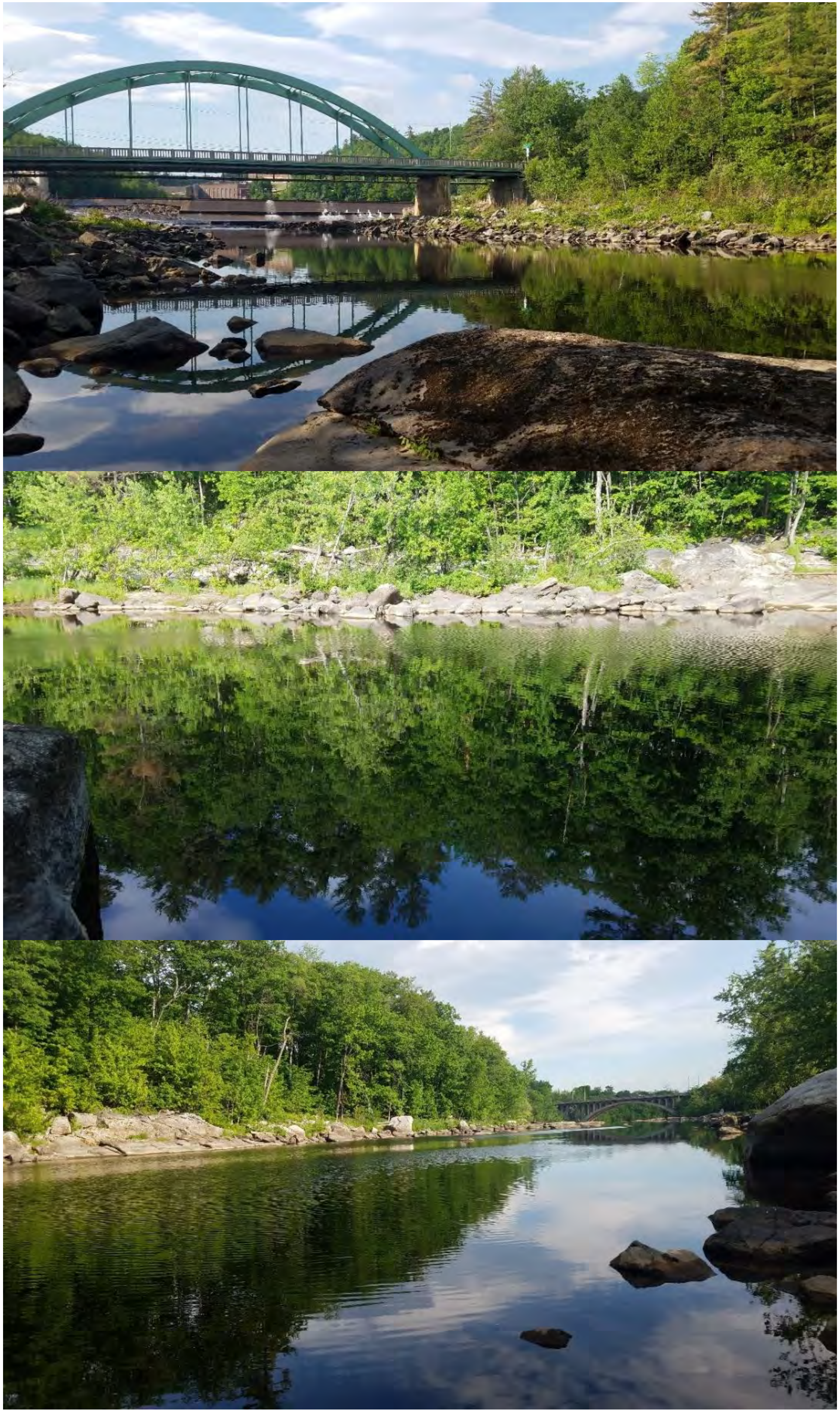


Photo 3 – Right bank, Pool 1 – lower middle (looking - upstream, across, downstream)

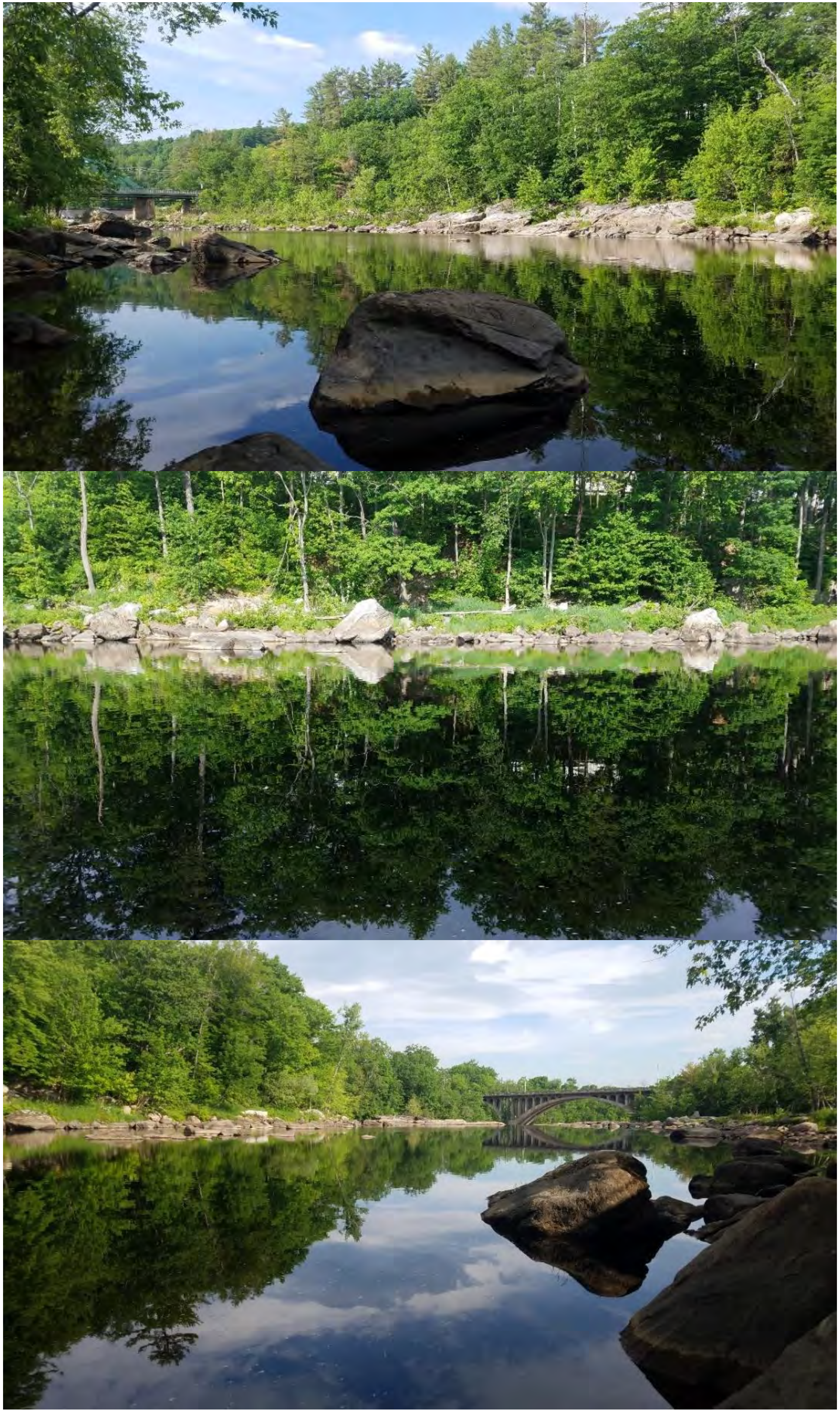


Photo 4 – Right bank, Pool 1 – lower end (looking - upstream, across, downstream)

Photo 5 – Right bank, Cascade 1/Pool 2 (looking - upstream, across, downstream)

Photo 6 – Right bank, Pool 3/Cascade 3 (looking - upstream, across, downstream)

Photo 7 – Right bank, Run 1 (looking – upstream (foreground), across, downstream (foreground))

Photo 8 – Right bank, Run 1/Riffle 1 (looking - upstream, across, downstream)

Photo 9 – Left bank, Pool 4/Riffle 1 (looking - upstream, across, downstream)

ATTACHMENT 2

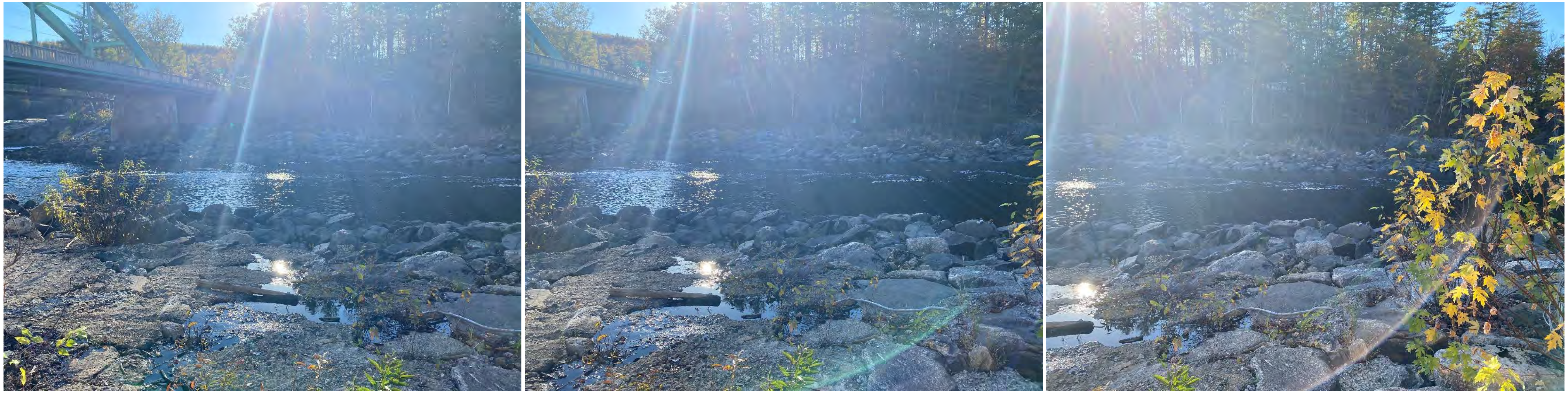
PHOTOGRAPHS OF EACH TRANSECT AT EACH CALIBRATION FLOW

Transect 1: October 14, 2021; calculated discharge of 61 cfs

Transect 1: October 15, 2021; calculated discharge of 92 cfs

Transect 1: October 19, 2021; calculated discharge of 195 cfs

Transect 1: October 20, 2021; calculated discharge of 270 cfs

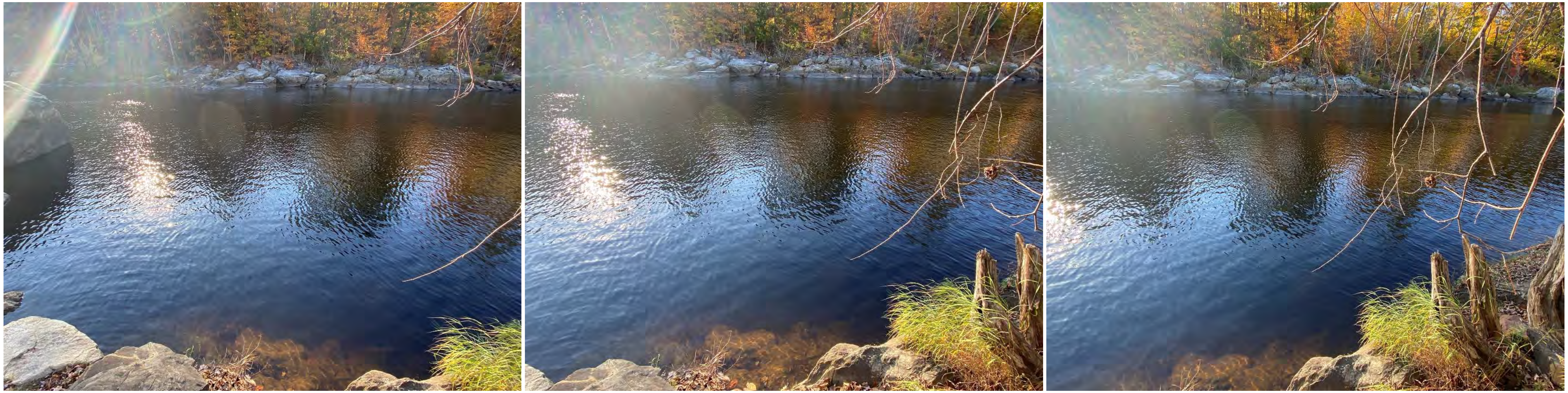


Transect 2: October 14, 2021; calculated discharge of 61 cfs

Transect 2: October 15, 2021; calculated discharge of 92 cfs

Transect 2: October 19, 2021; calculated discharge of 195 cfs

Transect 2: October 20, 2021; calculated discharge of 270 cfs



Transect 3: October 14, 2021; calculated discharge of 61 cfs

Transect 3: October 15, 2021; calculated discharge of 92 cfs

Transect 3: October 19, 2021; calculated discharge of 195 cfs

Transect 3: October 20, 2021; calculated discharge of 270 cfs

Transect 4: October 14, 2021; calculated discharge of 61 cfs

Transect 4: October 15, 2021; calculated discharge of 92 cfs

Transect 4: October 19, 2021; calculated discharge of 195 cfs

Transect 4: October 20, 2021; calculated discharge of 270 cfs

Transect 5: October 14, 2021; calculated discharge of 61 cfs

Transect 5: October 15, 2021; calculated discharge of 92 cfs

Transect 5: October 19, 2021; calculated discharge of 195 cfs

Transect 5: October 20, 2021; calculated discharge of 270 cfs

ATTACHMENT 3

HABITAT SUITABILITY CRITERIA METADATA AND CURVES

		Site -			Stream		Sample	Fish Length cm		-
Species	**Name**	**Specific**	**State**	**River**	**Width** ft	**Flow** cfs	**Size**	**Min**	**Max**	**Source**
SMB	Bovee	N	various	various	-	-	-	-	-	Bovee 1978
SMB	Oklahoma	N	OK	-	-	-	55	-	-	Edwards et al. 1983
SMB	Feather	Y	CA	Feather	70-106	96-131	52	16		TRPA 2001
SMB	Susquehanna	Y	PA	Susquehanna	3,900	3600-35000	129	12	46	Allen 1996
SMB	Virginia	Y	VA	N Anna & Craig	80-115	40-100	111	20	-	Groshens & Orth 1994
SMB	Huron	Y	MI	Huron	115	-	109	20	-	Monahan 1991
SMB	W Virginia	Y	WV	New,Meadow,Greenbriar	-	-	49	25	-	Joy et al. 1981
SMB	SoCal	Y	CA	4 rivers		2-460	90	21	-	Studley et al. 1986
SMB	Minnesota	Y	MN	5 rivers	-	-	141	-	-	Aadland & Kuitunen 2006
SMB	Baron Fork	Y	OK	Baron Frk Crk	-	-	64	115	-	Fisher & Remshardt 2000
RBT	Bovee	N	OR,ID,BC	various	-	-	-	-	-	Bovee 1978
RBT	Raleigh	N	OR,ID,CA,BC	various	-	-	-	-	-	Raleigh et al. 1984
RBT	Up Klamath	Y	OR	upper Klamath	87	325	164	16	40	TRPA 2004
RBT	NF Stanislaus	Y	CA	NF Stanislaus	48	26-333	243	16	30	TRPA 1993
RBT	Stanislaus Hi Flow	Y	CA	NF,MF,SF Stanislaus	49-71	30-333	194	16	40	TRPA 2002
RBT	LNF Feather PrAb	Y	CA	lower NF Feather	70-106	96-131	95	16	46	TRPA 2001
RBT	Pit	Y	CA	Pit	40-200	50-150	252	16	-	Baltz & Vondracek 1985
RBT	SF American Lrg	Y	CA	SF American	42-90	154	56	16	50	TRPA 2000
RBT	Battle	Y	CA	Battle	14-29	4-108	164	16	35	TRPA 1998
RBT	Deer Use	Y	CA	Deer	-	100-200	96	13	-	Moyle & Baltz 1985
RBT	Clavey	Y	CA	Clavey	-	24-130	474	16	-	Tuol Co/Turlock Irr Dist 1993
RBT	UNF Feather Comp	Y	CA	up NF Feather	40-50	40-140	179	16	42	TRPA 2002
RBT	UARP lrg	N	CA	generic lrg chan	-	-	-	-	-	Stillwater (unpub)
RBT	YubaBear lrg	N	CA	Yuba R forks/tribs	-	-	-	-	-	HDR (unpub)
BRN	Bovee	N	various	various	-	-	-	-	-	Bovee 1978
BRN	Raleigh	N	various	various	-	-	-	-	-	Raleigh et al. 1986
BRN	MF Stan	Y	CA	MF Stanislaus	40-55	50-200	147	16	-	TRPA 1992
BRN	Kananaskis	Y	Alberta	Kananaskis R	75-150	70	79	25	-	Courtney et al. 1998
BMI	Bovee	N	various	various	-	-	-	-	-	Bovee 1978
BMI	Platte	Y	NE	Platte R	-	-	-	-	-	Peters et al. 1989
BMI	Gore	Y	SE USA	various	-	-	1200	-	-	Gore et al. 2001

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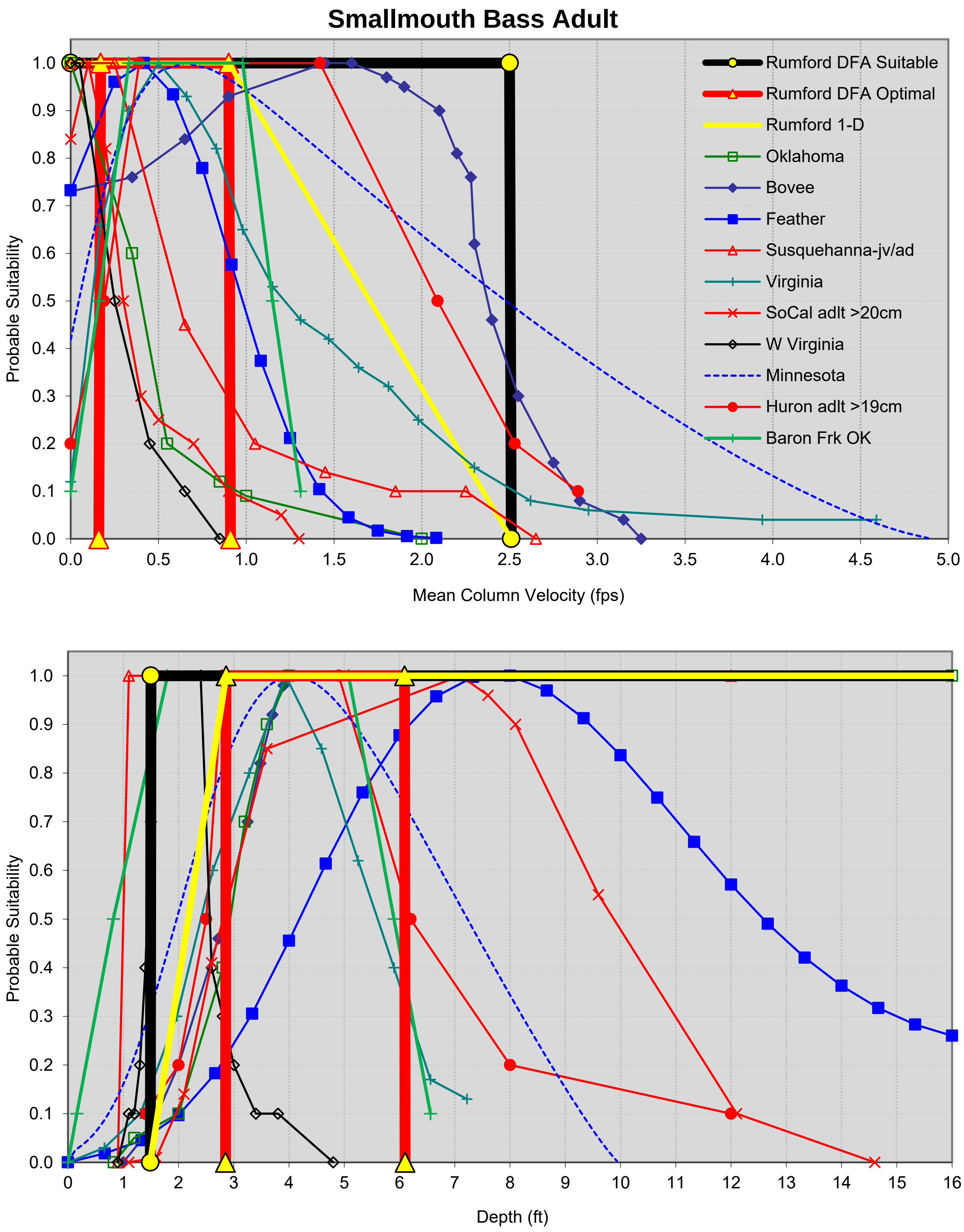
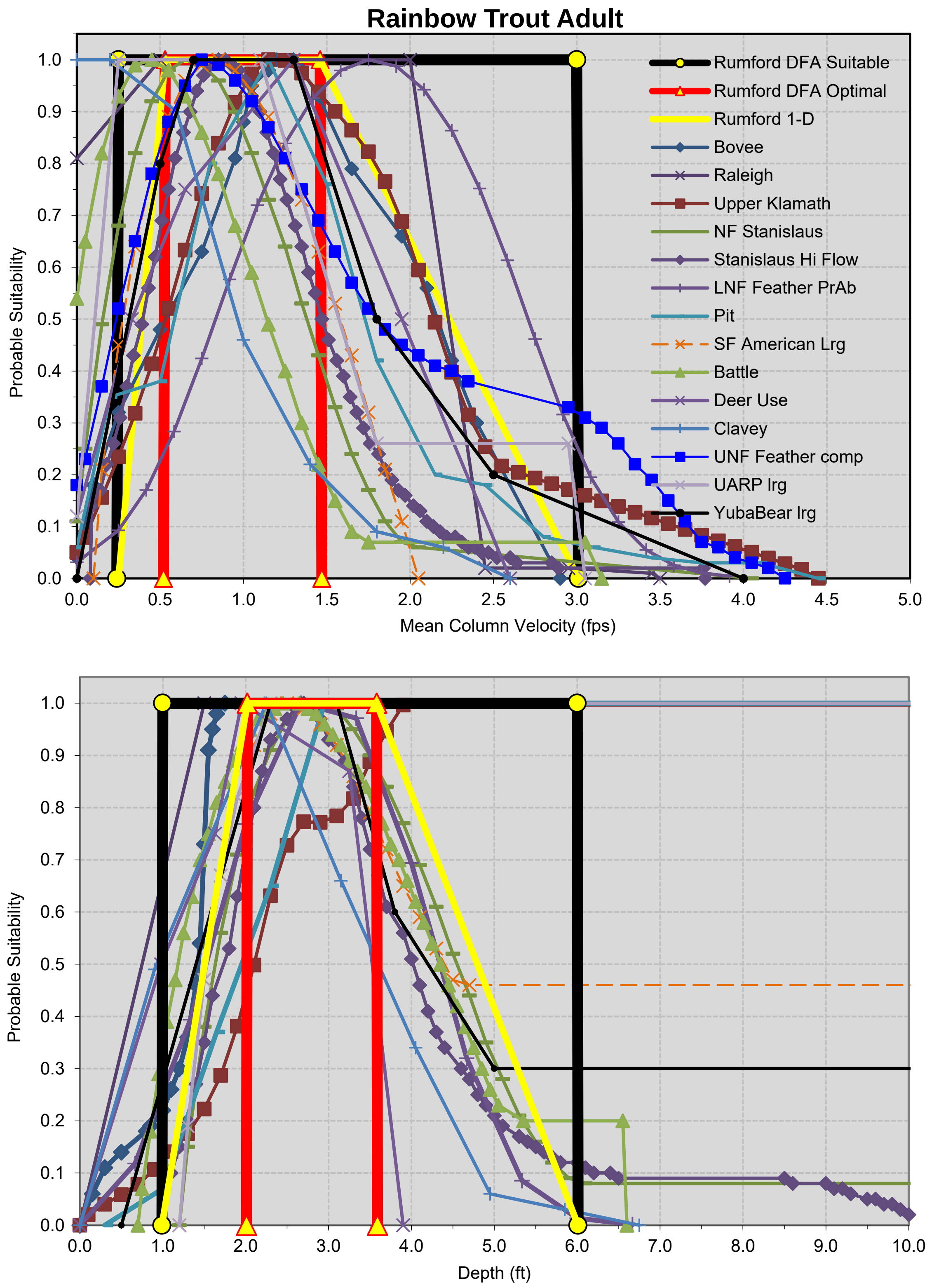
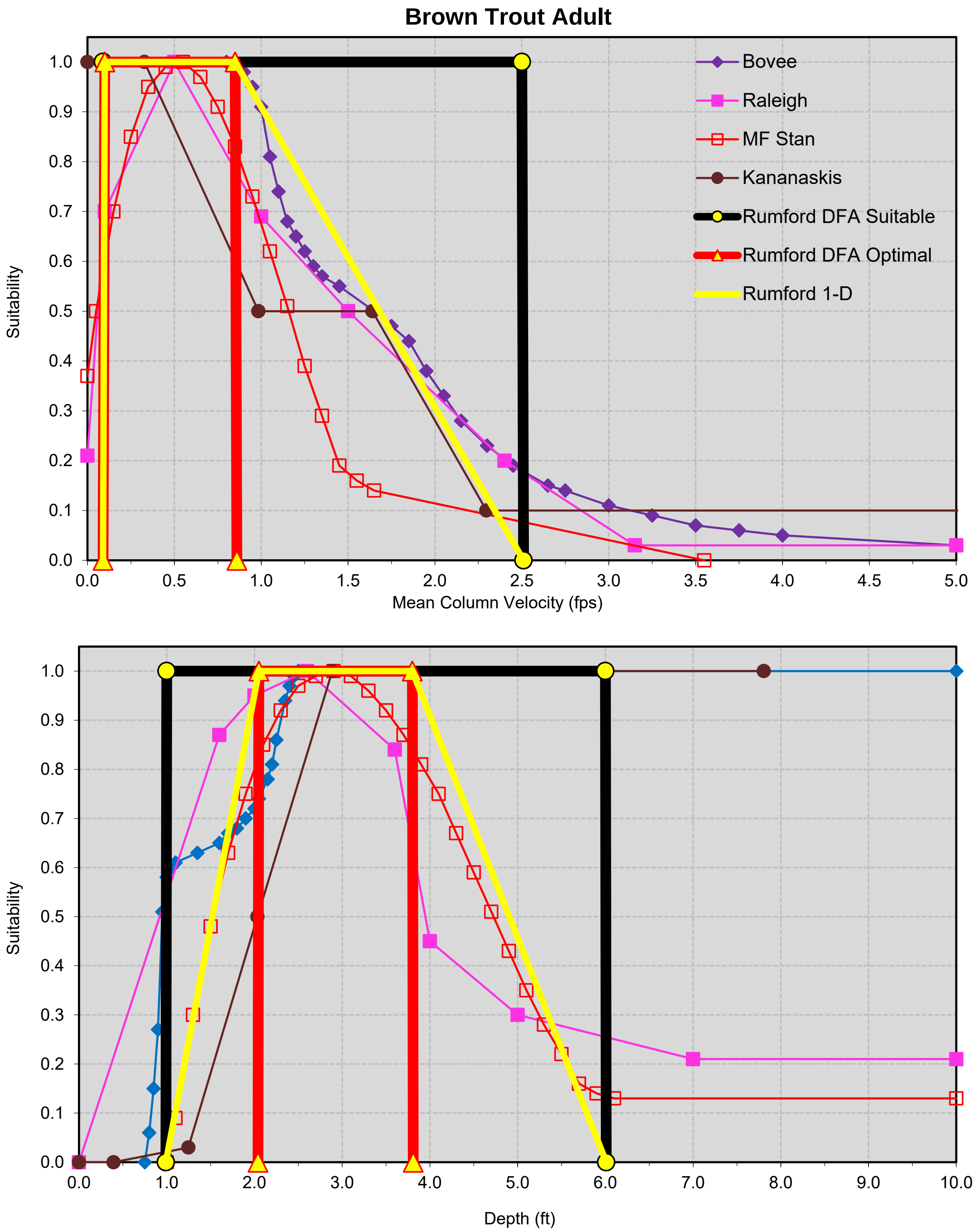


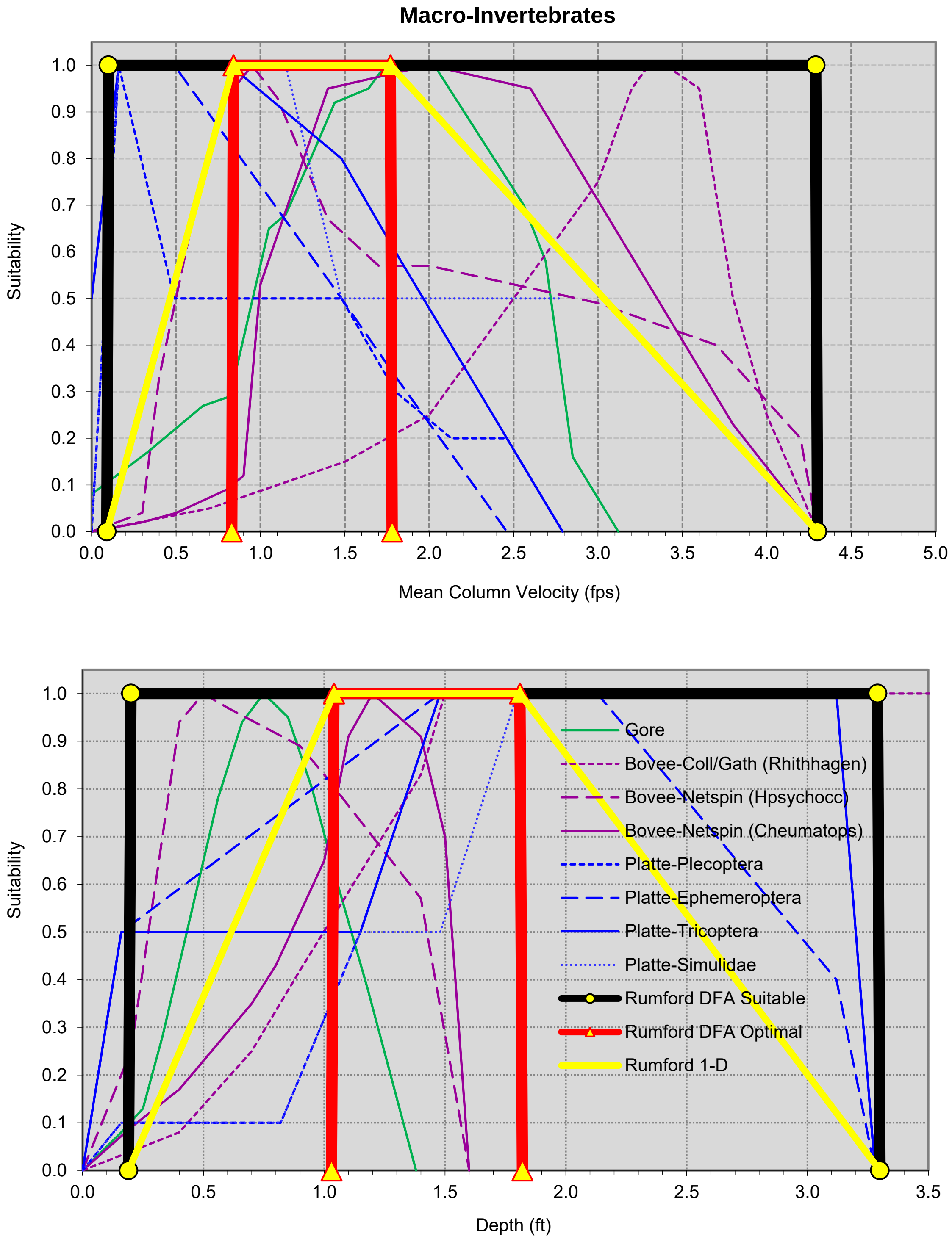
HSC curves for adult smallmouth bass with HSC used to represent DFA suitable, DFA optimal, and 1-D modeling HSC.



HSC curves for adult rainbow trout with HSC used to represent DFA suitable, DFA optimal, and 1-D modeling HSC.



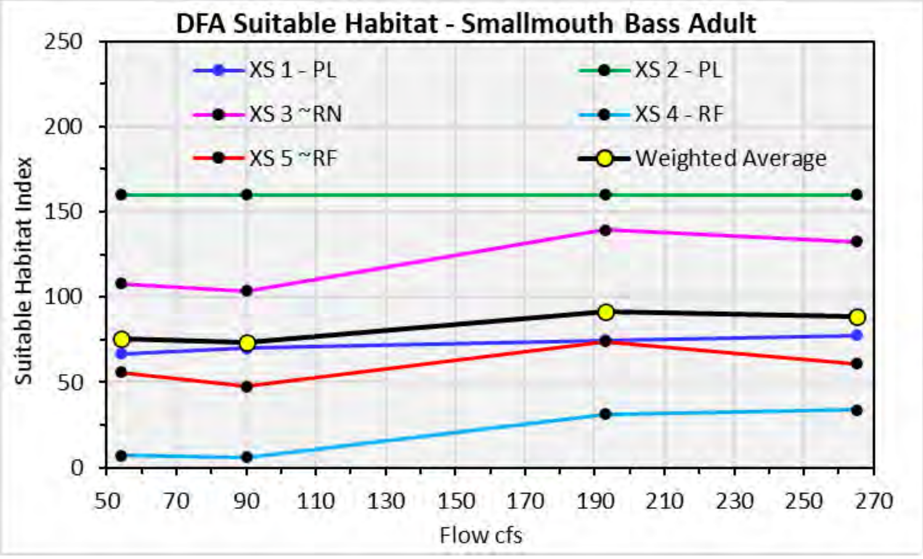
HSC curves for adult brown trout with HSC used to represent DFA suitable, DFA optimal, and 1-D modeling HSC.

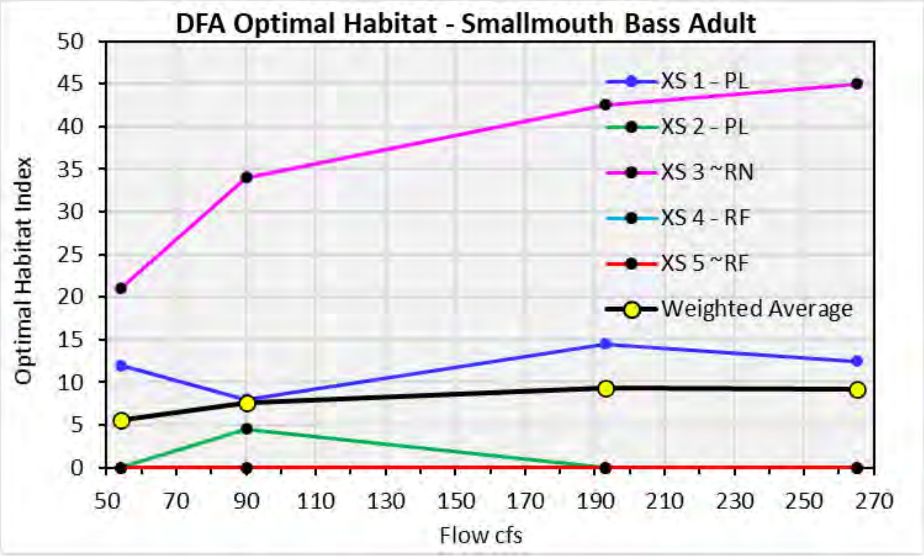


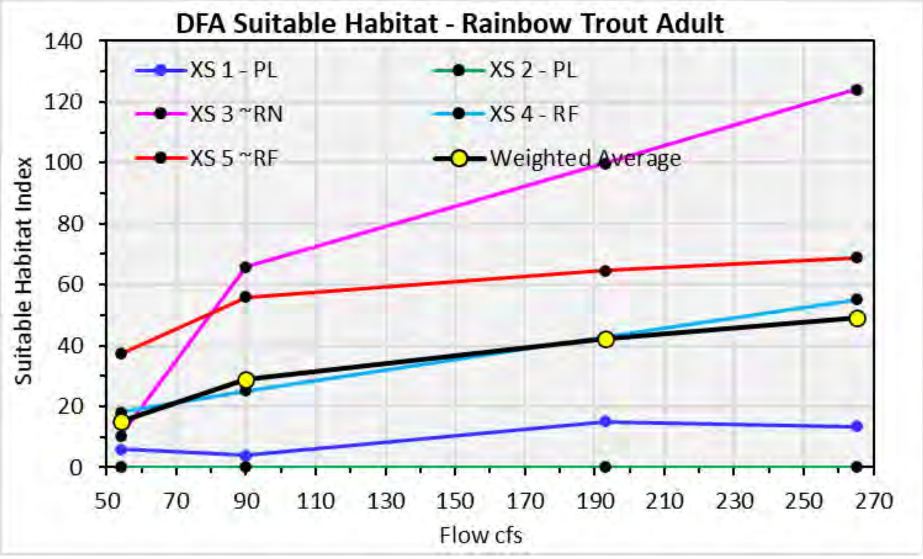
HSC curves for BMI with HSC used to represent DFA suitable, DFA optimal, and 1-D modeling HSC.

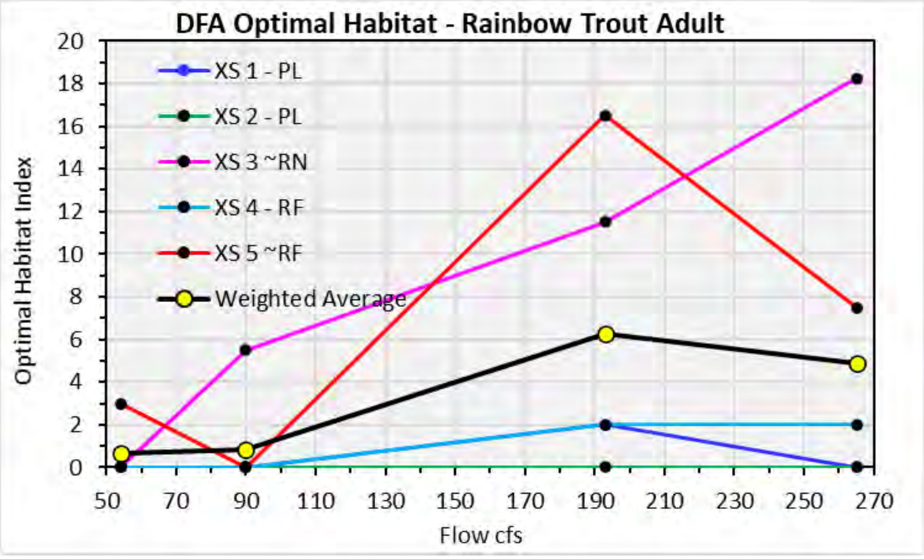
ATTACHMENT 4

DEMONSTRATION FLOW ASSESSMENT CURVES


DFA Suitable Habitat - Smallmouth Bass Adult


DFA Optimal Habitat - Smallmouth Bass Adult


DFA Suitable Habitat - Rainbow Trout Adult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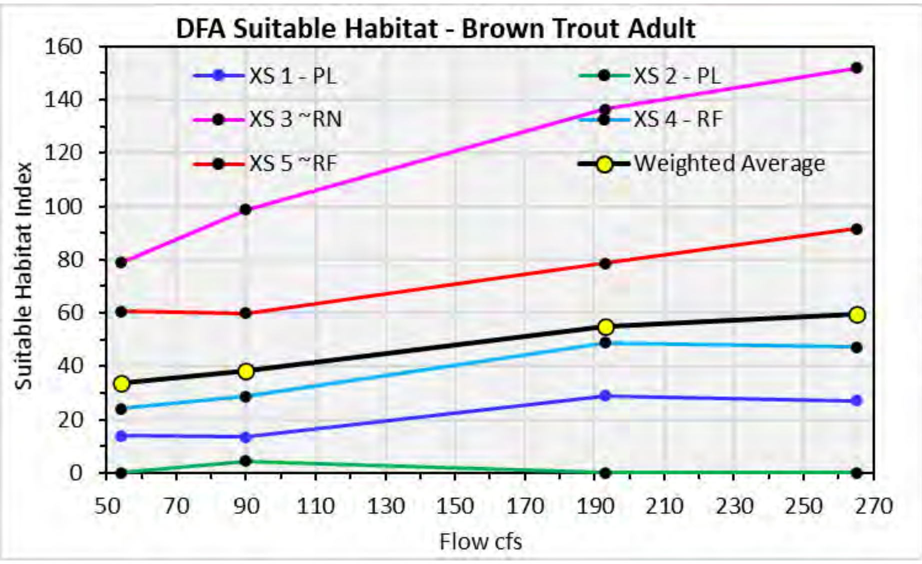
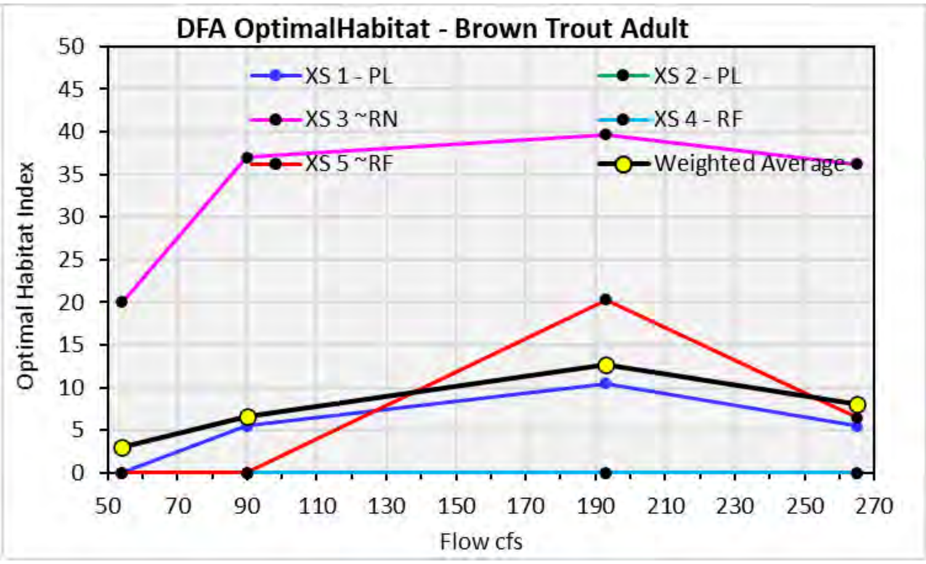
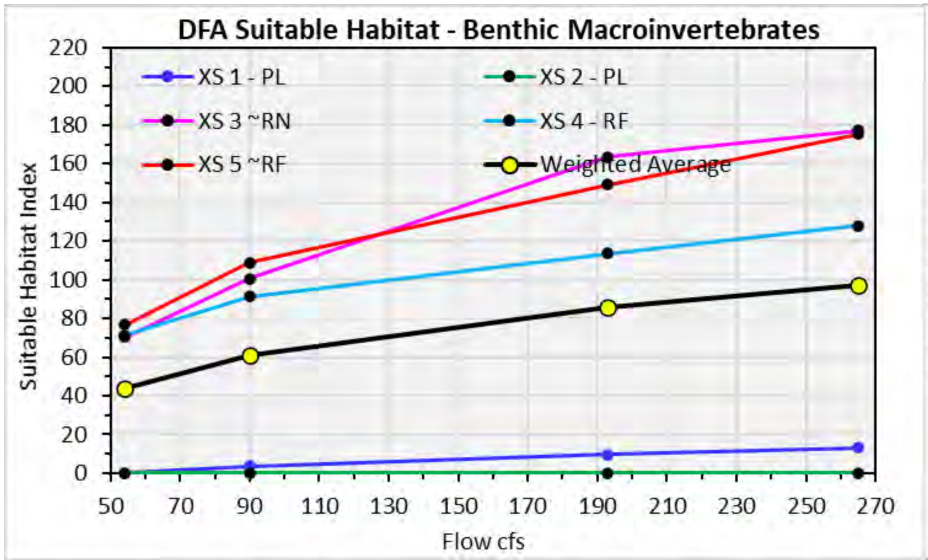
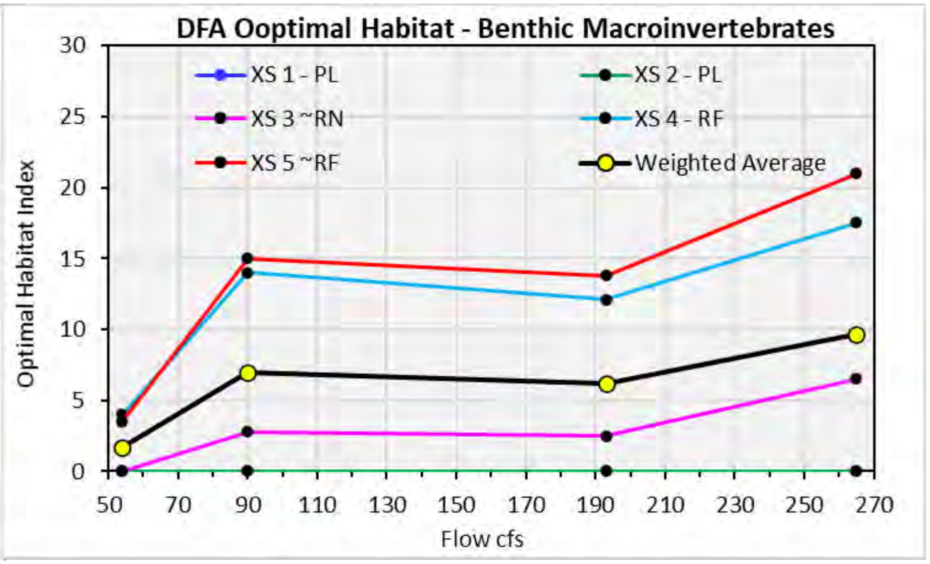

DFA Suitable Habitat - Brown Trout Adult


DFA OptimalHabitat - Brown Trout Adult

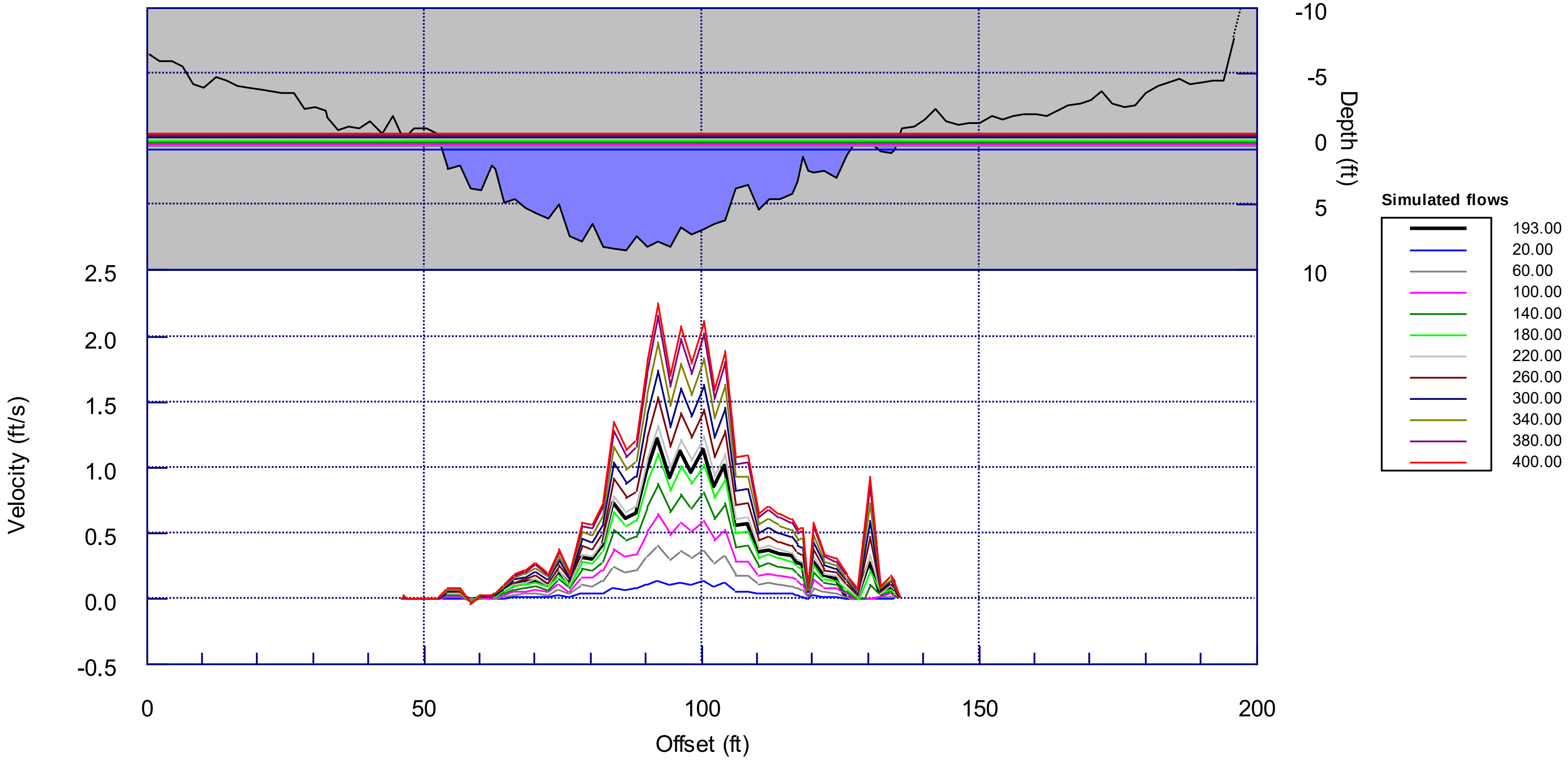

DFA Suitable Habitat - Benthic Macroinvertebrates


DFA Ooptimal Habitat - Benthic Macroinvertebrates

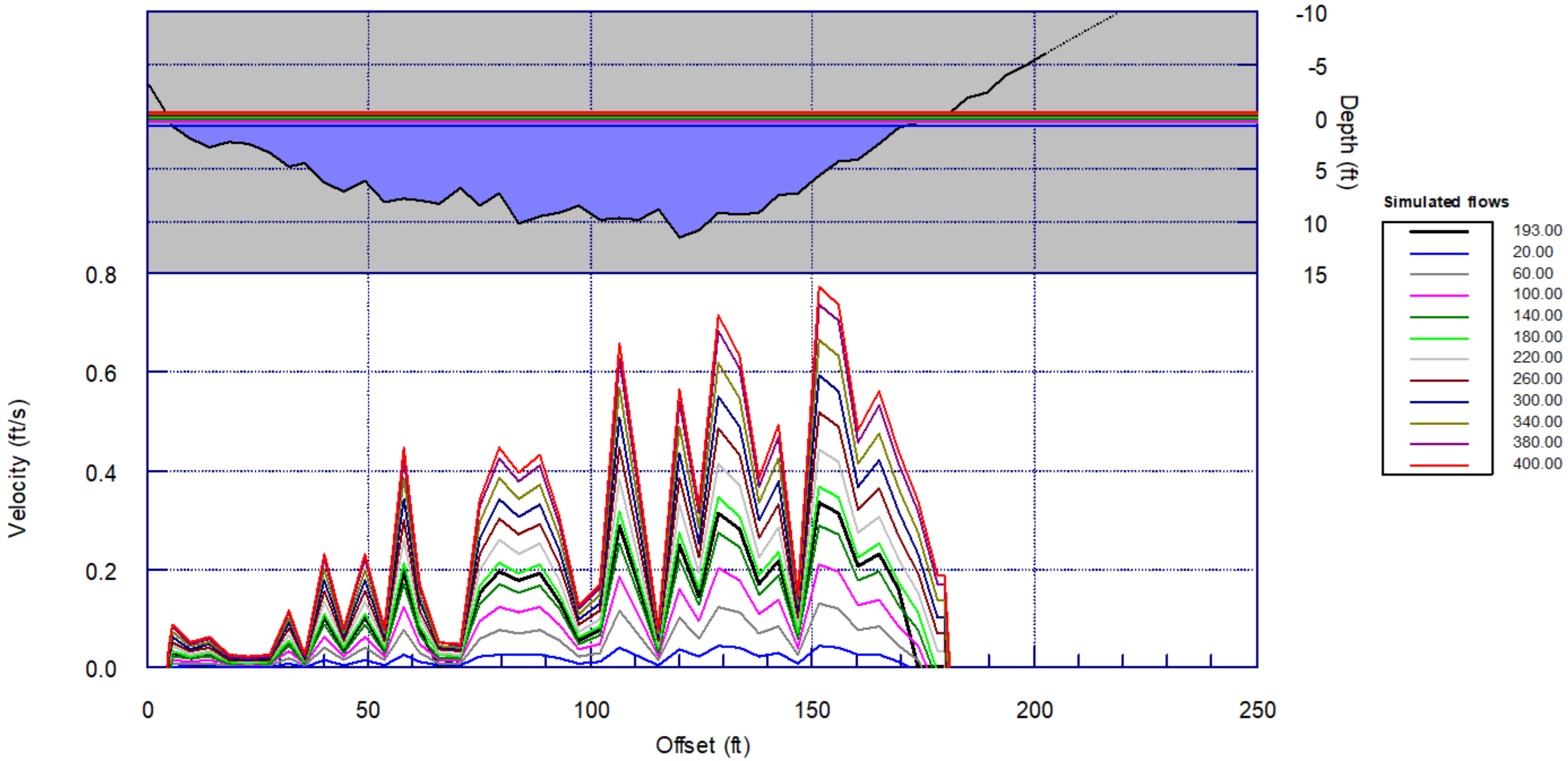
ATTACHMENT 5

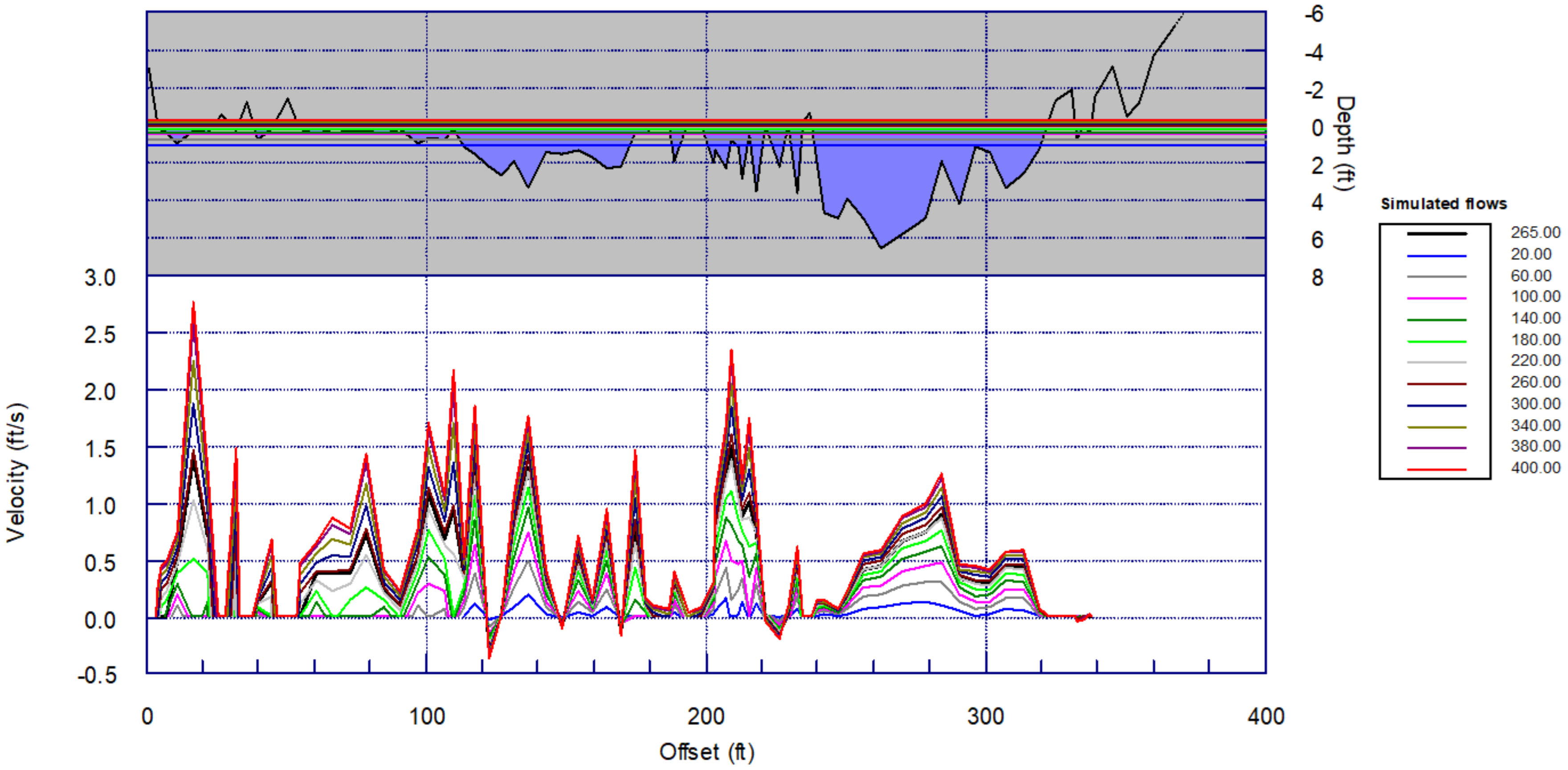
TRANSECT BOTTOM PROFILE, WATER SURFACE ELEVATION, AND VELOCITY DISTRIBUTION PLOTS

Cross-section: T1- Pool



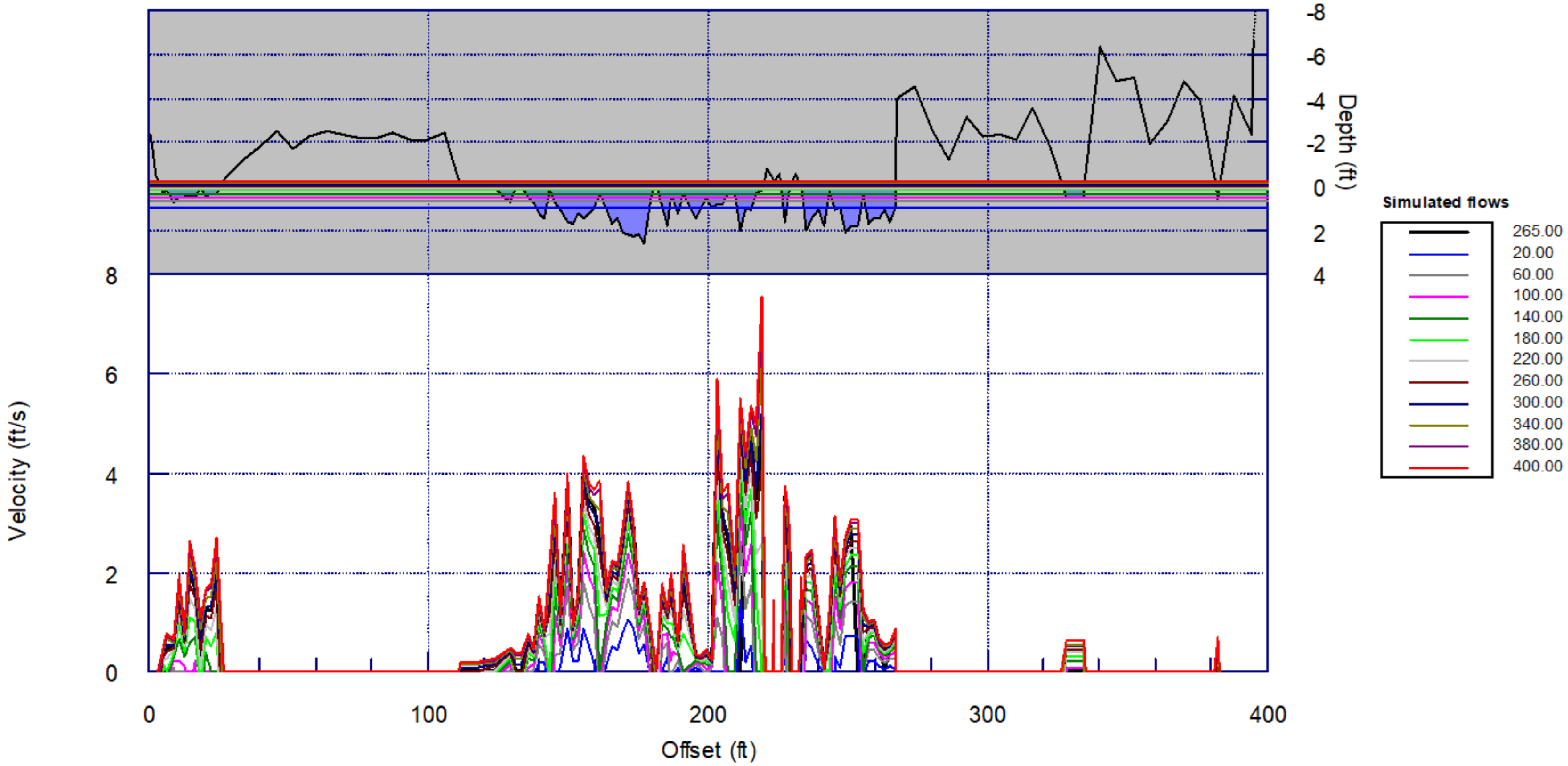
Cross-section: T2- Pool



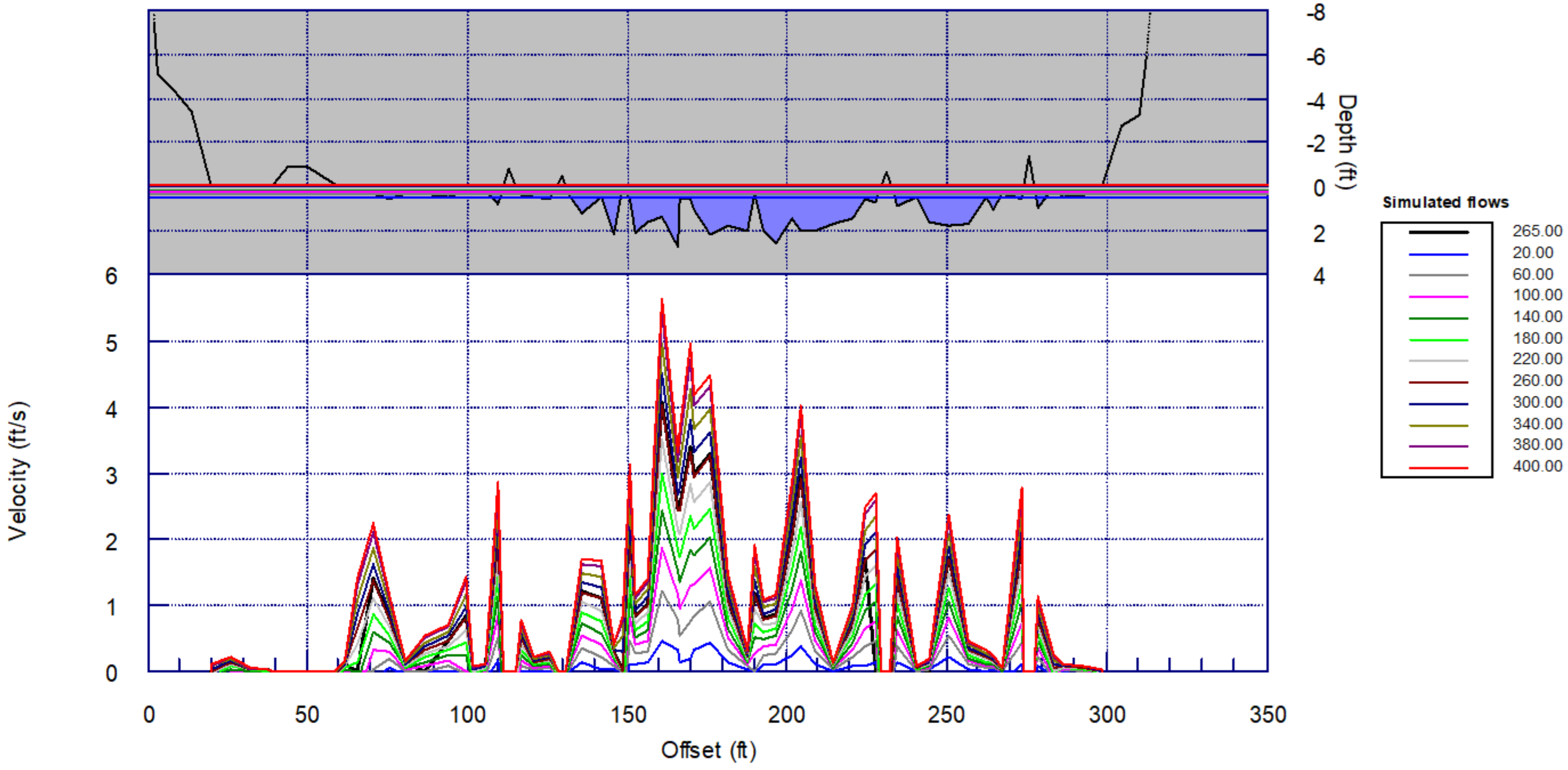


Cross-section: T3- Run

Cross-section: T4- Riffle



Cross-section: T5- Riffle



APPENDIX C

WHITEWATER BOATING STUDY REPORT

Whitewater Boating Study Report

1.0 Introduction

The Town of Rumford requested Rumford Falls Hydro LLC (RFH) conduct a Whitewater Boating Study to evaluate the feasibility of whitewater boating within the 1.1-mile-long stretch of the Androscoggin River between the Project's Middle Dam and the Maine Department of Agriculture, Conservation, and Forestry (MDACF) Boat Launch - Mexico. In the August 6, 2020, Study Plan Determination (SPD) for the Project, the Commission approved the Town of Rumford's proposed Whitewater Boating Study, with modifications. Pursuant to the Commissions' SPD, RFH conducted the approved Whitewater Boating Study in 2021 and 2022.

2.0 Goals and Objectives

The objective of the Whitewater Boating Study was to better understand the feasibility of whitewater boating recreation in the Project's Middle Dam bypass reach. The goals of the Whitewater Boating Study were to gain information about the type of whitewater opportunities that might be provided in the Middle Dam bypass reach, including the safety and quality of those experiences.

3.0 Study Area

The initial study area included the 1.1-mile-long reach of the Androscoggin River between the J. Eugene Boivin Park and the MDACF Boat Launch – Mexico. During the on-land assessment conducted in 2021, it was agreed that put-in at J. Eugene Boivin Park and the Middle Dam would be too dangerous due to the proximity of the low head dam (Middle Dam) and the potential for recreational boaters to put-in unknowingly above Class V rapids located further downstream (not visible from Middle Dam); therefore, the put-in location was moved further downstream, behind the Rumford Public Library and behind the Rumford Town Hall. This reach includes whitewater features ranging from Class I – V (Figure 1).

FIGURE 1
REACH EVALUATED FOR WHITEWATER BOATING STUDY

4.0 Methodology

In accordance with the SPD, RFH followed the methodology outlined in Whittaker et al. (2005) consistent with whitewater flow studies performed at hydropower projects and is in line with generally accepted practices in the scientific community. Whittaker et al. (2005) recommends "… *a progressive approach with 'phased' efforts of increasing resolution. All studies have to provide similar initial information about recreation opportunities, their likely dependency on flows, and potential project effects. However, more intensive or detailed studies will only be prescribed in situations that merit them*." Consistent with the Whittaker et al. (2005) methodology, the Whitewater Boating Study was performed in a stepwise approach, which included each of the activities described below. The study approach, which was distributed to stakeholders in January 2021 for their review, is provided as Attachment 1. In summary, the stakeholders did not have any comments on study approach.

4.1 Level 1: Desktop Evaluation

To better understand the whitewater opportunities at the Project, a desktop evaluation was conducted which consisted of a: (1) literature review; (2) flow analysis; and (3) structured interviews with experienced recreation users and resource experts.

A literature review was preformed to summarize existing information pertaining to recreation opportunities and the river's physical characteristics (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.

The flow analysis reviewed hydrology information as it related to whitewater (i.e., when whitewater conditions may naturally occur versus a scheduled release scenario) and identified operational constraints, safety concerns (e.g., station trips), and the effects to Project operations.

Structured interviews were conducted with experienced recreation users to obtain local knowledge of the river, recreation opportunities, and potential flow effects. RFH conducted focused interviews with a select number of stakeholders with knowledge of the reach, including those that identified themselves as experienced boaters. Per FERC's SPD, RFH also consulted with the Maine Department of Inland Fisheries and Wildlife (MDIFW) to discuss the flows needed to support angling in the Middle Dam bypass reach and how whitewater releases may influence those opportunities.

4.2 Level 2: Field Reconnaissance

A Level 2 field reconnaissance was conducted to assess the feasibility and quality of potential boating opportunities and estimate potential flow ranges for the study by scouting the reach from land. This consisted of: (1) development of a working group to provide guidance for the on-land boating feasibility assessment and potential single flow assessment; and (2) conducting an on-land boating feasibility assessment to determine the feasibility of boating in the reach, boater and public safety, quality of potential boating opportunities, and estimation of target flow ranges that would limit such opportunities.

4.2.1 Working Group

An initial kickoff meeting was held virtually on February 10, 2021. RFH provided meeting attendees with an overview of the study plan methodology, which was distributed in January 2021 prior to the meeting.

Following the kickoff meeting, a Working Group was developed consisting of one representative from the 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/non-governmental organizations (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), Town of Rumford
Chris Reed (Fire Chief), Town of Rumford
Jim Pellerin, MDIFW

4.2.2 On-Land Assessment

A preparation call for the on-land boating feasibility assessment was held on May 20, 2021. On May 26, 2021, the Working Group, and in addition, three experienced whitewater boaters 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 (Attachment 2).

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 cubic feet per second [cfs], 1,500 cfs, and 2,000 cfs). The assessment forms completed during the on-land assessment indicated support to advance to an on-water assessment (Level 3).

4.3 Level 3: Full Analysis

A Level 3 on-water analysis was performed to evaluate the target whitewater flows that were identified from Level 1 and 2 activities. The analysis also included: (1) completion of pre- and-post-fieldwork surveys by boating participants at each flow; (2) conducting an angler assessment focused on enjoyment and safety at each flow; and (3) participant discussion after all flows were observed to make an overall comparative evaluation.

4.3.1 On-Water Assessment

As previously discussed, based on input from the Working Group, it was determined that boating in the Middle Dam bypass reach was feasible, and thus, the on-water assessment was conducted. The on-water assessment included boaters evaluating target flows of 800 cfs, 1,500 cfs, and 2,000 cfs.

Prior to conducting the on-water assessment, participants completed a pre-run survey (Attachment 3). The pre-run survey asked participants to provide general information about their boating experience, skill level, frequency of boating the Androscoggin River or other rivers, and preferred watercraft. Participants completed a post-run survey after each boating run was completed under each of the three flow conditions of 800 cfs, 1,500 cfs, and 2,000 cfs (Attachments

4, 5, and 6, accordingly). The post-run survey asked participants to evaluate their boating experience under the specific flow. Given the two distinct skill-level runs within the reach, participants filled out post-run surveys for the upper reach and the lower reach. All participants filled out a comparative assessment form following the conclusion of all flow runs (Attachment 7).

Pursuant to Whittaker et al. (2005), an on-site group discussion was held following completion of the study runs, in which boaters discussed their experiences at each flow, identified safety issues, and summarized opinions about the feasibility of boating, types of opportunities, and possible flow ranges.

5.0 Results

5.1 Level 1: Desktop Evaluation

5.1.1 Literature Review

The Middle Dam bypass reach is approximately 0.5 river miles (RM) in length between Middle Dam to Lower Station powerhouse. This reach drops in elevation from 479 feet above mean sea level (msl) to 423 feet above msl over approximately 0.5 RM (downstream of Middle Dam to Lower Station powerhouse) or 3,121 feet, with a river gradient of 1.8 percent (94.9 feet per mile). Downstream of the Lower Station powerhouse, the river has a more gradual slope and drops from elevation 423 feet above msl to 410 feet above msl over approximately 2 RM or 10,534 feet, having an average river gradient of 0.1 percent (6.5 feet per mile). There is little documented information regarding whitewater opportunities or utilization in this reach, however, local whitewater boaters who participated in the study have provided accounts of boaters running the first drop (the slide) (Class IV), second drop (Class V) and the play area (Class I-III). In discussions with local whitewater boaters, the short reach below the play area is suitable for teaching novice boater whitewater boating basics.

RFH conducted a literature review of existing whitewater opportunities in the immediate Project area and region. A 12.3-mile reach of the Swift River, from the town of Roxbury, Maine to the confluence of the Androscoggin River approximately 1,000 feet downstream of the Lower Station powerhouse, is designated by American Whitewater as Class II-III whitewater. Based on discussions with local whitewater boaters, boaters run the Swift River in the vicinity of the Project under high flows in the spring. The Swift River is a steep, tiered, cascade, averaging 60 feet wide with a run of 150 feet (World Waterfall Database 2019). The Swift River contains a small waterfall with a 12-foot drop followed by a second 4-foot drop downstream (World Waterfall Database 2019).

RFH reviewed the American Whitewater database and identified documented whitewater opportunities within 60 miles of the Project. There are 59 documented whitewater opportunities according to the American Whitewater database, ranging in skill level. Table 1 summarizes these opportunities.

TABLE 1
DOCUMENTED WHITEWATER OPPORTUNITIES WITHIN 60 MILES OF THE RUMFORD FALLS PROJECT.

River Name	State	Reach Description	Whitewater Boating Class	Approx. Length (River Miles)	Approx. Distance from Project (miles)
Webb River	Maine	Webb Lake to Carthage	III	4.9	8
Black Brook	Maine	Devils Den to Ellis Rd., Rte 120	IV-V+	8.1	11
Bear River	Maine	Devils Horseshoe to N. Newry	II-III	7.6	14
Bull Branch	Maine	Bull Branch Rd to Sunday River Rd	IV-V	2.0	19
Sunday River	Maine	Pool to Androscoggin	II-III	7.6	16
Swift Cambridge	Maine	Cedar Brook to Dead Cambridge Rd	II-V	7.8	25
Swift River	Maine	Swift – Rt 17 Bridge to Mexico	II-III	12.3	9
Wild River	Maine	Hastings Rd to Gilead Rd	III-IV	8.7	24
Wilton Stream	Maine	Wilton to E. Wilton	II	5.9	18
Temple Stream	Maine	Drury Pond to Sandy River	II-III	8.6	19
Sandy Stream	Maine	Farmington Falls to New Sharon	II-III	6.6	24
Sandy Stream	Maine	Phillips Rd to Fairbanks Bridge	I-II	20.5	22
Sandy Stream	Maine	S. Branch Rd to Phillips	II-III	15.8	21
Orbeton Stream	Maine	Barnjum Stream to Sandy River	IV-V	5.2	23
Sandy Stream	Maine	Smalls Falls to S. Branch Rd	II-III	5.5	22
Long Pond Stream	Maine	Edelheid Rd to S. Shore Dr	IV-V	1.8	23
Kennebago	Maine	Kennebago Lake to Bridge	III-IV	7.2	33
Dead, S. Branch	Maine	Dallas School to Langston Mill	II-III	6.5	32
Magalloway	Maine	Parmachenee Lake to Aziscohos Lake	V+	3.6	45
Magalloway	Maine	Third E. Branch to First E. Branch	I-IV	8.8	56
Cupsuptic	Maine	Big Canyon to Big Falls	V+	6.9	47
Dead, S. Branch	Maine	Green Farm Bridge to Flagstaff	II-III	7.6	39
Dead, N. Branch	Maine	Chain Lakes to Eustis	I-III	26.5	42
Carrabassett, S. Branch	Maine	At Trail to Rte 27 Bridge	IV-V	2.7	39
Carrabassett	Maine	Carrabassett to Kingfield	I-IV	10.3	35
Mill Steam	Maine	Embden Pond to Slipp Rd	II	2.6	39
Wesserunsett Stream	Maine	Athens to Kennebec Rd	I	14.8	46
Sebasticook	Maine	Burnham to Benton	I-III	13.9	54
Nezinscot	Maine	Headwaters to Androscoggin Rd	I	19.4	25
Androscoggin	Maine	Dresser Rips (Lewiston, ME)	II-III	0.5	37

River Name	State	Reach Description	Whitewater Boating Class	Approx. Length (River Miles)	Approx. Distance from Project (miles)
Cathance	Maine	US Rte 1 to Cathance Rd	III-IV	3.5	51
Royal	Maine	Yarmouth Historical Society to Town Landing	IV	1.3	54
Cobbosseecontee Stream	Maine	Cobbosseecontee Lake to Pleasant Pond	II	11.6	42
Sheepscot, W. Branch	Maine	Weeks Mills to Sheepscot River	I-II	12.3	59
Sheepscot	Maine	Sheepscot Pond to Somerville	II	4.0	55
Sheepscot	Maine	Coopers Mills to W. Branch	II-III	3.8	53
Cobbosseecontee Stream	Maine	Gardiner to Kennebec River	II-III	1.0	44
Sandy Stream	Maine	Freedom Pond to Unity Pond	II-III	9.5	60
Sandy Stream	Maine	Stony Brook to Michael Stream (Lexington, Maine)	IV-V	5.6	40
Dead River	Maine	Spencer Falls to West Forks	II-III (IV)	14.8	61
Carrying Place Stream	Maine	2 Miles up to Wyman Lake	V	2.2	51
Carrabassett	Maine	Kingfield to US Rte 201A	I-IV	21.1	38
Carrabassett	Maine	Carrabassett to Kingfield	I-IV	10.3	35
Little Androscoggin	Maine	W. Paris to S. Paris	I-II	9.7	20
Crooked	Maine	Albany to N. Waterford	I-II	11.7	24
Androscoggin	New Hampshire	Bragg's Bay to Pontook	I-II	17.5	35
Peabody	New Hampshire	Rte 16 to Gorham	IV	4.8	33
Diamond River	New Hampshire	Swift Diamond to Wentworth Location	III-IV	3.5	35
Pemigewasset, N. Fork	New Hampshire	Ethan Pond to Franconia Falls	IV-V	13.9	59
Saco	New Hampshire	Crawford Notch to Barlett	III-IV	6.3	48
Saco, E. Branch	New Hampshire	Rte 302 to Lower Bartlett	Iv-V	2.1	43
Dry	New Hampshire	Dry River Trail to Dry River Campground	V	1.6	49
Rocky Branch	New Hampshire	Jericho Rd to Rte 302	IV-V	4.2	44
Nulhegan	Vermont	Hatchery to Connecticut River	II-III(V)	6.4	56
Mohawk	New Hampshire	Colebrook	II-III	9.9	53
Phillips Brook	New Hampshire	Milan	III	9.6	40
Ammonoosuc (Upper)	New Hampshire	W. Milan to Kilkenny Loop Rd	II	6.1	37
Ammonoosuc	New Hampshire	Bretton woods to Twin Mountain	II-III	7.2	48
Ammonoosuc	New Hampshire	Pierce Bridge to NH 116	II-IV	4.7	57
Lovell	New Hampshire	Pine Hill Rd to Rte 25	IV-V	6.0	61

Source: American Whitewater 2022.

5.1.2 Flow Analysis

As part of the desktop evaluation, flow data from the U.S. Geographical Survey (USGS) gage located approximately 550 feet downstream from the Lower Station Development’s powerhouse (i.e., USGS 01054500 Androscoggin River at Rumford, Maine) were compiled to assess and summarize historic flows based on the Project’s operation pursuant to the existing FERC-issued license and natural river hydrology. The monthly and annual minimum, average, and maximum flows from 2000 through 2021 are provided in Table 2. Table 3 presents the percentage of time flows were greater than the Lower Station’s maximum hydraulic capacity of 3,100 cfs. Flow duration curves are provided in Attachment 8.

Based on flow data from 2000 through 2021, the monthly average flows in the Androscoggin River typically have exceeded the hydraulic capacity of the Lower Station (i.e., 3,100 cfs) except in August and September (See Table 2). During the summer months (i.e., July, August, and September), which are often peak months for whitewater boating in this region, the daily average flows in the Androscoggin River have exceeded the hydraulic capacity of the Lower Station from 12.0 percent to 29.9 percent of the time. In June, the daily average flows exceeded the Lower Station’s hydraulic capacity 55.2 percent of the time (Table 3).

Table 4 presents the percentage of time flows in the Middle Dam bypass reach equaled or exceeded the study target flows (800 cfs, 1,500 cfs, and 2,000 cfs) assuming the Lower Station is operating at maximum capacity (3,100 cfs). During the area’s typical peak whitewater months of June, July, August, and September, 800 cfs is available 39.8 percent, 17.4 percent, 10.0 percent, and 6.2 percent of the time, respectively. A flow of 1,500 cfs is available 29.4 percent, 12.6 percent, and 7.6, and 3.9 percent of the time, respectively. And finally, a flow of 2,000 cfs is available 24.5 percent, 10.3 percent, 6.0 percent, and 3.3 percent of the time, respectively. Additionally, outside of the peak whitewater months, target whitewater flows are naturally available, particularly during the spring months when flows in the Androscoggin River are the often highest.

TABLE 2
RUMFORD FALLS PROJECT – HISTORICAL MONTHLY AND ANNUAL MINIMUM, AVERAGE, AND MAXIMUM FLOWS IN THE ANDROSCOGGIN RIVER, 2000 THROUGH 2021

Month	Minimum Flow (cfs)	Average Flow (cfs)	Maximum Flow (cfs)	10% Exceedance	90% Exceedance
January	1,110	3,735	19,500	5,129	2,162
February	1,390	3,518	13,000	4,909	2,191
March	1,450	4,625	27,300	6,998	2,450
April	1,960	9,296	42,800	18,320	3,720
May	1,510	6,957	23,500	14,000	2,731
June	1,100	4,371	30,400	8,513	1,740
July	1,260	3,158	20,300	5,118	1,720
August	1,140	2,679	37,900	3,819	1,530
September	1,050	2,263	10,400	3,343	1,390
October	998	3,715	34,900	6,997	1,470
November	925	4,253	22,800	7,774	1,940
December	1,210	4,353	33,400	7,056	1,890
Annual	**925**	**4,410**	**42,800**	**8,375**	**1,720**

1. Data for period January 1, 2000 to December 31, 2021.

2. Based on daily average discharge data from USGS Androscoggin Gage.

TABLE 3
RUMFORD FALLS PROJECT – PERCENT OF TIME ANDROSCOGGIN RIVER FLOWS HISTORICALLY WERE GREATER THAN THE LOWER POWERHOUSE'S HYDRAULIC CAPACITY (3,100 CFS), MONTHLY 2000 THROUGH 2021

Month	Percentage of Time [1,2]
January	72.4%
February	69.1%
March	75.2%
April	94.5%
May	82.7%
June	55.2%
July	29.9%
August	18.0%
September	12.0%
October	35.5%

Month	Percentage of Time [1,2]
November	56.1%
December	59.1%
Annual	54.9%

1. Data for period January 1, 2000 to December 31, 2021.
2. Based on daily average discharge data from USGS Androscoggin Gage.

TABLE 4
RUMFORD FALLS PROJECT – PERCENT OF TIME FLOWS IN THE MIDDLE DAM BYPASS REACH WERE GREATER THAN THE TARGET FLOWS, MONTHLY FROM 2000 THROUGH 2021

Month	Percent of Time [1,2,3]		
	800 cfs	1,500 cfs	2,000 cfs
January	32.6%	14.5%	10.3%
February	20.6%	12.4%	7.9%
March	54.8%	34.8%	25.1%
April	88.8%	78.5%	72.1%
May	72.9%	63.8%	56.6%
June	39.8%	29.4%	24.5%
July	17.4%	12.6%	10.3%
August	10.0%	7.6%	6.0%
September	6.2%	3.9%	3.3%
October	26.2%	18.2%	16.0%
November	38.3%	27.7%	23.8%
December	37.0%	25.1%	20.4%
Annual	37.1%	27.4%	23.0%

1. Data for period January 1, 2000 to December 31, 2021.
2. Based on daily average discharge data from USGS Androscoggin Gage.
3. Assumes Lower Station is operating at max capacity of 3,100 cfs (i.e., 3,100 cfs was subtracted from daily average).

5.1.3 Effects to Project Operations and Safety

An additional component of the desktop evaluation is to evaluate potential effects to Project operations and safety. Flows on the Androscoggin River are regulated by upstream non-project and non-RFH storage reservoirs established by the 1909 Androscoggin River Company Headwater Benefits Agreement (HBA), which was updated in 1983 (Androscoggin Reservoir Company [ARCO] HBA, 1909 /1983). The Lower Station Development has a total installed nameplate capacity of 15.2 MW and a maximum hydraulic capacity of 3,100 cfs. Pursuant to the existing

FERC-issued license, the Project is operated in a run-of-river mode with no usable storage. The Project is not able to store flows for whitewater releases and, therefore, any flows at 3,100 cfs or lower directed to the Middle Dam bypass reach from the station will impact generation. Further, when flows are not available to allow one or both of the units to run at approximately 500 cfs or higher to avoid cavitation, the unit needs to be shut down.

As discussed above, the daily average flows in the Androscoggin River have exceeded the hydraulic capacity in the summer months of June, July, August, and September 55.2 percent, 29.9 percent, 18 percent, and 12 percent of the time, respectively, from 2000 through 2021. During this period, the average daily flows in the Androscoggin River in July, and August, and September were 3,158 cfs, 2,679 cfs, and 2,263 cfs, respectively, which were at or below the hydraulic capacity of the Lower Station. The average flow in June over this time period was 4,371 cfs, exceeding the hydraulic capacity of the Lower Station.

Some safety concerns were identified by RFH and study participants in this reach. If one or both of the station units trip off-line when boaters and recreators are present in the reach of the river downstream of Middle Dam, immediate changes (within approximately 30 mins.) in the subject boating area can occur with discharges of approximately 1,500 cfs to 3,000 cfs. Additionally, due to the steep gradient of the Middle Dam bypass reach and shorelines, rescues would prove to be difficult, placing rescuers at risk as well.

During the on-water assessment, the first drop (slide) (Class IV) was noted by study participants as having pin potential (i.e., trapping a boater) on river left under lower flows (800 cfs) and considered suitable for advanced boaters with a safety team or expert experience. The second drop (Class V) was noted by study participants as requiring expert experience given the high risks, such as pin potential, associated with the drop. Study participants stated if running the second drop, setting safety teams is highly advised and is not suitable for intermediate boaters. Some of the participants stated the lower reach required a minimum skill level of beginner to intermediate depending on the watercraft and location.

5.1.4 Structured Interviews

Structured interviews were conducted with John Preble (local resident and whitewater boater), Karen Wilson (local resident and whitewater boater), and George O’Keefe (Town of Rumford, Economic Development Director and recreational boater). All three interviewees are knowledgeable of the Project area and have experience whitewater kayaking or canoeing. Additionally, RFH conducted an interview with Jim Pellerin of MDIFW to discuss the agency's objective of improving angling opportunities in the reach.

The three individuals interviewed with knowledge of the reach are all in support of providing whitewater opportunities in the reach. Two of the three individuals have whitewater boated in the reach. These two individuals classified the first drop (slide) and second drop as experts only ranging in Class IV to V depending on flow. The individuals further noted the lower reach (play area and below) is of interest to many boaters as it is opens up more opportunity to other skill levels (Class I to III). All three were interested in weekend releases in the summer (June, July, August). One boater also indicated they would be interested in having whitewater releases in early September.

In the interview with MDIFW, it was stated that the goal of the agency is to improve angling opportunities in the bypass reach. MDIFW stated concerns with whitewater flows and its negative impact to fish in the bypass reach as well as angler safety. MDIFW supported naturally occurring whitewater flows (mainly spring flows) as the fish species are conditioned to those flows at that time of year.

Summaries of these interviews are included for reference in Attachment 9.

5.2 Level 2: Field Reconnaissance

The Level 2 on-land boating feasibility assessment was performed on May 26, 2021. The following Working Group participants attended:

- Bob Nasdor, American Whitewater (whitewater boater)
- Todd Papianou, local resident (whitewater boater)
- John Preble, local resident (whitewater boater)
- George O'Keefe, Town of Rumford, Economic Development Director
- Chris Reed, Town of Rumford Fire Chief

Additional participants included:

- Harold Herschag, Mahoosuc Mountain Rescue (whitewater boater)
- Jake Risch, Sawyer River Group (whitewater boater)
- Alex Kerney, Mahoosuc Mountain Rescue (whitewater boater)

Participants were asked to identify any potential hazards in the reach under minimum flow conditions (21 cfs). Observed hazards within the reach included old concrete with protruding rebar and logging remnants in the vicinity of the Portland Street Bridge, which crosses above the second drop (Class V). Participants identified safety concerns with access near Middle Dam (a low head dam). Additionally, it was noted that the lower falls were not readily visible from J. Eugene Boivin Park and suggested placing signage to warn of falls danger below.

In addition to identifying potential hazards, participants were asked to evaluate various characteristics of potential put-in and take-out locations on the river including the J. Eugene Boivin Park, an informal access trail behind the Rumford Public Library ("Public Library Trail Access"), informal trail access behind Rumford Town Office ("Rumford Town Office Access"), informal trail access adjacent to River St./Hartford St. ("River St./Hartford St. Access"), MDACF Boat Launch - Mexico, and the Carry-In Launch/Carlton St. (Table 5). An additional site, the Town Dirt Lot/Snow Dump Trail, was not evaluated due to poor access and was subsequently removed as a potential access location in concurrence with the Working Group.

TABLE 5
ON-LAND ASSESSMENT PARTICIPANTS' SUMMARY EVALUATION OF POTENTIAL ACCESS LOCATIONS

	J. Eugene Boivin Park (put-in)	**Public Library Trail Access (put-in / take-out)**	**Rumford Town Office Access (put-in)**	**River St. / Hartford St. Access (put-in)**	**MDACF Boat Launch -Mexico (take-out)**	**Carry-In Launch / Carlton St. (take-out)**
Parking availability/capacity	Good	Good	Good	Good	Good	Limited
Proximity to roadway/parking area and length of trail	Good	Needs improvement	Needs improvement	Needs improvement	Good	Good

	J. Eugene Boivin Park (put-in)	**Public Library Trail Access (put-in / take-out)**	**Rumford Town Office Access (put-in)**	**River St. / Hartford St. Access (put-in)**	**MDACF Boat Launch -Mexico (take-out)**	**Carry-In Launch / Carlton St. (take-out)**
Adjacent land use and ownership compatibility	Compatible	Compatible	Compatible	Compatible	Compatible	Compatible
Slope, gradient, and/or stability of the trail for transporting boat from vehicle to launch or vice versa	Minimal grade	Moderate downhill grade	Steep slope down to water access	Steep slope	Boat launch grade	Inferior access due to traverse from ramp to parking lot
Potential for boat staging area	Yes	Yes	Yes	Yes	Existing	Possible
Height above water at put-in/take-out locations	10-15 feet	Water level	Water level	Water Level	Water level	Water level
Stream gradients at each location	Flat backwater	Waterfall feature not accessible, adequate for play hole	Moderate flow, closest put-in to the whitewater and was attractive to boaters as a scouting and observation site	Flat, close to the whitewater and was attractive to boaters wanting a warm up before running the falls	Flat	Minimal flow, Adequate, Slight upstream paddle to access site that may discourage boaters from using this as a takeout

Participants noted that the Public Library Trail Access and Rumford Town Office Access would be the most accessible put-in locations and the MDACF Boat Launch - Mexico would be the preferred take-out location.

Participants evaluated the boating feasibility of the reach at 1,500 cfs, observing the overall quality of the reach and noting safety concerns. This flow was agreed upon by the Working Group in the May 5, 2021 on-land assessment prep meeting. The upper reach, consisting of the first drop (slide), was observed to be a Class IV rapid suitable for kayaks and closed canoes (Figure 1). The second drop in the upper reach was considered a Class V rapid suitable for only kayaks. The play spot in the lower reach was evaluated as Class II-III rapids suitable for a wide range of skill sets and a variety of boats (e.g., kayaks, canoes, stand-up paddleboards). Overall, participants considered the

1,500 cfs flow good or adequate to run the first two drops and suggested a higher flow would be beneficial for the lower play spot. Specifically, participants discussed that 1,500 cfs would be the minimum flow for good boating in the play spot. All participants who provided on-land evaluation forms recommended continuing to an on-water feasibility assessment (Attachment 2).

5.3 Level 3: Full Analysis

Extensive coordination was required in the planning of the Level 3 on-water boating assessment component of the study. RFH closely monitored the flow and weather to determine if there would be sufficient flows to successfully complete the on-water assessment. The on-water assessment was postponed three times in 2021 due to low flows (September 24, 2021; October 21, 2021; and October 26, 2021). The on-water assessment was then scheduled for May 17, 2022, but postponed due to high flows and rescheduled for June. RFH provided regular updates to the Working Group and study participants.

The on-water boating assessment was performed on June 9, 2022, between 8:00 am and 5:30 pm and assessed flows of 800 cfs, 1,500 cfs, and 2,000 cfs. Participants convened at the Rumford Town Hall and study participants included intermediate, advanced, and expert level boaters. RFH developed and consulted with the Working Group regarding the pre-run, post-run, and comparative survey forms. RFH identified field safety protocols and procedures, including the use of on-scene emergency rescue crews, and all participants were required to adhere to the requirements throughout the field study. The boating participants completed evaluation forms following each of the controlled flow whitewater boating runs to evaluate the upper and lower reaches[1] with respect to:

- Estimate of the number of rapids, play spots, and unintended hits, stops, boat drags, and portages encountered on each run;

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[1] Although Whittaker et al. (2005) provides a framework and methodology to assess a reach as a whole; RFH and stakeholders agreed to assess the upper reach and lower reach separately in the assessment forms given the varying skill levels needed for the reaches. This approach provides additional, feature-specific data.

- Evaluation of features such as navigability, technicality, hydraulics, play areas, size/difficulty of rapids, overall whitewater, challenge, crowding, access, shuttles, number of rapids, length of runs, and safety;
- Estimate of acceptable and optimal flow ranges for different types of whitewater boating opportunities (e.g., different skill levels, boat types, or types of boating);
- Qualitative description and estimate of likely demand for boating opportunities;
- Evaluation of existing and potential put-in and take-out locations;
- Comparability to similar rivers in the region; and
- Identify safety concerns related to flows, access, and river features.

All boating participants completed the pre-run, post-run, and a comparative analysis survey. All participants also participated in a focus group discussion following completion of the controlled flow assessments.

5.3.1 Participant Pre-Run Information

Prior to assessing the study flows, all boating participants (four) completed a Pre-Run Survey (Attachment 3). Other individuals (five) provided safety support and participated in a focus group discussion. These boating participants, safety support, and focus group discussion participants (nine total) were associated with a variety of boating groups (such as American Whitewater, Mahoosuc Mountain Search and Rescue Team and Penobscot Paddle and Chowder Society) or identified as private boaters. All participants stated that a hard-shell kayak would be suitable for the two reaches. Three participants indicated that most boat types could likely be used (i.e., hard-shell kayaks, inflatable kayak, closed canoe, and self-bailing rafts greater than 10 feet in length). Two participants identified their skill levels as intermediate and were comfortable running Class III whitewater. One participant identified their skill level as advanced and was comfortable with Class IV whitewater, and one participant identified their skill level as expert and was comfortable running Class V whitewater.

Participants had been whitewater boating between 3 to 40 years, with a mean of 22 years, and spend between 5 to 50 days boating each year, with a mean of 28 days. One participant noted that the pandemic resulted in less whitewater boating days per year than previous years. Additionally, three participants indicated they have not previously participated in a whitewater boating study for a hydroelectric project and have not previously boated the Middle Dam bypass reach. One participant had participated in a whitewater boating study before and had also boated the Middle Dam bypass reach one time prior to the study. This participant reported previously using a hard-shell kayak to boat the reach at an estimated flow of 2,000 cfs.

5.3.2 Bypass Reach Flow Assessment

For all three flows, participants boating the upper reach put-in behind the Rumford Town Hall and those boating the lower reach used the Public Library Access Trail, which avoided the Class IV-V drops in the upper reach. All participants exited the bypass reach at the MDACF Boat Launch - Mexico (Figure 1). Participant assessment of the individual flows are summarized below.

5.3.2.1 800 cfs Flow Assessment

Scouting of the reach was conducted by participants prior to running the reach. At approximately 9:00 am, two participants put-in at the Rumford Town Office Access to boat the upper reach and two participants used the Public Library Access Trail to boat the lower reach. All four participants exited the bypass reach between approximately between 10:45 am – 11:00 am at the MDACF Boat Launch - Mexico. Two participants ran the upper reach, and all four participants ran the lower reach. To distinguish between the different boating experiences of the two reaches, participants were asked to complete a post-run survey for each reach they boated. Therefore, six post-run surveys were completed.

Upper Reach Post-Run Survey – 800 cfs

The two participants who boated the upper reach (Photos 1 and 2) used hard-shell kayaks and did not encounter any hits, stops, drags, or portages. In addition to hard shell kayaks, closed canoes, inflatable kayaks, and self-bailing rafts were also noted as potentially acceptable to boat the upper reach at 800 cfs. The participants experienced three rapids, with one participant specifically noting two Class V rapids and one Class III rapid[2] (Figure 1). When evaluating the number of play spots, one of the participants did not experience any play spots, while the other participant experienced

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[2] Class III rapid recorded on upper reach assessment form, but likely participant incorporated the Class III rapid from the lower reach inadvertently on this form.

two play spots. The participants evaluated the suitably of the flow for whitewater boating for various characteristics, noting that they would both definitely return in the future if this flow was available. Acceptability scores for characteristics of the upper reach at 800 cfs is presented in Table 6.

Both participants indicated the minimum skill level necessary to run the upper reach at 800 cfs was expert. One participant noted that an advanced boater could safely paddle the reach with safety personnel supervising the run. Both participants preferred a higher flow than 800 cfs in the upper reach.

One participant did not identify any safety issues and the other participant noted that the far left rapid (river left) on the first drop (slide) has pin potential (i.e., trapping a boater) at the bottom. Only one participant provided additional comments that suggested setting up safety personnel on river right or the center island just below the second drop. The participant noted that there is plenty of whitewater boating potential at 800 cfs and recommended installing a painted gauge for a minimum flow of 800 cfs and a reasonable maximum flow for most people that would run it. The participant further noted this is not a flow suitable for beginner or intermediate boaters.

PHOTO 1
FIRST DROP OF THE UPPER REACH (CLASS IV) AT 800 CFS

PHOTO 2
SECOND DROP OF THE UPPER REACH (CLASS V) AT 800 CFS

TABLE 6
ACCEPTABILITY SCORES FOR CHARACTERISTICS OF THE UPPER REACH AT 800 CFS

Characteristic	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Totally Acceptable
Navigability	0	0	0	1	1
Challenging Technical Boating	0	0	0	1	1
Powerful Hydraulics	0	0	1	1	0
Whitewater “Play Areas”	0	0	1	1	0
Size/Difficulty of Rapids	0	0	0	1	1
Overall Whitewater	0	0	0	1	1
Challenge	0	0	0	2	0
Safety	0	0	0	1	1

Lower Reach Post-Run Survey – 800 cfs

Of the four participants that boated the lower reach (Photo 3), two participants used hard-shell kayaks, one used an open canoe, and one used a shredder. Three participants indicated they did not encounter any hits, stops, drags, or portages. One participant encountered five hits but did not experience the other obstacles. Closed canoes, hard shell kayaks, inflatable kayaks, shredders, open canoes, and stand-up paddle boards were also noted as potentially acceptable to boat the lower reach at 800 cfs. When evaluating rapids and play spots, participants experienced between one to five rapids, and two to three play spots. The participants evaluated the suitably of the flow for whitewater boating for various characteristics, with one participant noting that they would definitely return in the future if this flow was available, two participants would probably return in the future, and one participant would not return in the future if this flow were available. Acceptability scores for characteristics of the lower reach at 800 cfs is presented in Table 7.

Two participants indicated the minimum skill level necessary to successfully run the lower reach at 800 cfs was intermediate, one of which noted it was only intermediate for boating in open canoes. Two participants indicated the minimum skill level necessary to successfully run the bypass reach at the provided flow was novice, one of which noted it was only novice for kayaks. One participant indicated that beginner boaters could successfully run the bypass reach at the provided flow, noting they should be accompanied by other stronger boaters. All four participants preferred a higher flow than 800 cfs for the lower reach. One participant detailed that 800 cfs was acceptable for just running the reach but would prefer a higher flow for surfing.

Two participants did not identify any safety issues. One participant identified that more water would be better and the 800 cfs is the minimum acceptable flow for surfing and navigating below the surf hole. Another participant identified a sticky hole at the last ledge drop on river left, which was especially difficult for open canoes. One participant provided comments highlighting the great surf potential to draw other participants to the area. Another participant provided the following comments:

- First ledge drop after the put-in location on river left needed more water for a clean run;
- Second ledge on left had a surfable wave, but not great in a canoe;
- Third ledge on the left had an enticing wavy hole, but it was easy to get caught in the sticky hole next to it; and
- Class II rapid above the mill was a little shallow.

PHOTO 3
PLAY SPOT (CLASS III) AND RAPIDS OF LOWER REACH AT 800 CFS

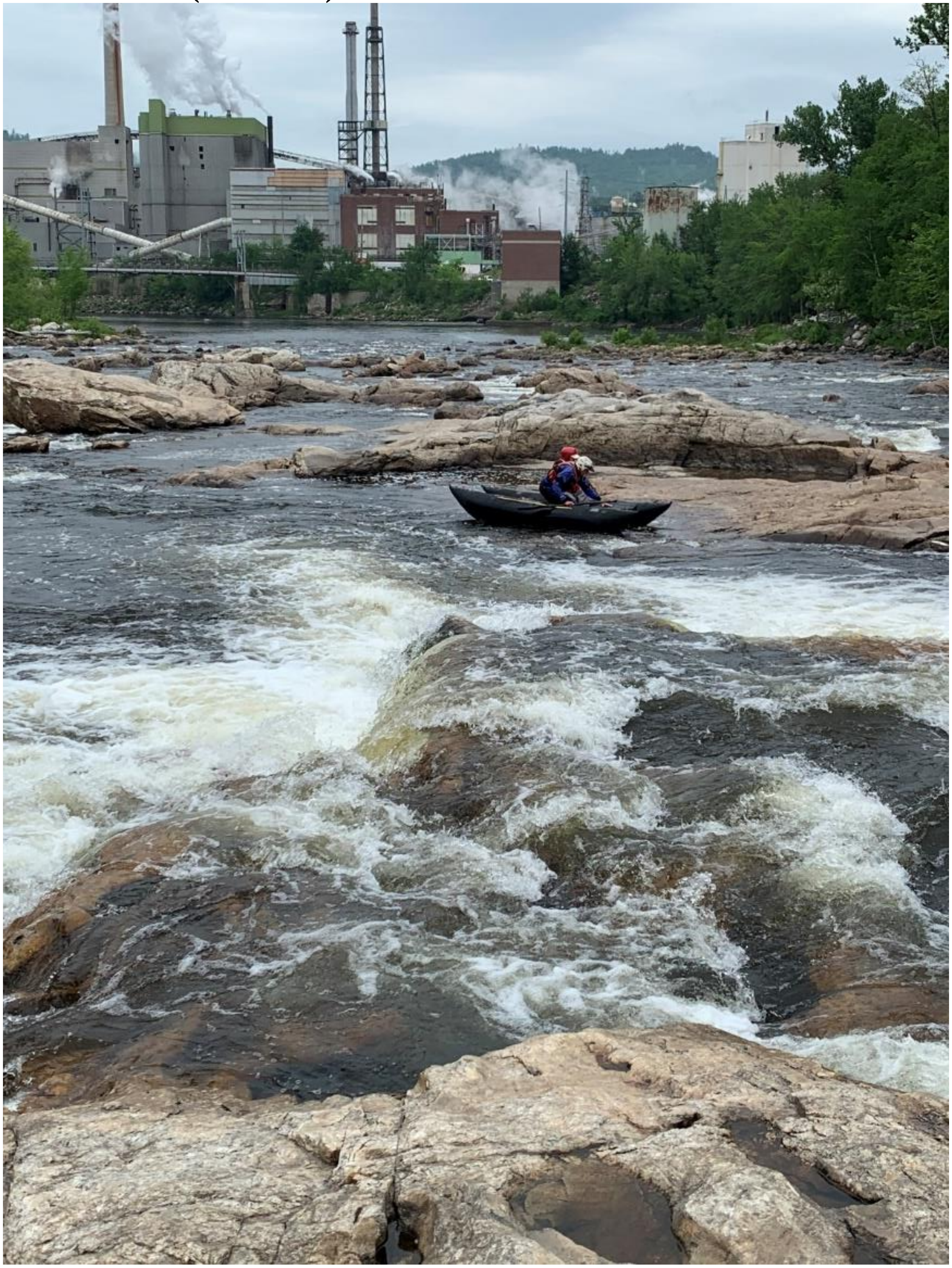

TABLE 7
ACCEPTABILITY SCORES FOR CHARACTERISTICS OF THE LOWER REACH AT 800 CFS

Characteristic	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Totally Acceptable
Navigability	0	0	1	3	0
Challenging Technical Boating	0	0	2	2	0
Powerful Hydraulics	0	0	3	1	0
Whitewater “Play Areas”	0	0	2	2	0
Size/Difficulty of Rapids	0	0	2	2	0
Overall Whitewater	0	0	2	2	0
Challenge	0	0	2	2	0
Safety	0	0	0	3	1

5.3.2.2 1,500 cfs Flow Assessment

Scouting of the reach was conducted by participants prior to running the reach. At approximately 11:30 am, two participants put-in at the Rumford Town Office Access to boat the upper reach and two boaters used the Public Library Access Trail to boat the lower reach. Scouting of the reach was conducted by participants prior to running the reach. All four participants exited the bypass reach between approximately between 1:15 pm – 1:30 pm at the MDACF Boat Launch - Mexico. All four participants ran the lower reach, two of which also ran the upper reach. To distinguish between the different boating experiences of the two reaches, participants were asked to complete a post-run survey for each reach they boated. Therefore, six post-run surveys were completed.

Upper Reach Post-Run Survey – 1,500 cfs

The two participants who boated the upper reach (Photos 4 and 5) used hard-shell kayaks and did not encounter any hits, stops, drags. One of the participants had to portage around rapids one time. In addition to hard shell kayaks, closed canoes were also noted as potentially acceptable to boat the upper reach at 1,500 cfs. Participants experienced two to three rapids, one participant specifically noting two Class V rapids and one Class III rapid[3]. The participants experienced one to two play spots at this flow. The participants evaluated the suitably of the flow for whitewater

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[3] Class III rapid recorded on upper reach assessment form, but likely participant incorporated the Class III rapid from the lower reach inadvertently on this form.

boating for various characteristics, noting that they would both definitely return in the future if this flow was available. Acceptability scores for characteristics of the upper reach at 1,500 cfs are presented in Table 8.

Both participants indicated the minimum skill level necessary to run the upper reach at 1,500 cfs was expert. One participant noted that an advanced boater could safely paddle the reach with good safety personnel supervising the run. Both participants preferred the 1,500 cfs flow for the upper reach (this flow was optimal). One participant noted that this could be an optimal flow but wanted to run at 2,000 cfs before confirming. They also suggested 1,200 cfs might be an optimal flow.

One participant did not identify any safety issues and the other noted that it was harder to scout the second drop and harder to set safety, but not too difficult. Only one participant provided additional comments noting the channel on river left opened up on the first drop. On the river left side of the rapid, the boater must catch the last eddy before the last drop and ferry to the right chute (left and middle chutes are not good). The second drop was harder to scout, but the line was wider. The participant also noted that there were a few fun surfs between the second drop and the surf wave in the lower reach.

PHOTO 4
FIRST DROP OF THE UPPER REACH (CLASS IV AT 1,500 CFS

PHOTO 5
SECOND DROP OF THE UPPER REACH (CLASS V) AT 1,500 CFS

TABLE 8
ACCEPTABILITY SCORES FOR CHARACTERISTICS OF THE UPPER REACH AT 1,500 CFS

Characteristic	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Totally Acceptable
Navigability	0	0	0	1	1
Challenging Technical Boating	0	0	0	1	1
Powerful Hydraulics	0	0	0	1	1
Whitewater “Play Areas”	0	0	0	2	0
Size/Difficulty of Rapids	0	0	0	1	1
Overall Whitewater	0	0	0	1	1
Challenge	0	0	0	1	1
Safety	0	0	0	1	1

Lower Reach Post-Run Survey – 1,500 cfs

Of the participants that boated the lower reach (Photo 6), two participants used hard-shell kayaks, one used an open canoe, and one used a shredder. Three participants indicated they did not encounter any hits, stops, drags, or portages. One participant encountered three hits and had to portage around rapids/sections one time. Closed canoes, hard shell kayaks, inflatable kayaks, shredders, open canoes, and self-bailing rafts were also noted as potentially acceptable to boat the lower reach at 1,500 cfs. When evaluating rapids and play spots, participants experienced between one to five rapids, and one to three play spots. The participants evaluated the suitably of the flow for whitewater boating for various characteristics, with two participants noting that they would definitely return in the future if this flow was available; one participant would probably return in the future, and one participant would not return in the future if this flow were available. Acceptability scores for characteristics of the lower reach at 1,500 cfs are presented in Table 9.

Three participants indicated the minimum skill level necessary to successfully run the lower reach at 1,500 cfs was intermediate, one of which noted it was only intermediate for boating in kayaks. One participant indicated the minimum skill level necessary to successfully run the bypass reach at the provided flow was advanced, noting it was only advanced for open canoes. One participant indicated that beginner boaters could successfully run the bypass reach at the provided flow, noting they should be accompanied by other stronger boaters. One participant also noted that novice skill levels could successfully run the bypass reach at the provided flow. Two participants preferred this flow as the optimal flow, and one participant preferred a higher flow.

None of the participants identified safety issues on this run. Three participants provided comments. One indicated that the surfing was fun, but they could only do flat spins since loops need deeper water; overall, the play spot and rapids were better than at 800 cfs. Another participant identified that the 1,500 cfs flow covered up most of the shallow areas and at the third ledge on the left a nice play hole developed where previously, at 800 cfs, a sticky hole was hard to avoid. Another participant noted it was easier paddling at 1,500 cfs than 800 cfs.

PHOTO 6
PLAY SPOT (CLASS III) AND RAPIDS OF LOWER REACH AT 1,500 CFS

TABLE 9
ACCEPTABILITY SCORES FOR CHARACTERISTICS OF THE LOWER REACH AT 1,500 CFS

Characteristic	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Totally Acceptable
Navigability	0	0	0	2	2
Challenging Technical Boating	0	0	0	1	3
Powerful Hydraulics	0	0	1	1	2
Whitewater “Play Areas”	0	0	0	1	3
Size/Difficulty of Rapids*	0	0	0	0	3
Overall Whitewater	0	0	0	1	3
Challenge	0	0	0	1	3
Safety	0	0	1	1	2

* One participant did not score the acceptability of the size/difficulty of rapids.

5.3.2.3 2,000 cfs Flow Assessment

Scouting of the reach was conducted by participants prior to running the reach. At approximately 3:00 pm, two participants put-in at the Rumford Town Office Access to boat the upper reach and one participant used the Public Library Access Trail to boat the lower reach. All three participants exited the bypass reach between approximately between 3:45 pm – 4:00 pm at the MDACF Boat Launch - Mexico. All three participants ran the lower reach, and two also ran the upper reach. To distinguish between the different boating experiences of the two reaches, participants were asked to complete a post-run survey for each reach they boated. Therefore, five post-run surveys were completed.

Due to rain throughout the course of the day, flows between approximately 3:15 pm and 4:00 pm steadily increased from approximately 2,000 cfs to 2,400 cfs.

Upper Reach Post-Run Survey - 2,000 cfs

The two participants who boated the upper reach (Photos 7 and 8) used hard-shell kayaks and encountered a combined one hit, one stop, and two portages. In addition to hard shell kayaks, closed canoes were also noted as potentially acceptable to boat the upper reach at 2,000 cfs. One participant experienced three rapids and two play spots. After carefully evaluating the conditions, the other participant chose to not boat the upper reach because of fatigue and, therefore, did not encounter any rapids or play spots. The participants evaluated the suitably of the flow for whitewater boating for various characteristics. The participant who chose not to boat the upper reach under 2,000 cfs noted that they would probably return, and the other participant noted they would definitely return in the future if this flow was available. Acceptability scores for characteristics of the upper reach at 2,000 cfs are presented in Table 10.

Both participants indicated the minimum skill level necessary to run the upper reach at 2,000 cfs was expert. Both participants preferred a lower flow than 2,000 cfs for the upper reach. One participant noted a lower flow would be better for the second drop, while the same flow or a higher flow may be ideal for the first drop.

One participant swam at the bottom of the first drop, noting it as a safety concern. The other participant noted striking a rock hard during the second drop trying a left line and was flushed off immediately. The participant experienced no injuries, but the boat was slightly dented. The participant who completed both drops provided comments noting that the first drop was amazing at 2,000 cfs and the second drop was not as good.

PHOTO 7
FIRST DROP OF THE UPPER REACH (CLASS IV) AT 2,000 CFS

PHOTO 8
SECOND DROP OF THE UPPER REACH (CLASS V) AT 2,000 CFS

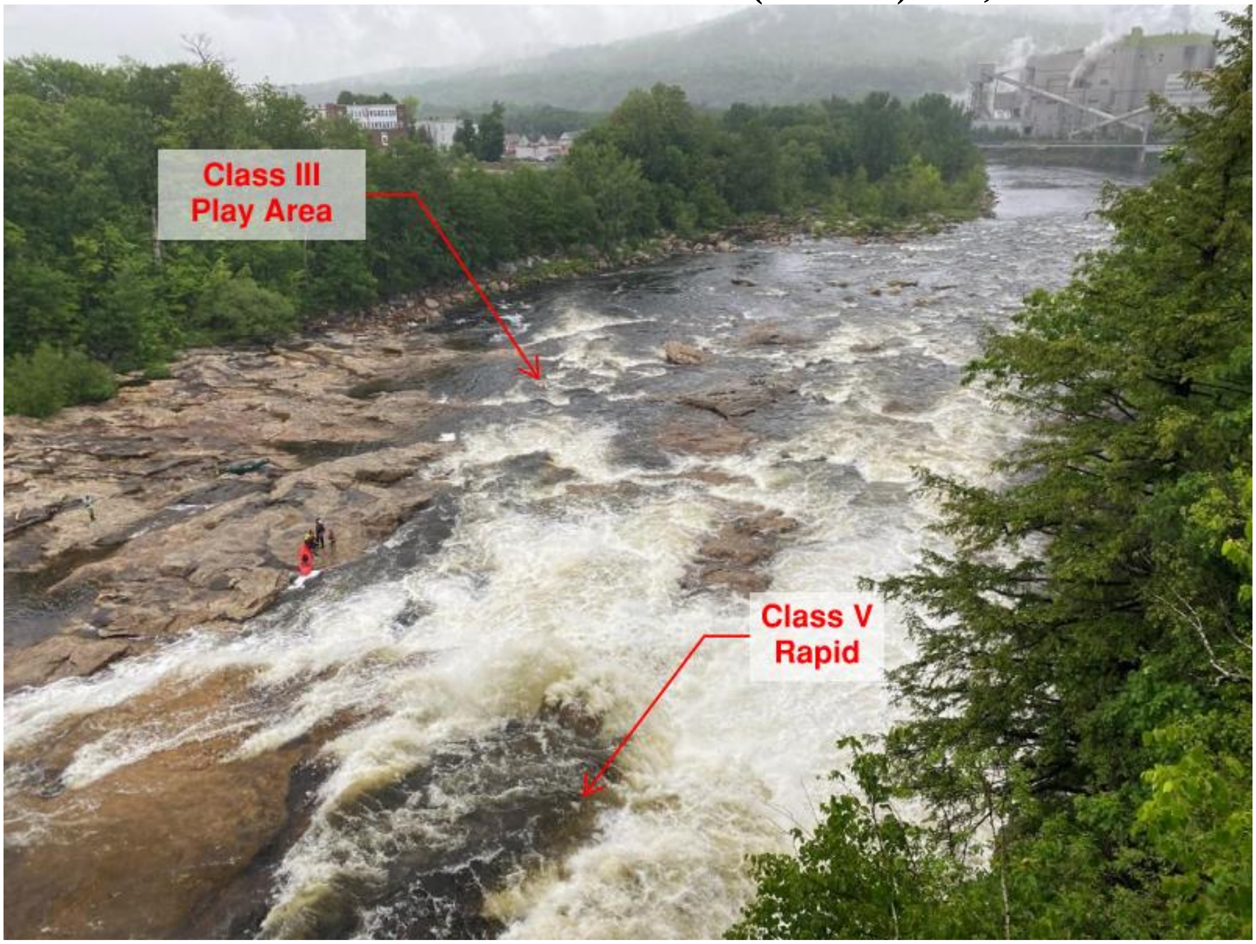

TABLE 10
ACCEPTABILITY SCORES FOR CHARACTERISTICS OF THE UPPER REACH AT 2,000 CFS

Characteristic	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Totally Acceptable
Navigability	0	0	1	1	0
Challenging Technical Boating*	0	0	0	0	1
Powerful Hydraulics	0	1	0	1	0
Whitewater "Play Areas"	0	1	0	0	1
Size/Difficulty of Rapids	0	0	1	0	1
Overall Whitewater	0	0	1	0	1
Challenge	0	0	1	0	1
Safety	0	1	0	1	0

* One participant did not score the acceptability of the challenging technical boating of the reach.

Lower Reach Post-Run Survey – 2,000 cfs

Of the three participants that boated the lower reach (Photo 9), two participants used hard-shell kayaks and one used an open canoe. Two participants indicated they did not encounter any hits, stops, drags, or portages. One participant had to portage around rapids/sections one time. Closed canoes, hard shell kayaks, inflatable kayaks, open canoes, and self-bailing rafts were also noted as potentially acceptable to boat the lower reach at 2,000 cfs. When evaluating rapids and play spots, participants experienced between zero to five rapids, and one to two play spots. The participants evaluated the suitably of the flow for whitewater boating for various characteristics, with one participant noting that they would definitely return in the future if this flow was available; one participant would probably return in the future, and one participant would not return in the future if this flow were available. Acceptability scores for characteristics of the lower reach at 2,000 cfs are presented in Table 11.

Two participants indicated the minimum skill level necessary to successfully run the lower reach at 2,000 cfs was intermediate, one of which noted it was only intermediate for boating in kayaks. One participant indicated the minimum skill level necessary to successfully run the lower reach at the provided flow was advanced, noting it was only advanced for open canoes. One participant indicated that beginner and novice boaters could successfully run the bypass reach at the provided flow. One participant preferred this flow as the optimal flow, one participant preferred a lower flow, and one participant preferred a higher flow.

None of the participants identified safety issues on this run. One participant commented that the surf is not deep enough for loops and may need more water. Another participant commented that the best play spot on the run is the bottom ledge on river left, noting that kayakers preferred the 2,000 cfs. As an open canoe boater, this participant was better able to play the hole at the 1,500 cfs; however, stated the majority of the potential water users would be kayakers.

PHOTO 9
PLAY SPOT AND RAPIDS OF LOWER REACH (CLASS III) AT 2,000 CFS

TABLE 11
ACCEPTABILITY SCORES FOR CHARACTERISTICS OF THE LOWER REACH AT 2,000 CFS

Characteristic	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Totally Acceptable
Navigability	0	0	0	1	2
Challenging Technical Boating	0	0	0	1	2
Powerful Hydraulics	0	0	1	0	2
Whitewater “Play Areas”	0	0	0	1	2
Size/Difficulty of Rapids	0	0	1	0	2
Overall Whitewater	0	0	0	1	2
Challenge	0	0	0	1	2
Safety	0	0	0	1	2

5.3.2.4 Comparative Flow Assessment

All four study participants completed a comparative flow assessment to compare the overall satisfaction and experience of the study flows (Attachment 7). Two participants completed comparative flow assessment surveys for the upper reach and four participants completed surveys for the lower reach.

Upper Reach – Comparative Flow Assessment

Both participants who boated the upper reach used a hard-shell kayak and were considered experts, classified running Class V whitewater. The participants participated in all three flows (800 cfs, 1,500 cfs, 2,000 cfs). Participants evaluated the overall importance of different characteristics related to their overall satisfaction of the upper reach (Table 12). Participants also evaluated the three study flows based on their skill level and craft used (Table 13).

The participants agreed that 800 cfs was the minimum flow needed to boat the upper reach, and 800 or 1,000 cfs was the minimum acceptable flow, defined as the lowest flow at which you would return to paddle it. The optimal range of flows for the upper reach was between 800 cfs and either 1,500 cfs or 1,800 cfs. One participant indicated that 1,500 cfs was the highest flow a participant could safely boat the upper reach, and the other participant suggested greater than 2,500 cfs as the highest safe flow.

In general, the participants found the put-in and take-out facilities acceptable and in good condition. One participant noted that the Public Library Access Trail put-in location could be improved if the poison ivy was removed and if stairs were added.

Participants compared the two drops of the upper reach to the reaches found in the Raquette River, New York; Upper Magalloway, Maine; and bottom of Moose River, New York.

TABLE 12
IMPORTANCE OF FACTORS TO OVERALL WHITEWATER TRIP SATISFACTION IN UPPER REACH

Characteristic	Not Important		Somewhat Important		Very Important
Navigability	0	0	0	0	2
Challenging Technical Boating	0	0	1	1	0
Powerful Hydraulics	0	0	1	1	0
Whitewater “Play Areas”	0	0	0	2	0
Size/Difficulty of Rapids	0	0	0	1	1
Overall Whitewater Challenge	0	0	0	2	0
Safety	0	0	0	1	1
Crowding	0	0	1	0	1
Long Run(s)	0	0	1	1	0
Short Run(s)	0	0	2	0	0
Low Number of Portages	0	0	0	1	1
High Number of Rapids	0	0	0	1	1
Low Number of Rapids	1	0	1	0	0
Easy Access	0	0	0	2	0
Easy Shuttles	0	0	0	2	0

TABLE 13
ACCEPTABILITY OF STUDY FLOWS IN UPPER REACH

Flow	Totally Unacceptable	Unacceptable	Marginal	Acceptable	Totally Acceptable
800 cfs	0	0	0	1	1
1,500 cfs	0	0	0	0	2
2,000 cfs	0	0	2*	0	1*

*One participant noted 2,000 cfs was totally acceptable for the first drop and marginal for the second drop.

Lower Reach - Comparative Flow Assessment

Two participants used a hard-shell kayak, one used an open canoe, and one used a shredder to boat the lower reach. Two participants were experts (comfortable running Class V whitewater), one was advanced (comfortable running Class IV whitewater), and one was intermediate (comfortable running Class III whitewater). Three participants participated in all three flows (800 cfs, 1,500 cfs, 2,000 cfs), and one participant participated in two flows (800 cfs, 1,500 cfs). Three participants had never boated the lower reach, and one participant had boated the reach four times. Participants evaluated the importance of the different characteristics related to their overall satisfaction of the lower reach (Table 14).

Participants also evaluated the three study flows based on their skill level and craft used (Table 15). The majority of the flows were rated as totally acceptable for the participants, regardless of flow.

The participants noted 800 cfs, 1,000 cfs, and 1,500 cfs as the minimum flows needed to boat the lower reach, and 1,200 cfs was the minimum acceptable flow (one participant noted 1,500 as the minimum acceptable flow). The optimal range of flows for the lower reach varied depending on the participant's skill level and craft. For most participants the optimal range of flows started at 1,200 cfs and went to either 1,500 cfs, 2,500 cfs, or 3,000 cfs. Two participants indicated that most flows would be safe for the lower reach, and two other participants noted 1,800 cfs and 3,000 cfs as the highest safe flow.

In general, the participants found the put-in and take-out facilities acceptable and in good condition. Participants noted that the Public Library Access Trail put-in location could be improved with stairs and a portable toilet. The participants further noted that the MDACF Boat Launch - Mexico was in great condition and could be improved with a portable toilet.

Boaters compared the lower reach to the reaches found in the Rapid River, Maine; Magalloway River, Maine; Swift River, Maine; Pontook/Androscoggin River, Maine; Middle Mad River, Vermont; Lower Kennebec River, Maine; and Errol Rapid/Upper Androscoggin, New Hampshire.

TABLE 14
IMPORTANCE OF FACTORS TO OVERALL WHITEWATER TRIP SATISFACTION IN LOWER REACH

Characteristic	Not Important		Somewhat Important		Very Important
Navigability	0	0	0	2	2
Challenging Technical Boating	0	0	2	2	0
Powerful Hydraulics	0	1	1	1	1
Whitewater “Play Areas”	0	0	0	4	0
Size/Difficulty of Rapids	0	0	1	2	1
Overall Whitewater Challenge	0	0	1	3	0
Safety	0	0	0	1	3
Crowding	0	0	3	0	1

Characteristic	Not Important		Somewhat Important		Very Important
Long Run(s)	0	1	2	1	0
Short Run(s)	1	1	2	0	0
Low Number of Portages	0	0	0	2	2
High Number of Rapids	0	0	0	3	1
Low Number of Rapids	2	0	1	0	1
Easy Access	0	0	2	2	0
Easy Shuttles	0	0	1	3	0

TABLE 15
ACCEPTABILITY OF STUDY FLOWS IN LOWER REACH

Flow	Totally Unacceptable	Unacceptable	Marginal	Acceptable	Totally Acceptable
800 cfs	0	0	2	1	1
1,500 cfs	0	0	0	2	2
2,000 cfs*	0	0	0	1	2

*Three participants participated in the 2,000 cfs flow.

5.3.3 Focus Group Discussion

RFH moderated a focus group discussion after assessment of the study flows. Focus group participants included the four boater participants, as well as Bob Nasdor (American Whitewater), George O’Keefe (Town of Rumford Economic Director), John Preble (local resident and whitewater boater), and two whitewater safety team members (i.e., Mahoosuc Mountain Search and Rescue) supporting the study. Focus group participants stated that both put-in locations (Public Library Access Trail and Rumford Town Office Access) could be improved with stairs and clearing of poison ivy. Focus group participants agreed that the take-out location (MDACF Boat Launch - Mexico) was in good condition. There was discussion of using the Town Dirt Lot/Snow Dump Trail as a potential put-in location, but the area is not compacted and would need significant improvements to be accessible for boaters and was therefore considered an unacceptable location. Other areas along the river were noted as being too steep and dense with tree cover to act as an access route for boaters or safety personnel.

When discussing flow rates, participants agreed that 800 cfs was the minimum flow rate to boat the reach. Many of the boater participants stated they would not return to boat the reach at an 800 cfs flow as it was “scratchy” (too shallow) throughout the run and the play area was much weaker than at other flows.

Participants stated the 1,500 cfs flow was fun for both the upper reach and lower reach. In the upper reach, 1,500 cfs widened out the Class IV/V slide and provided for a cleaner passage in the Class V rapid (Figure 1). In the lower reach, participants stated the play area was a lot more fun at this flow with additional play spots.

Participants stated the slide (Class IV-V) was fun under 2,000 cfs and would be considered a Class V in this higher flow. The second rapid (Class V) was “pushier” under the 2,000 cfs flow and would continue to require a high skill level. Participants stated the lower reach was fun under 2,000 cfs with play areas present.

After discussing the individual flows, the boater participants reached the consensus that 1,500 cfs was the optimal flow for the entire reach and would be ideal for many skill levels and craft types. It was discussed that 1,500 cfs would potentially attract people to the reach as it would provide opportunities for all skill levels.

Focus group participants suggested providing real-time flow data to the public, accessible via an online platform, so boaters could assess the reach prior to arriving. Focus group participants stated the highlight of the run was the play area and stated that it would draw boaters from approximately a two-hour radius of Rumford. The group agreed that this reach was most likely to draw boaters who were either driving to Rumford for the day or heading north to other whitewater boating recreation sites in the region. Focus group participants suggested that weekends in June through August, specifically between 10:00 am – 3:00 pm, would be an optimal release timeframe. Focus group participants also suggested that a release schedule should be flexible and to coordinate with other whitewater releases in the region. It was stated that a reliable release schedule would also be helpful to draw more boaters to the reach.

5.3.4 Bypass Reach Angler Observation

During the on-water boating analysis, an angler evaluation was also conducted at the different flows, which focused on the enjoyment and safety at each flow (Attachment 10). One angler, formerly with MDIFW, and currently conducting the Angler Creel Survey for the Project, participated in the survey and assessed two flows (800 cfs and 1,500 cfs) and completed a comparative assessment (Attachment 11).

5.3.4.1 800 cfs Flow

The participant evaluated angler characteristics from a dry area in the rock out crops and within the lower reach area for the Project at 800 cfs, noting that most of the characteristics were acceptable (Table 16). The participant rated the angling experience at 800 cfs as acceptable and the optimal flow. The participant noted that there were five good pools and other fast water runs and all areas were very fishable. They noted there were excellent conditions to target feeding trout; however, wading, while may be possible at this flow, it would not be advised. The participant observed an 8-inch trout leaping under the east side of the Portland Street bridge.

TABLE 16
ACCEPTABILITY OF ANGLER CHARACTERISTICS AT 800 CFS

	Totally Unacceptable	Unacceptable	Marginal	Acceptable	Totally Acceptable
Ability to safely wade stream channel			X		
Ability to walk on shoreline or bank					X
Ability to see fish				X	
Ability to land fish				X	
Number of quality fishing spots					X
Fishing success	N/A (participant did not fish)				
Fishing challenge				X	

5.3.4.2 1,500 cfs Flow

The participant evaluated angler characteristics from a dry area in the rock out crops and within the lower reach for the Project at 1,500 cfs, noting that most of the characteristics were acceptable, but less acceptable than at 800 cfs (Table 17). The participant rated the angling experience at 1,500 cfs as acceptable, but indicated the flow was slightly too high. The participant noted that two out of the five good pools were less fishable, and most runs were unfishable. The higher flow created fishable pockets behind ledges. Wading, while may still be possible, is not advised and was observed to be more dangerous than at 800 cfs.

TABLE 17
ACCEPTABILITY OF ANGLER CHARACTERISTICS AT 1,500 CFS

	Totally Unacceptable	Unacceptable	Marginal	Acceptable	Totally Acceptable
Ability to safely wade stream channel			X		
Ability to walk on shoreline or bank				X	
Ability to see fish			X		
Ability to land fish				X	
Number of quality fishing spots				X	
Fishing success	N/A (participant did not fish)				
Fishing challenge				X	

5.3.4.3 Comparative Survey

The angler participated in the 800 cfs and 1,500 cfs study flows and rated both flows as acceptable for angling. The participant suggested an optimal flow rate of less than 1,000 cfs. The participant noted that the 800 cfs provided better angling opportunities while 1,500 cfs, although it still provided good angling opportunities, had too much of a current in the runs. The angler noted the 1,500 cfs created side pockets that were good but may attract bass and rough fish more than trout.

6.0 Summary

RFH conducted a Whitewater Boating Study at the Project to evaluate the feasibility of whitewater boating in the 1.1-mile-long stretch of the Androscoggin River between the Project's Middle Dam and the Boat Launch in Mexico. To support this evaluation, RFH followed the Whittaker et al. (2005) methodology and conducted a three-level study.

Level 1 consisted of a desktop evaluation and included a literature review of existing information about recreation opportunities in the immediate vicinity and Project area. The literature review documented there are 59 whitewater opportunities within 60 miles and there are little documented whitewater opportunities in the immediate Project area with the exception of a reach in the Swift River.

A flow analysis was also conducted in support of Level 1. The flow analysis analyzed and reviewed hydrology information as it relates to whitewater and any operational constraints and safety concerns. It was found that during the summer months of June, July, August, and September, which are often peak months for whitewater boating in this region, the daily average flows in the Androscoggin River have exceeded the hydraulic capacity of the Lower Station from 12.0 percent to 55.2 percent of the time. Identified safety concerns consisted of the steep drop in the reach and shoreline as well as the skill level necessary to navigate the two drops in the upper reach.

Interviews with experienced recreation users of the reach were also conducted under Level 1. Interviews were conducted with two whitewater users of the reach, one individual associated with the Town of Rumford and one individual with MDIFW. The two users of the reach and the individual with the Town of Rumford supported providing whitewater opportunities in the reach from June through August. These two individuals classified the first drop (slide) and second drop as experts only, ranging in Class IV to V depending on flow. The individuals further noted the lower reach (play area and below) is of interest to many boaters as it provides more opportunity to other skill levels (Class I to III). In the interview with MDIFW, it was stated that the goal of the agency is to improve angling opportunities in the bypass reach. MDIFW stated concerns with whitewater flows and its negative impact to fish in the bypass reach as well as angler safety.

Level 2 consisted of field reconnaissance. Sub-tasks included development of a Working Group and the on-land boating feasibility assessment. On-land boating feasibility assessment participants noted that the Public Library Trail Access and Rumford Town Office Access would be the most accessible put-in locations and the Boat Launch - Mexico would be the preferred take-out location. It was noted that the put-in at Middle Dam would be too dangerous with the presence of a low-head dam and the inability to view the rapids further downstream. Participants observed the upper reach, consisting of the first drop (slide), to be a Class IV rapid suitable for kayaks and closed canoes. The second drop in the upper reach was considered a Class V rapid suitable for only kayaks. The play spot in the lower reach was evaluated as Class II-III rapids suitable for a wide range of skill sets and a variety of boats (e.g., kayaks, canoes, stand-up paddleboards). Participants in the on-land boating feasibility assessment recommended continuing to an on-water feasibility assessment.

Level 3 consisted of the on-water assessment. The Working Group agreed to assessing flows of 800 cfs, 1,500 cfs, and 2,000 cfs. Based on results from the on-water assessment, participants indicated the first drop (slide, Class IV) in the upper reach should be for advance boaters, whereas the second drop (Class V) should be for expert boaters given the high risks associated with the second drop. One participant noted that an advanced boater could safely paddle the reach with good safety personnel supervising the run.

Safety concerns were highlighted with both the first drop and second drop. A participant noted the first drop (slide) under lower flows contained pin potential (i.e., trapping a boater) on river left under conditions at 800 cfs. Under the higher flows, participants stated the first drop (slide) could be considered a Class V, therefore, presenting significant hazards. Participants noted the second drop contained pin potential under all flows and requires skills of an expert boater. Participants reported the second drop as “pushier” as the flows increased therefore increasing risks. Additionally, due to the steep gradient of the Middle Dam bypass reach and shorelines, rescues would prove to be difficult, placing the rescuer at risk as well.

The participants indicated that the play area in the lower reach would be ideal for beginner to intermediate boaters depending on craft used and location within the reach. Preference of flows ranged throughout the reach, but a consensus was reached that 1,500 cfs was the optimal flow for the entire reach and would be ideal for many skill levels and craft types. Angling was rated as better in the bypassed reach at 800 cfs than at 1,500 cfs.

Overall, participants found the upper reach and lower reach fun at the 1,500 cfs flow and indicated they would definitely return in the future if this flow was available. With the 1,500 cfs flow, additional play spots were opened up. The focus group participants stated the highlight of the reach was the play area and stated that it would draw boaters from approximately a two-hour radius of Rumford. The group agreed that this reach was most likely to draw boaters who were either driving to Rumford for the day or heading north to other whitewater boating recreation sites in the region. Flows of this level in the Middle Dam bypass reach occur naturally during certain times of the year, especially in the spring and during storm events. In July and August, the average daily flows are at or below the maximum hydraulic capacity of the Lower Station with slightly higher flows in June. If the lower station is operating at its full maximum hydraulic capacity (3,100 cfs), flow of 1,500 cfs in the Middle Dam bypass reach would only be expected to occur 29.4 percent (June), 12.6 percent (July), 7.6 percent (August), and 3.9 percent (September) of the time.

The Project is operated as a run-of-river facility and has no usable storage capacity. The Project is not able to store flows for whitewater releases and, therefore, any flows at 3,100 cfs or lower directed to the Middle Dam bypass reach from the station will impact generation. Further, when flows are not available to allow one or both of the units to run at approximately 500 cfs or higher to avoid cavitation, the unit needs to be shut down.

7.0 Variances from FERC-Approved Study Plan

The Whitewater Boating Study was conducted in accordance with FERC's SPD.

8.0 References

American Whitewater. 2022. River Info. [Online] URL: American Whitewater. Accessed July 20, 2022.

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ATTACHMENT 1

STUDY APPROACH

Rumford Falls Hydroelectric Project (FERC No. 2333)
Rumford Falls Whitewater Study Plan Overview and Approach

Per the Federal Energy Regulatory Commission (FERC or Commission) Study Plan Determination dated August 6, 2020, the Whitewater Study will follow Whittaker et al. (2005)[1] and consist of up to the following three levels of study, which are described in greater detail below:

- Level 1: Desktop Evaluation
- Level 2: Field Reconnaissance
- Level 3: Full Analysis

The reach to be evaluated for whitewater boating is depicted in Figure 1 (attached). Given the diversity of whitewater situations, Whittaker et al. (2005) recommends "… *a progressive approach with 'phased' efforts of increasing resolution. All studies have to provide similar initial information about recreation opportunities, their likely dependency on flows, and potential project effects. However, more intensive or detailed studies will only be prescribed in situations that merit them*." Consistent with the Whittaker et al. (2005) methodology, the Whitewater Study will be performed in a stepwise approach, which will include each of the activities listed below, if deemed appropriate based, on the results of the previous level's evaluation activities.

The anticipated schedule is also below. The dates associated with field activities may be subject to change based on the COVID-19 Center for Disease Control guidelines and/or available flow in the Androscoggin River.

Level 1: Desktop Evaluation (*November 2020 – April 2021)*

This is the initial information collection and integration phase. This phase of the study will focus on "desktop" methods using existing information, or limited interviews with people familiar with flows and recreation within the reach.

This level consists of the following:

1. Literature review (*November 2020 – March 2021*) - Summarize existing information about recreation opportunities and the river's physical characteristics (e.g., length, gradient, width, play areas).
    a. Research existing whitewater in region (including the Swift River per FERC request) and immediate Project area.
2. Flow analysis (*November 2020 – March 2021*) - Summarize recreation-relevant hydrology and identify existing and operational constraints on existing or alternative flow regimes.
    a. Analyze and review hydrology information as it relates to whitewater (i.e., when whitewater conditions may naturally occur vs. a scheduled release scenario). Information regarding desired flows for whitewater boating will be obtained through discussions in Level 2.
    b. Identify operational constraints, safety concerns (e.g., station trips), and the effects to project operations.
3. Structured interviews with experienced recreation users or resource experts (*February 2021 – March 2021)* – Obtain local knowledge of the river, recreation opportunities, and potential flow effects.

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[1] Whittaker, D. B. Shelby, and J. Gangemi. 2005. Flows and Recreation A Guide to Studies for River Professionals. October.

    a. Conduct limited/focused interviews with a select number of stakeholders (3-5 people) with knowledge of the reach and including those that have identified themselves as experienced boaters.
        i. Contact American Whitewater to see if they are aware of people kayaking/rafting the reach and schedule informal interviews to gather additional information.
    b. Per FERC's directive, consult with Maine Department of Inland Fisheries and Wildlife (MDIFW) to further discuss their objective of improving angling opportunities in the Project's bypassed reach. This task will also overlap with the proposed Flow Study for Habitat Evaluation.

Level 2: Field Reconnaissance *(March 2021 – June 2021)*

Per Whittaker et al (2005), this level assesses the feasibility and potential quality of boating opportunities and estimates approximate flow ranges by scouting a reach from on land. This assessment is typically done when the reach has no history of previous boating use (note: the Project reach is not listed in American Whitewater's online database). Pending results of the on land field assessment, a single flow on-water assessment may be conducted.

This level consists of the following:

1. Develop Working Group (*February 2021 - April 2021*) – Refine methodology (e.g., develop survey questions and including target flow for the on land boating feasibility assessment and single flow assessment (if needed).
    a. Working Group should be limited to one representative each from MDIFW, American Whitewater, Town of Rumford, and public safety entity (i.e., town fire department). Any other stakeholders, including members of the public/NGOs, who have identified themselves as experienced whitewater boaters may also be included. It is critical to keep the Working Group to a manageable size in order to effectively make decisions.
2. Document flows (*Ongoing*)
    a. Brookfield will photo document select representative flows in the upcoming months as they naturally occur.
3. On land boating feasibility assessment (*April 2021*) – Working Group to assess the feasibility of boating the reach, including boater and public safety. Also assess the potential quality of the boating opportunities and estimate target flow ranges that would limit such opportunities (e.g., higher or lower flows). Scout the reach of interest from land and encourage discussions among the Working Group.
    a. Assess put-in/takeout areas, types of opportunities, possible flow ranges, potential project effects, safety of boaters and anglers under various flow conditions (e.g., underwater hazards, location of nearest hospital, operational concerns).
    b. Conduct during relatively low flow condition to facilitate identification of hazards.
    c. Develop a summary document of assessment.
    d. If whitewater boating is determined to be infeasible for safety or other reasons by American Whitewater, safety entities, or other participants, this determination would conclude the Whitewater Study. However, this must be a collaborative decision. If concurrence is not reached, either an on-water assessment at a single flow would be conducted under Level 2 to further investigate feasibility, or if all parties agree, the study would move forward to Level 3.
4. On-water assessment (single flow), if agreed upon (*May/June 2021*) – Assess the feasibility, flow, and quality of boating opportunities by boating the river at a single identified flow.

    a. Based on discussions during the on land activities, determine if preferable to use a professional-level participant (e.g., recommended or provided by American Whitewater or professional outfitter participants identified by Brookfield) or include a larger, but limited group of interested stakeholders. This single flow evaluation will incorporate the use of an evaluation survey form (pre- and post-run) and subsequent group discussion (if not just American Whitewater participant) post-assessment (opinions will be summarized regarding the feasibility of boating, types of opportunities, possible flow ranges, and potential project effects).
    b. Decision whether to proceed to Level 3.

Level 3: Full Analysis (*June 2021*)

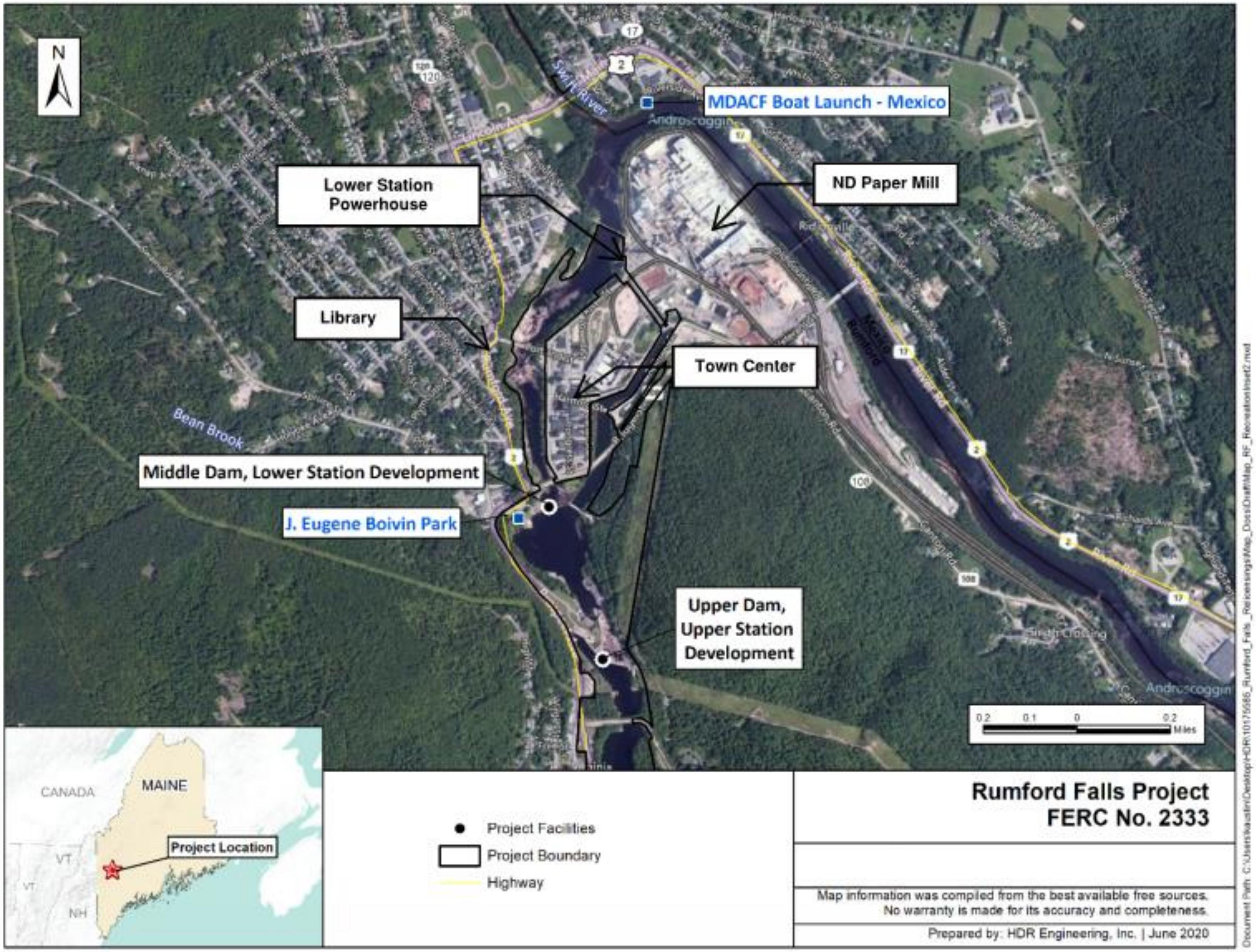
This level evaluates estimated flow ranges for whitewater opportunities by assessing multiple flows. Flow selections will be informed by data collected in Levels 1 and 2.

This level consists of the following:

1. Controlled flow studies for boating (*June 2021*) – Evaluate estimated flow ranges for boating opportunities by having a panel of boaters evaluate several known flows (evaluation of 2-4 flows is common).
    a. Level 1 and 2 information will be used to determine targeted flows in coordination with Working Group.
        i. Consider other resources of interest (e.g., aquatic biota) as well as power generation when scheduling releases.
    b. Boaters will complete a pre-fieldwork survey on their experience and boating preferences, run the river at each flow, and evaluate flows after each run.
        i. American Whitewater can help identify volunteer boaters for controlled release evaluations or Brookfield may identify. Since not much is known about the reach as it pertains to whitewater boating, American Whitewater may recommend limiting participation to a smaller group (e.g., 12 participants) due to safety concerns.
    c. This will include a survey for anglers focused on enjoyment and safety. Angler participation should include a MDIFW representative and 2-3 angling volunteers. Volunteers may be identified through public outreach or recommendations by MDIFW.
    d. After all flows are observed, participants will discuss and make an overall comparative evaluation with available photos and video footage of key rapids and conditions.

Results from this study will be included in the Initial Study Report (ISR) which encompasses all the relicensing studies and must be filed with the FERC and distributed to the relicensing participants in August 2021. Relicensing participants will have the opportunity to comment on the results when it is filed with FERC in accordance with the Integrated Licensing Process framework.

Figure 1: Proposed Reach to be Evaluated for Whitewater Boating (from J. Eugene Boivin Park to the Mexico Boat Launch).



ATTACHMENT 2

COMPLETED ON-LAND ASSESSMENTS

LAND-BASED EVALUATION FORM
RUMFORD FALLS WHITEWATER BOATING ASSESSMENT

Date: 5/26/21

Participant Initials: BN

Participant experience level: CLASS III/IV KAYAKER

The following questions are intended to assess the feasibility of boating the reach of the Androscoggin River below the Rumford Falls Hydroelectric Project's Middle Dam (Lower Station Development), as well as boater and public safety.

Part I: Evaluation of Hazards at Minimum Flow

1. Identify and discuss safety hazards and considerations:

   a) Review and identify any observed hazards within the reach at minimum flow.
   b) Review and identify any boater and public safety considerations.
   c) Please provide a brief description of any observed hazards and their location:

PUT-IN STAIRS NEEDED FOR ACCESS TO RIVER

POSSIBLE LOW-HEAD DAM AT BOTTOM OF MIDDLE DAM

1ST DROP BELOW PUT IN CLEARLY RUNABLE

2ND DROP HAS HAZARDS AT MIN FLOW. SIGNIFICANT

Part II: Evaluation of Access Locations

This section evaluates the put-in and take-out locations.

Discuss the potential access locations listed above in terms of the following characteristics:

Site Characteristic(s)	Comments
	Put-in locations
	J. Eugene Boivin Park
Availability and capacity of parking	GOOD PARKING AT VISITORS CENTER
Proximity to roadway or parking area and length of trail	PARKING ADJACENT TO PUTIN. SHORT PATH
Compatibility with adjacent land use and ownership	PUBLIC PARK

Site Characteristic(s)	Comments
Slope, gradient, and/or stability of the trail for transporting boat from vehicle to launch or vice versa	SOME IMPROVEMENT ON ACCESS TRAIL WOULD MAKE ACCESS EASIER
Potential for boat staging area	~~UNCLEAR WHETHER ACCESS~~ PARKING AREA GOOD STAGING AREA
Height above water at put-in/take-out locations	20 FT ±
Stream gradients at each location	POOL BELOW MIDDLE DAM
Public Library Trail Access	
Availability and capacity of parking	AMPLE PARKING 15 SPACES
Proximity to roadway or parking area and length of trail	RUGGED TRAIL DOWN TO WATER NEEDS IMPROVEMENT
Compatibility with adjacent land use and ownership	PUBLIC
Slope, gradient, and/or stability of the trail for transporting boat from vehicle to launch or vice versa	LOOSE STONES TRIPPING HAZARD
Potential for boat staging area	PARKING AREA GOOD STAGING AREA LARGE BOULDERS DOWN TO WATER
Height above water at put-in/take-out locations	BOULDERS LEAD DOWN TO WATER
Stream gradients at each location	STEEP GRADIENT. 2 CLASS IV/V DROPS
Town Dirt Lot / Snow Dump Trail	
Availability and capacity of parking	
Proximity to roadway or parking area and length of trail	
Compatibility with adjacent land use and ownership	
Slope, gradient, and/or stability of the trail for transporting boat from vehicle to launch or vice versa	
Potential for boat staging area	
Height above water at put-in/take-out locations	
Stream gradients at each location	

Site Characteristic(s)	Comments
Rumford Town Office Access	
Availability and capacity of parking	GOOD PARKNG 20+ SPACES
Proximity to roadway or parking area and length of trail	NEARBY, BUT RUGGED TRAIL DOWN TO RIVER
Compatibility with adjacent land use and ownership	PUBLIC
Slope, gradient, and/or stability of the trail for transporting boat from vehicle to launch or vice versa	DIFFICULT ACCESS TRAIL. NEED IMPROVEMENT
Potential for boat staging area	GOOD STAGING IN PARKING AREA
Height above water at put-in/take-out locations	15 ± FOOT DROP. EASY PUTIN AT TOP
Stream gradients at each location	STEEP GRADIENT BUT CLEARLY RUNABLE
River Street / Hartford Street Access	
Availability and capacity of parking	
Proximity to roadway or parking area and length of trail	
Compatibility with adjacent land use and ownership	
Slope, gradient, and/or stability of the trail for transporting boat from vehicle to launch or vice versa	
Potential for boat staging area	
Height above water at put-in/take-out locations	
Stream gradients at each location	
Take-Out Locations	
MDACF Boat Launch Mexico	
Availability and capacity of parking	12
Proximity to roadway or parking area and length of trail	AT TAKE OUT
Compatibility with adjacent land use and ownership	PUBLIC
Slope, gradient, and/or stability of the trail for transporting boat from vehicle to launch or vice versa	GENTLE
Potential for boat staging area	EXCELLENT

Site Characteristic(s)	Comments
Height above water at put-in/take-out locations	
Stream gradients at each location	
	Carry-In Launch / Carleton St.
Availability and capacity of parking	
Proximity to roadway or parking area and length of trail	
Compatibility with adjacent land use and ownership	
Slope, gradient, and/or stability of the trail for transporting boat from vehicle to launch or vice versa	
Potential for boat staging area	
Height above water at put-in/take-out locations	
Stream gradients at each location	

2. Do you have a preferred put-in and take out location? ______________________

____

3. Do you have any additional comments regarding the put-in and take-out locations or safety considerations?

____

____

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____

____

① FIRST DROP
② BIG 2ND DROP
③ BOTTOM PLAYSPOT

Part III: Flow of 1,500 cfs

This section evaluates boating feasibility of the reach at 1,500 cfs as well as overall quality of the reach and other safety considerations.

1. Please identify the experience level (Class I through V) required to boat this reach: ① CLASS IV ② CLASS V ③ CLASS II

2. Please evaluate this flow (~1,500 cfs) and reach for your primary activity and experience level of the following characteristics observed today:

Characteristic	N/A	Please rate each characteristic (Circle one number)					Adequacy of Flow?		
		Unacceptable	Poor	Neutral	Good	Excellent	Too low	Just right	Too high
Navigability	☐	1	2	3 ②	③ 4 ①	5	☐	☐	☐
Water depth for clearance of falls/rocks	☐	1	2	3	4 ①②③	5	☐	☐	☐
Water speed/ current	☐	1	2	3	4 ①②③	5	☐	☐	☐
Exposure of rocks	☐	1	2	3	4 ①②③	5	☐	☐	☐
Exposure of sand/ gravel bars	☐	1	2	3	4	5	☐	☐	☐
Eddies	☐	1	2	3	4	5	☐	☐	☐
Safety (due to flow)	☐	1	2	~~①~~ 3 ②	4 ①	③ 5	☐	☐	☐
Safety (due to debris/ other hazards)	☐	1	2	3 ②	4 ①	5 ③	☐	☐	☐
Aesthetic quality	☐	1	2	3	4	5 ①②③	☐	☐	☐
Overall quality	☐	1	2	3	4 ①②③	5	☐	☐	☐

3. Please provide a brief explanation of your rating and the overall quality of the whitewater boating of this reach.

VARIED REACH. ① CLASS IV PARK + HUCK LAPS. ② BIG DROP CLASS V EXPERIENCED BOATERS ONLY. ③ EASY CLASS II TRAINING + PLAY. POSSIBLE PLAY PARK. POSSIBLE SPECTATOR REACH AT ① + ②

4. Identify and discuss safety hazards and considerations at this flow:

a) Are there any potential areas where emergency egress would be difficult?

EASY ROADSIDE ACCESS FOR EMERGENCY

b) Identify any public safety responder considerations should rescue services be required.

TRAILS DOWN TO RIVER RUGGED

c) Please provide a brief description of any observed hazards and their location at this flow:

BIG DROP ② HAS SIGNIFICANT HAZARDS AT ALL LEVELS. RUNABLE RAPID ③ AT LOW FLOW + > 1500 CFS ① IS BOATABLE AT MANY LEVELS ③ > 1500 LIKELY NEEDED

d) Do you have any additional comments regarding safely boating the reach at this flow?

5. Identify and discuss features, flows, and other aspects of boating this reach:

a) Did you observe any significant features or opportunities at this reach? Please provide a brief description: ① FUN SLIDE BOATABLE BY SOLID INTERMED PADDLER. ② SKILLED CLASS V ONLY ③ BROAD USER GROUP INCLUDING BEGINNER. SOMETHING FOR EVERYONE

b) Compared to this flow level, what flow would you prefer to boat this reach at? (*Circle one*)

Much lower Lower [✓ No change] [✓ Higher] Much Higher

c) Discuss the difficulty of this run at various flow regimes.

UNKNOWN

d) Discuss the type of watercraft suitable for this reach.

① KAYAK, CLOSED CANOE ② KAYAK ③ KAYAK, CANOE, SUP

e) Discuss the length of the run and time to run this reach.

SHORT RUN WOULD BE RUN IN LAPS

6. Do you have any additional comments?

DIFFICULT TO PRECISELY IDENTIFY MIN ACCEPTABLE & OPTIMAL FLOWS WITHOUT ON-WATER STUDY

Part IV: Path Forward

1. Based on today's On-Land Assessment, do you recommend moving forward with an on-water feasibility assessment? Circle one: [✓ YES] NO

Thank you!

LAND-BASED EVALUATION FORM
RUMFORD FALLS WHITEWATER BOATING ASSESSMENT

Date:__5/28/21__________________________ Participant Initials:___HH____________

Participant experience level:_

WW paddler since 1988. Licensed Maine WW guide. Background includes Maine WW advisory board, ACA instructor- kayak and rescue, commercial guide trainer, Outward Bound instructor trainer.

The following questions are intended to assess the feasibility of boating the reach of the Androscoggin River below the Rumford Falls Hydroelectric Project's Middle Dam (Lower Station Development), as well as boater and public safety.

Part I: Evaluation of Hazards at Minimum Flow

1. Identify and discuss safety hazards and considerations:

a) **Review and identify any observed hazards within the reach at minimum flow:**
At minimum flow, the hazards are essentially loose and rough terrain found at any potential WW site with no water specific concerns at this unrunnable level.

b) Review and identify any boater and public safety considerations.

c) Please provide a brief description of any observed hazards and their location: **Other than natural, inherent hazards there is rebar and other logging operation remnants that need to be dealt with. It is unlikely any of these hazards hidden at minimum flow will create hazards at runnable levels.**

Part II: Evaluation of Access Locations

This section evaluates the put-in and take-out locations.

Discuss the potential access locations listed above in terms of the following characteristics:

Site Characteristic(s)	Comments
Put-in locations	
J. Eugene Boivin Park	
Availability and capacity of parking	Excellent parking. ? what percentage of capacity of this lot is used currently, will WW uses exceed capacity. No obvious overflow area if/when capacity is exceeded.
Proximity to roadway or parking area and length of trail	Great
Compatibility with adjacent land use and ownership	Great
Slope, gradient, and/or stability of the trail for transporting	Easy

Site Characteristic(s)	Comments
boat from vehicle to launch or vice versa	
Potential for boat staging area	Good
Height above water at put-in/take-out locations	
Stream gradients at each location	
Public Library Trail Access	
Availability and capacity of parking	Good, but limited with same access issues as above. Not the best side from a paddler perspective. Running the falls is best done with access from the other side.
Proximity to roadway or parking area and length of trail	Good
Compatibility with adjacent land use and ownership	Good
Slope, gradient, and/or stability of the trail for transporting boat from vehicle to launch or vice versa	easy
Potential for boat staging area	Good
Height above water at put-in/take-out locations	
Stream gradients at each location	
Town Dirt Lot / Snow Dump Trail	
Availability and capacity of parking	
Proximity to roadway or parking area and length of trail	
Compatibility with adjacent land use and ownership	
Slope, gradient, and/or stability of the trail for transporting boat from vehicle to launch or vice versa	
Potential for boat staging area	
Height above water at put-in/take-out locations	
Stream gradients at each location	

Site Characteristic(s)	Comments
Rumford Town Office Access	
Availability and capacity of parking	Probably the best- Easy parking, plenty of it.
Proximity to roadway or parking area and length of trail	Can't get any closer to the roadway. It is the roadway.
Compatibility with adjacent land use and ownership	Good
Slope, gradient, and/or stability of the trail for transporting boat from vehicle to launch or vice versa	Easy, with some improvement.
Potential for boat staging area	
Height above water at put-in/take-out locations	
Stream gradients at each location	
River Street / Hartford Street Access	
Availability and capacity of parking	
Proximity to roadway or parking area and length of trail	
Compatibility with adjacent land use and ownership	
Slope, gradient, and/or stability of the trail for transporting boat from vehicle to launch or vice versa	
Potential for boat staging area	
Height above water at put-in/take-out locations	
Stream gradients at each location	
Take-Out Locations	
MDACF Boat Launch Mexico	
Availability and capacity of parking	
Proximity to roadway or parking area and length of trail	
Compatibility with adjacent land use and ownership	
Slope, gradient, and/or stability of the trail for transporting boat from vehicle to launch or vice versa	
Potential for boat staging area	

Site Characteristic(s)	Comments
Height above water at put-in/take-out locations	
Stream gradients at each location	
Carry-In Launch / Carleton St.	
Availability and capacity of parking	
Proximity to roadway or parking area and length of trail	
Compatibility with adjacent land use and ownership	
Slope, gradient, and/or stability of the trail for transporting boat from vehicle to launch or vice versa	
Potential for boat staging area	
Height above water at put-in/take-out locations	
Stream gradients at each location	

2. Do you have a preferred put-in and take out location? ___**For the waterfall itself, Access from across from the police station is great. It is the preferred side for both paddlers and viewers.**

3. Do you have any additional comments regarding the put-in and take-out locations or safety considerations?

Boivin park- Concern was voiced that if this was a designated parking area, it might encourage people to run the dam. The dam is going to start being run regardless. Once it gets run a few times, posted on social media, etc, it will be run pretty regularly if there are boaters there. It might be worth considering embracing this, and creating a sluice, or other structural changes. Possibly consider both a sluice, and a play spot. (I don't know what is technically possible. Not my area of expertise)

Part III: Flow of 1,500 cfs

This section evaluates boating feasibility of the reach at 1,500 cfs as well as overall quality of the reach and other safety considerations.

1. Please identify the experience level (Class I through V) required to boat this reach:

IV/V. I disagree with those calling this straight forward class IV. The drop itself is not technically difficult. Once it is run a number of times, there will be some established lines, and it will require less skill and less assessment proficiency, so technically drop itself may be class IV. But, because of the potential consequences, the skill level required to run it safely is class V. There is a swift current with minimal recovery before entering the true class V just downstream.

2. Please evaluate this flow (~1,500 cfs) and reach for your primary activity and experience level of the following characteristics observed today:

Characteristic	N/A	Please rate each characteristic (Circle one number)					Adequacy of Flow?		
		Unacceptable	Poor	Neutral	Good	Excellent	Too low	Just right	Too high
Navigability	☐	1	2	3	4	5	☐	☐	☐
Water depth for clearance of falls/rocks	☐	1	2	3	4	5	☐	☐	☐
Water speed/ current	☐	1	2	3	4	5	☐	☐	☐
Exposure of rocks	☐	1	2	3	4	5	☐	☐	☐
Exposure of sand/ gravel bars	☐	1	2	3	4	5	☐	☐	☐
Eddies	☐	1	2	3	4	5	☐	☐	☐
Safety (due to flow)	☐	1	2	3	4	5	☐	☐	☐
Safety (due to debris/ other hazards)	☐	1	2	3	4	5	☐	☐	☐
Aesthetic quality	☐	1	2	3	4	5	☐	☐	☐
Overall quality	☐	1	2	3	4	5	☐	☐	☐

3. Please provide a brief explanation of your rating and the overall quality of the whitewater boating of this reach.

Waterfalls aren't really rated using above criteria. This is, essentially, a big slide drop. There will be a wide range of levels at which this is runnable, including 1500. There is another route down on river left that probably needs more water to be good. Recreational flows allowing descent of the river left lines would be a huge benefit, as it would essentially create two very distinct rapids with the same access.

4. Identify and discuss safety hazards and considerations at this flow:

a) Are there any potential areas where emergency egress would be difficult. **Very good emergency egress.**

b) Identify any public safety responder considerations should rescue services be required. **Because of it's public nature and easy access, there may be a perception that the fire department, or some other 911 based rescue, may be responsible for on water rescue. In the overwhelming majority of true paddling emergencies, rescues are effected by other paddlers. Even with it's close proximity to the fire station, it not reasonable to expect Rumford Fire to effectively respond to most on-water emergencies.**

c) Please provide a brief description of any observed hazards and their location at this flow: **The Class V section immediately below the waterfall is, by far, the chief safety concern here. There may be levels in which this rapid becomes easier and safer to run.**

d) Do you have any additional comments regarding safely boating the reach at this flow? **Whitewater has inherent hazards. This is a serious piece of whitewater at any flow.**

5. Identify and discuss features, flows, and other aspects of boating this reach:

a) Did you observe any significant features or opportunities at this reach? Please provide a brief description: **The play wave toward the bottom is reportedly a great spot at the right levels**

b) Compared to this flow level, what flow would you prefer to boat this reach at? (*Circle one*)
Whatever flow enables running the far left line.

c) Discuss the difficulty of this run at various flow regimes.

____

____

d) Discuss the type of watercraft suitable for this reach. A**ll WW boats, given the right skill level.**

e) Discuss the length of the run and time to run this reach.

The term "Park and play" was coined some time ago to refer to an easy access feature on the river that does not require actually running the river. Park the car, play the feature, carry back to the car. This is a "park and huck" waterfall.

6. Do you have any additional comments?

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Part IV: Path Forward

1. Based on today's On-Land Assessment, do you recommend moving forward with an on-water feasibility assessment? Circle one: **YES** NO

Thank you!

LAND-BASED EVALUATION FORM
RUMFORD FALLS WHITEWATER BOATING ASSESSMENT

Date:___5/26/21__________________ Participant Initials:_________JHR____________

Participant experience level: Expert Whitewater Kayaker/Swiftwater Rescue Instructor/SAR Team

The following questions are intended to assess the feasibility of boating the reach of the Androscoggin River below the Rumford Falls Hydroelectric Project's Middle Dam (Lower Station Development), as well as boater and public safety.

Part I: Evaluation of Hazards at Minimum Flow

1. Identify and discuss safety hazards and considerations:

a) Review and identify any observed hazards within the reach at minimum flow.
b) Review and identify any boater and public safety considerations.
c) Please provide a brief description of any observed hazards and their location:

- Old Concrete with rebar river right above second falls.
- Low Head Dam at at Eugene Bovin Park put in is not a concern of mine at the observed flows, will become a hazard with more flow. Recommend observations at higher flows to identify the water level where the Hazard develops.
- Falls not readily visible from above at Eugene Bovin Park. Recommend good signage if this put in is developed to inform the non-whitewater skilled public of the downstream hazards.

Part II: Evaluation of Access Locations

This section evaluates the put-in and take-out locations.

Discuss the potential access locations listed above in terms of the following characteristics:

Site Characteristic(s)	Comments
Put-in locations	
J. Eugene Boivin Park	
Availability and capacity of parking	Adequate
Proximity to roadway or parking area and length of trail	Adequate
Compatibility with adjacent land use and ownership	Developing a public access point could encourage public exposure to low head dam Hazzard at higher flows
Slope, gradient, and/or stability of the trail for transporting boat from vehicle to launch or vice versa	Recommend routing put in trail over the rocks to the downstream edge of the river left pool. Would not recommend a public access over the bedrock adjacent to the Dam.
Potential for boat staging area	Adequate

Site Characteristic(s)	Comments
Height above water at put-in/take-out locations	Adequate
Stream gradients at each location	Significant flatwater from here to 1st falls will have most whitewater paddlers seeking a put-in closer to the falls.
Public Library Trail Access	
Availability and capacity of parking	Adequate
Proximity to roadway or parking area and length of trail	Adequate
Compatibility with adjacent land use and ownership	Compatible
Slope, gradient, and/or stability of the trail for transporting boat from vehicle to launch or vice versa	Adequate with slight improvement for erosion control.
Potential for boat staging area	Adequate
Height above water at put-in/take-out locations	Not an issue
Stream gradients at each location	This put in provides an option "playboaters" who wish to skip the two falls and access the beginner and river play features at the end of the reach. This option provides excellent Search and Rescue access to the falls
Town Dirt Lot / Snow Dump Trail	
Availability and capacity of parking	Not Assessed
Proximity to roadway or parking area and length of trail	Not Assessed
Compatibility with adjacent land use and ownership	Not Assessed
Slope, gradient, and/or stability of the trail for transporting boat from vehicle to launch or vice versa	Not Assessed
Potential for boat staging area	Not Assessed
Height above water at put-in/take-out locations	Not Assessed
Stream gradients at each location	Not Assessed
Rumford Town Office Access	
Availability and capacity of parking	Adequate
Proximity to roadway or parking area and length of trail	Adequate
Compatibility with adjacent land use and ownership	Compatible

Site Characteristic(s)	Comments
Slope, gradient, and/or stability of the trail for transporting boat from vehicle to launch or vice versa	Adequate with slight improvement for erosion control.
Potential for boat staging area	Adequate
Height above water at put-in/take-out locations	Not an issue
Stream gradients at each location	This is the closest put into the whitewater and will be attractive to WW boaters, especially as a scouting and observation site. General Public will have full view of the falls and consequences of accessing the river at this location.
River Street / Hartford Street Access	
Availability and capacity of parking	Adequate
Proximity to roadway or parking area and length of trail	Adequate
Compatibility with adjacent land use and ownership	Compatible
Slope, gradient, and/or stability of the trail for transporting boat from vehicle to launch or vice versa	Adequate with slight improvement for erosion control.
Potential for boat staging area	Adequate
Height above water at put-in/take-out locations	Not an issue
Stream gradients at each location	This put in is close to the whitewater and will be attractive to WW boaters wanting a bit of warm up before running the falls. General Public will have full view of the falls and consequences of accessing the river at this location.
Take-Out Locations	
MDACF Boat Launch Mexico	
Availability and capacity of parking	Adequate
Proximity to roadway or parking area and length of trail	Adequate
Compatibility with adjacent land use and ownership	Compatible
Slope, gradient, and/or stability of the trail for transporting boat from vehicle to launch or vice versa	Adequate
Potential for boat staging area	Adequate
Height above water at put-in/take-out locations	Adequate

Site Characteristic(s)	Comments
Stream gradients at each location	Adequate
Carry-In Launch / Carleton St.	
Availability and capacity of parking	Adequate
Proximity to roadway or parking area and length of trail	Adequate
Compatibility with adjacent land use and ownership	Adequate
Slope, gradient, and/or stability of the trail for transporting boat from vehicle to launch or vice versa	Adequate
Potential for boat staging area	Adequate
Height above water at put-in/take-out locations	Adequate
Stream gradients at each location	Adequate, Slight upstream Paddle may discourage kayakers from using this takeout.

2. Do you have a preferred put-in and take out location?

Each put in has a good use and provide options. The River Street, Library and Town Office Access will likely see the most use. The Mexico Boat Launch will see the most use for a takeout.

3. Do you have any additional comments regarding the put-in and take-out locations or safety considerations?

I would also consider developing a viewing trail on the river right bank just downstream of the Portland Street bridge. This is the only adequate viewing location to properly scout the second falls. With or without the trail whitewater

Part III: Flow of 1,500 cfs

This section evaluates boating feasibility of the reach at 1,500 cfs as well as overall quality of the reach and other safety considerations.

1. Please identify the experience level (Class I through V) required to boat this reach: _Upper Falls Class IV+, Middle Falls Class V, Lower Rapids Class II_

2. Please evaluate this flow (~1,500 cfs) and reach for your primary activity and experience level of the following characteristics observed today:

Characteristic	N/A	Please rate each characteristic (Circle one number)					Adequacy of Flow?		
		Unacceptable	Poor	Neutral	Good	Excellent	Too low	Just right	Too high
Navigability	☐	1	2	3	[✓ 4]	5	☐	☐	☐
Water depth for clearance of falls/rocks	☐	1	2	3	[✓ 4]	5	☐	☐	☐
Water speed/ current	☐	1	2	3	4	[✓ 5]	☐	☐	☐
Exposure of rocks	☐	1	2	3	[✓ 4]	5	☐	☐	☐
Exposure of sand/ gravel bars	☐	1	2	3	4	[✓ 5]	☐	☐	☐
Eddies	☐	1	2	3	4	[✓ 5]	☐	☐	☐
Safety (due to flow)	☐	1	2	3	4	[✓ 5]	☐	☐	☐
Safety (due to debris/ other hazards)	☐	1	2	3	4	[✓ 5]	☐	☐	☐
Aesthetic quality	☐	1	2	3	[✓ 4]	5	☐	☐	☐
Overall quality	☐	1	2	3	[✓ 4]	5	☐	☐	☐

Note on Flows:

Flows of 1500 were adequate for the upper falls, more water would make the upper falls more attractive.

Observed Flows from 1000-1500 were adequate for the second falls. More water would make the falls more challenging up to a point where a second river left line opens then the second falls will potentially be easier/safer.

1500 seemed to be the minimum for good playboating on the lower rapids with more water improving the quality.

3. Please provide a brief explanation of your rating and the overall quality of the whitewater boating of this reach.

Releases on this reach will provide a unique type of whitewater (“Creek Boating”) that is not available on the other Dam Release river in Maine and New Hampshire, and provide an attractive “park and play” feature on the lower stretch that will provide opportunity for river playboating, whitewater and swiftwater rescue instruction, and beginner whitewater. While it is short it would provide features for recreation that appeal across the spectrum of whitewater enthusiasts and skill level.

4. Identify and discuss safety hazards and considerations at this flow:

a) Are there any potential areas where emergency egress would be difficult? No, Good Access throughout

b) Identify any public safety responder considerations should rescue services be required.

Monitor dam at put in to determine which flows present the low head dam hazard

c) Please provide a brief description of any observed hazards and their location at this flow:

Very minor old rebar and concrete between the first and second waterfalls

d) Do you have any additional comments regarding safely boating the reach at this flow?

This reach is similar in difficulty and character to long standing recreational releases on the Raquette, Beaver, and Moose Rivers in Upstate NY, and the Green River in VT, as well as the Green River in NC and Tallulah River in Georgia

5. Identify and discuss features, flows, and other aspects of boating this reach:

a) Did you observe any significant features or opportunities at this reach? Please provide a brief description: Yes Opportunity for summer “creek boating” style whitewater otherwise unavailable from other Maine and NH Dam Releases

b) Compared to this flow level, what flow would you prefer to boat this reach at? (*Circle one*)

Much lower Lower No change Higher Much Higher

Undetermined – I would like to see the stretch at flows abov 1500 CFS to determine if easier lines opened up with more water.

c) Discuss the difficulty of this run at various flow regimes.

The upper falls is a Class IV+ Class V at 1500 CFS; the second falls is Class V at 1500 CFS, and the rapids below the falls are Class II at 1500 CFS

d) Discuss the type of watercraft suitable for this reach.

Whitewater Specific Craft (Canoes, Kayaks, Inflatables)

e) Discuss the length of the run and time to run this reach.

The upper two falls would fall into the category of "Park and Huck" where whitewater boaters run the same feature multipole times (contrasted with river running where you run a river from start to finish paddling each feature a single time). The lower reach will mostly ebe used for "park and play" where whitewater boaters take turns surfing and practicing freestyle moves on a specific river feature. Sessions will last as long as the boaters have time for.

6. Do you have any additional comments?

Recognizing that it is not part of this whitewater study, and also recognizing that this ie a long term process. I'd like to include the upper falls into the study area. Without scouting it is hard to assess its safety and suitability for recreational whitewater. Just because it is taller and longer does not necessarily mean that the falls is more dangerous than the two falls below. We do know that it has been kayaked successfully and safely more than 10 years ago using older less capable kayak designs. As the relicensing has multi-decade impacts and the sport continues to evolve both skills based and technology it is reasonable to assume that waterfalls of the size and length of the upper falls will become more and more mainstream. A good example is the spillway on the Mosier section of the Beaver River in NY. When the releases were first negotiated no one even considered the spillway falls would be runnable.

Now there are hundreds of runs fo the falls on release weekends I would request that we at least are provided the opportunity for a shore based scout ans similar assessment of the falls above Eugine Bolvin park.

Part IV: Path Forward

1. Based on to day's On-Land Assessment, do you recommend moving forward with an on-water feasibility assessment? Circle one: [✓ YES] NO

Yes this is critical to determine both the optimal flows for the paly wave feature on the lower stretch and the optimal flows for the Class V second drop. I'd like to see flow ranges that include increments as high as 3K CFS

Thank you!

LAND-BASED EVALUATION FORM
RUMFORD FALLS WHITEWATER BOATING ASSESSMENT

Date: June 15, 2021

Participant Initials: GEO

Participant experience level: Intermediate level experience including previous rescue training

The following questions are intended to assess the feasibility of boating the reach of the Androscoggin River below the Rumford Falls Hydroelectric Project's Middle Dam (Lower Station Development), as well as boater and public safety.

Part I: Evaluation of Hazards at Minimum Flow

1. Identify and discuss safety hazards and considerations:

a) Review and identify any observed hazards within the reach at minimum flow.
b) Review and identify any boater and public safety considerations.
c) Please provide a brief description of any observed hazards and their location:

a1) some pieces of rebar visible possibly from construction of Memorial Bridge

a2) access site at Boivin Park is adjacent to low head dam

b1) rebar below Memorial Bridge should be removed prior to broad whitewater use

b2) access site adjacent to (above and below) lower Rumford Falls is preferable

c1) steel rebar possibly leftover from temporary supports to arch bridge

c2) Middle Dam is has undertow including from Canal gate

Part II: Evaluation of Access Locations

This section evaluates the put-in and take-out locations.

Discuss the potential access locations listed above in terms of the following characteristics:

Site Characteristic(s)	Comments
Put-in locations	
J. Eugene Boivin Park	
Availability and capacity of parking	Excellent
Proximity to roadway or parking area and length of trail	Directly adjacent, minimal trail distance
Compatibility with adjacent land use and ownership	Compatible

Site Characteristic(s)	Comments
Slope, gradient, and/or stability of the trail for transporting boat from vehicle to launch or vice versa	Minimal grade
Potential for boat staging area	Yes, will be using with other public traffic at site
Height above water at put-in/take-out locations	10-15 feet
Stream gradients at each location	Flat backwater
Public Library Trail Access	
Availability and capacity of parking	Good with lighting
Proximity to roadway or parking area and length of trail	Excellent road access, trail is about 0.1 miles
Compatibility with adjacent land use and ownership	Compatible
Slope, gradient, and/or stability of the trail for transporting boat from vehicle to launch or vice versa	Moderate downhill grade. Likely requires some improvement
Potential for boat staging area	Yes, will be using with other public traffic at site
Height above water at put-in/take-out locations	Water level
Stream gradients at each location	Moderate flow above falls, significant gradient in lower site
Town Dirt Lot / Snow Dump Trail	
Availability and capacity of parking	Site not evaluated, excluded based on poor access
Proximity to roadway or parking area and length of trail	
Compatibility with adjacent land use and ownership	
Slope, gradient, and/or stability of the trail for transporting boat from vehicle to launch or vice versa	
Potential for boat staging area	
Height above water at put-in/take-out locations	
Stream gradients at each location	

Site Characteristic(s)	Comments
Rumford Town Office Access	
Availability and capacity of parking	Good, will improve if ladder truck shed is removed
Proximity to roadway or parking area and length of trail	Immediate proximity, less than 200 feet of trail
Compatibility with adjacent land use and ownership	Compatibility
Slope, gradient, and/or stability of the trail for transporting boat from vehicle to launch or vice versa	Steep slope down to water access
Potential for boat staging area	Yes, competes with daytime parking for bank employees
Height above water at put-in/take-out locations	At water level
Stream gradients at each location	Moderate flow
River Street / Hartford Street Access	
Availability and capacity of parking	Excellent, very high capacity
Proximity to roadway or parking area and length of trail	Directly adjacent including trail
Compatibility with adjacent land use and ownership	Superior compatibility
Slope, gradient, and/or stability of the trail for transporting boat from vehicle to launch or vice versa	Steep slope, likely requirements improvement
Potential for boat staging area	Yes, wide open minimal interference
Height above water at put-in/take-out locations	Water level
Stream gradients at each location	Flat
Take-Out Locations	
MDACF Boat Launch Mexico	
Availability and capacity of parking	Very good
Proximity to roadway or parking area and length of trail	No trail. Launch comes directly to roadway
Compatibility with adjacent land use and ownership	Compatible
Slope, gradient, and/or stability of the trail for transporting boat from vehicle to launch or vice versa	Boat launch grade
Potential for boat staging area	Existing

Site Characteristic(s)	Comments
Height above water at put-in/take-out locations	At water level
Stream gradients at each location	Flat
Carry-In Launch / Carleton St.	
Availability and capacity of parking	Good
Proximity to roadway or parking area and length of trail	Less than 100 feet
Compatibility with adjacent land use and ownership	Compatible
Slope, gradient, and/or stability of the trail for transporting boat from vehicle to launch or vice versa	Inferior access due to traverse from ramp to parking lot
Potential for boat staging area	Possible
Height above water at put-in/take-out locations	Water level subject to seasonal flows
Stream gradients at each location	Minimal flow

2. Do you have a preferred put-in and take out location? There are three, Hartford & Exchange Street

Public Library for intermediate users and Mexico Boat Launch for beginning access

3. Do you have any additional comments regarding the put-in and take-out locations or safety considerations?

Each of the three preferred locations has its own advantages.

It is extremely important for multiple access points to be provided.

Each access point contributes to the composite value of the total recreational opportunity.

Part III: Flow of 1,500 cfs

This section evaluates boating feasibility of the reach at 1,500 cfs as well as overall quality of the reach and other safety considerations.

1. Please identify the experience level (Class I through V) required to boat this reach: Class I-II-III

2. Please evaluate this flow (~1,500 cfs) and reach for your primary activity and experience level of the following characteristics observed today:

Characteristic	N/A	Please rate each characteristic (Circle one number)					Adequacy of Flow?		
		Unacceptable	Poor	Neutral	Good	Excellent	Too low	Just right	Too high
Navigability	☐	1	2	3	[✓ 4]	5	☐	☒	☐
Water depth for clearance of falls/rocks	☐	1	2	3	[✓ 4]	5	☐	☒	☐
Water speed/ current	☐	1	2	3	4	[✓ 5]	☐	☒	☐
Exposure of rocks	☐	1	2	3	4	[✓ 5]	☐	☒	☐
Exposure of sand/ gravel bars	☐	1	2	3	4	[✓ 5]	☐	☒	☐
Eddies	☐	1	2	3	[✓ 4]	5	☐	☒	☐
Safety (due to flow)	☐	1	2	3	4	[✓ 5]	☐	☒	☐
Safety (due to debris/ other hazards)	☐	1	2	3	4	[✓ 5]	☐	☒	☐
Aesthetic quality	☐	1	2	3	4	[✓ 5]	☐	☒	☐
Overall quality	☐	1	2	3	4	[✓ 5]	☐	☒	☐

3. Please provide a brief explanation of your rating and the overall quality of the whitewater boating of this reach.

Flow at 1,500 cfs establishes a viable recreational feature with high utility to multiple expertise levels. More water is clearly preferable however 1,500 cfs is sufficient to establish the feature and to build a broad recreational user base. 2,000 cfs likely preferable. Flow witnessed was likely in excess of 1,500 cfs and closer to 1,750.

4. Identify and discuss safety hazards and considerations at this flow:

a) Are there any potential areas where emergency egress would be difficult? Yes, currrent conditions likely require improvements to trails with stairs or other access.

b) Identify any public safety responder considerations should rescue services be required.

Trail improvements in order to provide access at Public Library and Exchange & Hartford

c) Please provide a brief description of any observed hazards and their location at this flow:

Rebar beneath the Memorial Bridge which needs to be removed. Low head dam at Boivin Park access site is a significant hazard.

d) Do you have any additional comments regarding safely boating the reach at this flow?

Signage at access points will be very important to ensuring users are fully informed of the feature

5. Identify and discuss features, flows, and other aspects of boating this reach:

a) Did you observe any significant features or opportunities at this reach? Please provide a brief description: The entire feature is situated directly adjacent to the downtown service center. This feature has extraordinary potential to serve as a major source of economic growth and diversification from outdoor recreation interests. New hotel nearby.

b) Compared to this flow level, what flow would you prefer to boat this reach at? (*Circle one*)

Much lower Lower No change [✓ Higher] Much Higher

c) Discuss the difficulty of this run at various flow regimes.

Difficulty varies depending on put in. Quite remarkable that the run has a descending order of difficulty with advanced areas upstream. Excellent access for all levels.

d) Discuss the type of watercraft suitable for this reach.

Raft, kayak and canoe. Some tubing in the lower reach is clearly possible.

e) Discuss the length of the run and time to run this reach.

Multiple runs of 0.6 miles +/- depending on entry point.

6. Do you have any additional comments?

Feature is exceptionally worthy of development. Project configuration provides unusual ability to control very specific quantities of water at relatively low flows (1,500 - 2,000 cfs). Feature is of statewide and potentially regional (New England) significance in terms of broad based ability of public to access, multiple skills levels that could be accomodated, and existing tourist traffic on US-2 and at Sunday River.

Part IV: Path Forward

1. Based on today's On-Land Assessment, do you recommend moving forward with an on-water feasibility assessment? Circle one: [✓ YES] NO

Thank you!

From: abk@mac.com
To: MacVane, Kelly
Subject: Re: Rumford Falls WW Study - Evaluation Forms
Date: Thursday, June 3, 2021 1:29:25 PM

Not all of my thoughts fit well in the form, but I'll try to keep them roughly in that order.

Experience:
A few years ago I was paddling some of the hardest water in the North East (mainly with Jake Risch who was also present), and have done a couple of real exploratory runs, but I've backed off more recently. I've also spent a lot of time teaching. I'm also a member of the local Mahoosuc Mountain Res

I'm going to be using 1 for the drop above the Portland Street bridge, 2 for the big one underneath it, and 3 for the run out below as we had discussed.

Min flow hazards:
There is really not enough water to run the first drop at min flow, it's pretty clear that you boat really wouldn't want to slide on it, and what flow is there will push you towards that sketchy crack in front of the boulder at the bottom of the slide on river left.
The second drop may have had a line off the right, but we didn't take enough of a look at it to evaluate it well until the flow came off. It has the geometry that could make it pretty nasty in there, but it's likely at minimum flow it doesn't have the strength for that.
Below it's likely that there just isn't enough channelization at minimum flow to avoid having to drag yourself over anything, but it did not look like there was much in the way of danger.

Access locations:

Boivin Park:
I think with all of us parked there for the eval, that was the busiest that I've ever seen the parking area and there was still a good amount of space. It doesn't have great access to the water, especially if the goal is to keep people from paddling down the dam, as that's the best natural access. Trying to improve the access by putting in a gangway and dock would just lead to those being torn away at flood despite plans to remove them.
Having the park as the official access also doesn't set paddlers & paddling on that stretch of river for success. While scouting is part of paddling, there is a resistance to getting out of your boat (for me, I'm so lanky that it is hard enough to fit into one in the first place…). With some of the lower access points, they're naturally right next to the drops which will help promote paddlers to scout them and make good decisions as to if they should run them.

Library:
While it's got the most limited parking, it's still a lot better than most access points on surrounding rivers (not everywhere is the Kennebec with it's hundreds of stairs and power for inflating rafts). The trail down while it could use a little improvement, is much better then lots of place.

Town Office:
I think this is the best of the access points. The trail may need some work to settle in, but it gives you a good view of the first rapid, and is close enough to the bridge to convince folks that they should scout the second from the bridge as they decide the first one might not be for them and they walk over to the library. Plenty of parking, and probably the best way to reduce the likelihood of too much unintentional nakedness while changing by being right behind town offices and firehouse. Similar to the library, the sloped ledge gives easy access at a variety of water levels.

River/Hartford:
Meh, like Boivin park it's perfect positioned to keep people from scouting.

On the take-out side of things, the MDACF and pedestrian bridge options are more convent than asking folks to paddle up to Carelton street.

For safety access, it might be worth exploring how to get near water level below the second drop on the right. People will figure out how to get there and if there is already a route of least resistance they will follow it.

1500 looked pretty reasonable for all the drops, but there are really two different types of runs to consider. From the towns perspective, I would focus on making sure the flows are good for the play wave in the third drop ('the stink hole'), as that will draw the most folks. From everything I've heard, it's really accessible to lots of different levels of paddlers, just people don't know when it will be running.

There are very few folks who are going to look at the upper two drops and try to run them without knowing what they are doing. At some level you really can't stop them, so I'd focus any energy on making the 3rd drop/play section the best it can be.

I'd definitely move forwards with an on-water assessment, but I really don't know how levels will affect the 3rd drop (less focused on it than the upper two). It looked like 1000-1200 might have been near minimum for the first, and maybe a little lower for the second, but when they would really be good is also up in the air till we get some water between our boats and ledge.

Thanks again for orchestrating the flow study!

-Alex Kerney
On Jun 1, 2021, 5:13 PM -0400, MacVane, Kelly <Kelly.MacVane@hdrinc.com>, wrote:

> Hi All-
>
> Thanks again for attending the On-Land Assessment portion of the Whitewater Study last week. As a reminder, please send me your evaluation form no later than COB Thursday, June 3rd so we can plan next steps. So far I have evaluation forms from Bob, Harold, and Todd.

> Let us know if any questions.
>
> Thanks,
>
> Kelly
>
> **Kelly MacVane**
>
> *Senior Regulatory Specialist, Hydropower Services*
>
> **HDR**
>
> 970 Baxter Boulevard, Suite 301
> Portland, Maine 04103
> **D** 207-239-3828 **M** 207-650-5364
> kelly.macvane@hdrinc.com
>
> hdrinc.com/follow-us

ATTACHMENT 3

COMPLETED ON-WATER ASSESSMENT PRE-RUN SURVEYS

Rumford Falls Hydroelectric Project (FERC No. 2333)
FERC Relicensing
Whitewater Study Pre-Run Survey

Name: Brian Denley **Affiliation:** MMSAR

Home Zip Code: 04217

E-Mail Address: bdenleyconstruction@gmail.com

1) What whitewater crafts do you think are appropriate for this reach? (*Please choose all that apply*)
   - [✓ a.] Hard shell kayak
   - b. Inflatable kayak
   - c. Closed canoe
   - d. Self-bailing raft (include length)
   - e. Other (please list)

2) What is your skill level?
   - a. Novice (comfortable running Class II whitewater)
   - [✓ b.] Intermediate (comfortable running Class III whitewater)
   - c. Advanced (comfortable running Class IV whitewater)
   - d. Expert (comfortable running Class V whitewater)

3) How many years have you been whitewater boating?

   3

4) Over the past 3 years, approximately how many days per year did you whitewater boat?

   40 +

5) Have you ever participated in a whitewater boating study associated with the relicensing of a hydroelectric project?

   a. _____Yes ___X No
   b. If yes, when, and for which project(s)?

6) How many times have you boated the Middle Dam Bypass Reach at the Rumford Falls Hydroelectric Project? 0

   a. If you have boated this reach before, what were the flows?

      i. Approximately: ___N/A___cfs to: ___N/A___cfs
      ii. What type of craft did you use? (*Please choose all that apply*)
         1. Hard shell kayak
         2. Inflatable kayak
         3. Closed canoe
         4. Self-bailing raft (include length)
         5. Other (please list)

Thank You for Your Participation

Rumford Falls Hydroelectric Project (FERC No. 2333)
FERC Relicensing
Whitewater Study Pre-Run Survey

Name: Bradford P Croteau **Affiliation:** ____________________

Home Zip Code: 03570

E-Mail Address: bradfordPCroteau@gmail.com

1) What whitewater crafts do you think are appropriate for this reach? (*Please choose all that apply*)
   - [✓ a.] Hard shell kayak
   - [✓ b.] Inflatable kayak
   - [✓ c.] Closed canoe
   - [✓ d.] Self-bailing raft (include length)
   - e. Other (please list)

2) What is your skill level?
   - a. Novice (comfortable running Class II whitewater)
   - b. Intermediate (comfortable running Class III whitewater)
   - c. Advanced (comfortable running Class IV whitewater)
   - [✓ d.] Expert (comfortable running Class V whitewater)

3) How many years have you been whitewater boating? 20

4) Over the past 3 years, approximately how many days per year did you whitewater boat? 50

5) Have you ever participated in a whitewater boating study associated with the relicensing of a hydroelectric project?

   a. __X__Yes _____No
   b. If yes, when, and for which project(s)?

6) How many times have you boated the Middle Dam Bypass Reach at the Rumford Falls Hydroelectric Project? One

   a. If you have boated this reach before, what were the flows?

      i. Approximately: __2000__cfs to: ____________cfs
      ii. What type of craft did you use? (*Please choose all that apply*)
         [✓ 1. Hard shell kayak]
         2. Inflatable kayak
         3. Closed canoe
         4. Self-bailing raft (include length)
         5. Other (please list)

Thank You for Your Participation

Rumford Falls Hydroelectric Project (FERC No. 2333)
FERC Relicensing
Whitewater Study Pre-Run Survey

Name: Kyle Duckworth

Home Zip Code: 04609

E-Mail Address: kjduckworth@gmail.com

Affiliation: AW, Penobscot Paddle and Chowder Society

1) What whitewater crafts do you think are appropriate for this reach? (*Please choose all that apply*)
   a. Hard shell kayak
   b. Inflatable kayak
   c. Closed canoe
   d. Self-bailing raft (include length)
   e. Other (please list)

Don't know - haven't paddled it. I assume all could be used.

2) What is your skill level?
   a. Novice (comfortable running Class II whitewater)
   b. Intermediate (comfortable running Class III whitewater)
   [✓ c.] Advanced (comfortable running Class IV whitewater)
   d. Expert (comfortable running Class V whitewater)

3) How many years have you been whitewater boating? 25

4) Over the past 3 years, approximately how many days per year did you whitewater boat?

Not many during Covid, but typically 15 days in a normal year.

5) Have you ever participated in a whitewater boating study associated with the relicensing of a hydroelectric project?

   a. _____Yes __X__No
   b. If yes, when, and for which project(s)?

6) How many times have you boated the Middle Dam Bypass Reach at the Rumford Falls Hydroelectric Project? 0

   a. If you have boated this reach before, what were the flows?

      i. Approximately: _____________cfs to: _____________cfs
      ii. What type of craft did you use? (*Please choose all that apply*)
         1. Hard shell kayak
         2. Inflatable kayak
         3. Closed canoe
         4. Self-bailing raft (include length)
         5. Other (please list)

Thank You for Your Participation

Rumford Falls Hydroelectric Project (FERC No. 2333)
FERC Relicensing
Whitewater Study Pre-Run Survey

Name: Morrill Nason **Affiliation:** PPCS

Home Zip Code: 04220

E-Mail Address: mnasonjr@gmail.com

1) What whitewater crafts do you think are appropriate for this reach? (*Please choose all that apply*)
   - [✓ a.] Hard shell kayak
   - [✓ b.] Inflatable kayak
   - [✓ c.] Closed canoe
   - [✓ d.] Self-bailing raft (include length) 12'-14'
   - [✓ e.] Other (please list) shredder

2) What is your skill level?
   - a. Novice (comfortable running Class II whitewater)
   - [✓ b.] Intermediate (comfortable running Class III whitewater)
   - c. Advanced (comfortable running Class IV whitewater)
   - d. Expert (comfortable running Class V whitewater)

3) How many years have you been whitewater boating? 40

4) Over the past 3 years, approximately how many days per year did you whitewater boat?

   5

5) Have you ever participated in a whitewater boating study associated with the relicensing of a hydroelectric project?

   a. _____Yes __X__No
   b. If yes, when, and for which project(s)?

   —

6) How many times have you boated the Middle Dam Bypass Reach at the Rumford Falls Hydroelectric Project? None

   a. If you have boated this reach before, what were the flows?

      i. Approximately: ____________cfs to: ____________cfs
      ii. What type of craft did you use? (*Please choose all that apply*)
         1. Hard shell kayak N/A
         2. Inflatable kayak
         3. Closed canoe
         4. Self-bailing raft (include length)
         5. Other (please list)

Thank You for Your Participation

ATTACHMENT 4

COMPLETED POST-RUN SURVEYS – 800 CFS

Upper

Rumford Falls Hydroelectric Project (FERC No. 2333)
FERC Relicensing
Whitewater Study Post-Run Survey

Name: Bradford Croteau **Date of Run:** 6-9-2022

Flow: 800 **cfs**

1) What type of craft did you use for this run?
   - [✓ a.] Hard shell kayak
   - b. Inflatable kayak
   - c. Closed canoe
   - d. Self-bailing raft (include length)
   - e. Other (please list)

2) Please identify the put-in and take-out locations you used for this run.

Put-in location: Upper Time: 9:30

Take-out location: Mexico Time: 11:00

3) Please estimate the number of unintended hits, stops, boat drags, and portages you had on this run:
   - a. I accidently hit rocks or other obstacles (but did not stop) about Na times.
   - b. I was stopped after hitting rocks or other obstacles about NA times (but did not have to get out of my boat to continue downstream).
   - c. I had to get out to drag or pull my boat off rocks or other obstacles about NA times.
   - d. I had to portage around rapids or sections about NA times.

4) How many rapids and play spots did you experience at this flow?

a. 3 Rapids ______ Play Spots

5) Please evaluate the availability of the following factors at this flow.

	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Totally Acceptable
Navigability	1	2	3	[✓ 4]	5
Challenging Technical Boating	1	2	3	[✓ 4]	5
Powerful Hydraulics	1	2	3	[✓ 4]	5
Whitewater "Play Areas"	1	2	[✓ 3]	4	5
Size/Difficulty of Rapids	1	2	3	[✓ 4]	5
Overall Whitewater	1	2	3	[✓ 4]	5
Challenge	1	2	3	[✓ 4]	5
Safety	1	2	3	[✓ 4]	5

6) At this flow, what minimum skill level would a paddler need to be to safely paddle this reach?

a. Beginner
b. Novice
c. Intermediate
d. Advanced
[✓ e. Expert]

7) Are you likely to return for future boating if this flow were to be provided or available?

a. Definitely no
b. Possibly
c. Probably
[✓ e. Definitely yes]

8) Was this flow optimal, or would you prefer a flow that was higher or lower than this flow?

a. Much lower
b. Lower
c. About the same (this flow was optimal)
[✓ d.] Higher
e. Much higher

9) If you feel qualified to offer an opinion of the desirability of this run at this flow using different types of crafts, please respond to the following statements.

This run at this flow would work well for:	**Strongly Disagree**	**Disagree**	**No Opinion**	**Agree**	**Strongly Agree**
Hard shell kayaks	1	2	3	[✓ 4]	5
Inflatable kayaks	1	[✓ 2]	3	4	5
Closed canoes	1	2	[✓ 3]	4	5
Self-bailing rafts	1	[✓ 2]	3	4	5
Other (Please specify):	1	2	3	4	5

10) Did you observe or experience any significant safety issues on your run (e.g., swims, pins, wrapped boats, constructed or natural river features, etc.)? Please explain.

NO

11) Please use the space below to provide any other comments about your boating experience at this flow.

____

____

____

____

____

____

____

____

Thank You for Your Participation

Rumford Falls Hydroelectric Project (FERC No. 2333)
FERC Relicensing
Whitewater Study Post-Run Survey

Name: Ben Schott **Date of Run:** 6/9/22

Flow: 808 cfs

1) What type of craft did you use for this run?
   - [✓ a.] Hard shell kayak
   - b. Inflatable kayak
   - c. Closed canoe
   - d. Self-bailing raft (include length)
   - e. Other (please list)

Upper

2) Please identify the put-in and take-out locations you used for this run.

Put-in location: Upper Time: 9:00

Take-out location: upper Mexico Time: 11:45

3) Please estimate the number of unintended hits, stops, boat drags, and portages you had on this run:
   - a. I accidently hit rocks or other obstacles (but did not stop) about_____times.
   - b. I was stopped after hitting rocks or other obstacles about_____times (but did not have to get out of my boat to continue downstream).
   - c. I had to get out to drag or pull my boat off rocks or other obstacles about ______ times.
   - d. I had to portage around rapids or sections about_____times.

N/A

low volume right line on first drop
min level for run in my opinion

4) How many rapids and play spots did you experience at this flow?

a. 3 Rapids 2 Play Spots

2(V) 1(III-)

5) Please evaluate the availability of the following factors at this flow.

	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Totally Acceptable
Navigability	1	2	3	4	[✓ 5]
Challenging Technical Boating	1	2	3	4	[✓ 5]
Powerful Hydraulics	1	2	[✓ 3]	4	5
Whitewater "Play Areas"	1	2	3	[✓ 4]	5
Size/Difficulty of Rapids	1	2	3	4	[✓ 5]
Overall Whitewater	1	2	3	4	[✓ 5]
Challenge	1	2	3	[✓ 4]	5
Safety	1	2	3	4	[✓ 5]

6) At this flow, what minimum skill level would a paddler need to be to safely paddle this reach?

a. Beginner
b. Novice
c. Intermediate
[✓ d.] Advanced good w/ safety
[✓ e.] Expert

7) Are you likely to return for future boating if this flow were to be provided or available?

a. Definitely no
b. Possibly
c. Probably
[✓ e.] Definitely yes

8) Was this flow optimal, or would you prefer a flow that was higher or lower than this flow?

- a. Much lower
- b. Lower
- c. About the same (this flow was optimal)
- [✓ d.] Higher
- e. Much higher

9) If you feel qualified to offer an opinion of the desirability of this run at this flow using different types of crafts, please respond to the following statements.

This run at this flow would work well for:	Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree
Hard shell kayaks	1	2	3	4	[✓ 5]
Inflatable kayaks (Expert)	1	2	3	[✓ 4]	5
Closed canoes	1	2	3	4	[✓ 5]
Self-bailing rafts (1st drop, not 2nd)	1	2	3	[✓ 4]	5
Other (Please specify):	1	2	[✓ 3]	4	5

10) Did you observe or experience any significant safety issues on your run (e.g., swims, pins, wrapped boats, constructed or natural river features, etc.)? Please explain.

far left to left on 1st rapid has pin potential

@ bottom

2nd drop must berun

11) Please use the space below to provide any other comments about your boating experience at this flow.

Setting safety river righ or center island just below 2nd drop is highly advised.

Plenty of potential (painted gauge for min (800) and other flows to reasonable max for most people that would run it. This is Not for intermediate boaters

Thank You for Your Participation

Lower

Rumford Falls Hydroelectric Project (FERC No. 2333)
FERC Relicensing
Whitewater Study Post-Run Survey

Name: Bradford Croteau **Date of Run:** 6-9-2022

Flow: 800 **cfs**

1) What type of craft did you use for this run?
   - [✓ a.] Hard shell kayak
   - b. Inflatable kayak
   - c. Closed canoe
   - d. Self-bailing raft (include length)
   - e. Other (please list)

2) Please identify the put-in and take-out locations you used for this run.

Put-in location: Upper Time: 9:30

Take-out location: Mexico Time: 11:00

3) Please estimate the number of unintended hits, stops, boat drags, and portages you had on this run:
   - a. I accidently hit rocks or other obstacles (but did not stop) about NA times.
   - b. I was stopped after hitting rocks or other obstacles about NA times (but did not have to get out of my boat to continue downstream).
   - c. I had to get out to drag or pull my boat off rocks or other obstacles about NA times.
   - d. I had to portage around rapids or sections about NA times.

4) How many rapids and play spots did you experience at this flow?

a. 1 Rapids 2 Play Spots

5) Please evaluate the availability of the following factors at this flow.

	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Totally Acceptable
Navigability	1	2	3	[✓ 4]	5
Challenging Technical Boating	1	2	[✓ 3]	4	5
Powerful Hydraulics	1	2	[✓ 3]	4	5
Whitewater "Play Areas"	1	2	3	[✓ 4]	5
Size/Difficulty of Rapids	1	2	[✓ 3]	4	5
Overall Whitewater	1	2	3	[✓ 4]	5
Challenge	1	2	3	[✓ 4]	5
Safety	1	2	3	[✓ 4]	5

6) At this flow, what minimum skill level would a paddler need to be to safely paddle this reach?

a. Beginner
[✓ b.] Novice
c. Intermediate
d. Advanced
e. Expert

7) Are you likely to return for future boating if this flow were to be provided or available?

a. Definitely no
b. Possibly
[✓ c.] Probably
e. Definitely yes

8) Was this flow optimal, or would you prefer a flow that was higher or lower than this flow?

a. Much lower
b. Lower
c. About the same (this flow was optimal)
[✓ d.] Higher
e. Much higher

9) If you feel qualified to offer an opinion of the desirability of this run at this flow using different types of crafts, please respond to the following statements.

This run at this flow would work well for:	Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree
Hard shell kayaks	1	2	3	[✓ 4]	5
Inflatable kayaks	1	2	3	[✓ 4]	5
Closed canoes	1	2	3	[✓ 4]	5
Self-bailing rafts	1	2	3	[✓ 4]	5
Other (Please specify):	1	2	3	4	5

10) Did you observe or experience any significant safety issues on your run (e.g., swims, pins, wrapped boats, constructed or natural river features, etc.)? Please explain.

NO

11) Please use the space below to provide any other comments about your boating experience at this flow.

____

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Thank You for Your Participation

Rumford Falls Hydroelectric Project (FERC No. 2333)
FERC Relicensing
Whitewater Study Post-Run Survey

Name: Ben Schott **Date of Run:** 6/9/22

Flow: 600 **cfs**

1) What type of craft did you use for this run?
   - [✓ a.] Hard shell kayak
   - b. Inflatable kayak
   - c. Closed canoe
   - d. Self-bailing raft (include length)
   - e. Other (please list)

LOWER

2) Please identify the put-in and take-out locations you used for this run.

Put-in location: Top Time: 9

Take-out location: Mexico Time: 10:45

3) Please estimate the number of unintended hits, stops, boat drags, and portages you had on this run:
   - a. I accidently hit rocks or other obstacles (but did not stop) about_____times.
   - b. I was stopped after hitting rocks or other obstacles about_____times (but did not have to get out of my boat to continue downstream).
   - c. I had to get out to drag or pull my boat off rocks or other obstacles about ______ times.
   - d. I had to portage around rapids or sections about_____times.

N/A

4) How many rapids and play spots did you experience at this flow?

a. 3 _____Rapids 2 _____Play Spots → lower

2(V) 1(III-)

5) Please evaluate the availability of the following factors at this flow.

	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Totally Acceptable
Navigability	1	2	3	[✓ 4]	5
Challenging Technical Boating	1	2	3	[✓ 4]	5
Powerful Hydraulics	1	2	3	[✓ 4]	5
Whitewater "Play Areas"	1	2	3	[✓ 4]	5
Size/Difficulty of Rapids	1	2	3	[✓ 4]	5
Overall Whitewater	1	2	3	[✓ 4]	5
Challenge	1	2	3	[✓ 4]	5
Safety	1	2	3	[✓ 4]	5

6) At this flow, what minimum skill level would a paddler need to be to safely paddle this reach? w/ other stronger boaters III- / below surf beginner

[✓ a. Beginner]
b. Novice
c. Intermediate
d. Advanced
e. Expert

7) Are you likely to return for future boating if this flow were to be provided or available?

a. Definitely no
b. Possibly
c. Probably
[✓ e. Definitely yes] play boating

8) Was this flow optimal, or would you prefer a flow that was higher or lower than this flow?
   - a. Much lower
   - b. Lower
   - c. About the same (this flow was optimal)
   - [✓ d.] Higher
   - e. Much higher

9) If you feel qualified to offer an opinion of the desirability of this run at this flow using different types of crafts, please respond to the following statements.

This run at this flow would work well for:	**Strongly Disagree**	**Disagree**	**No Opinion**	**Agree**	**Strongly Agree**
Hard shell kayaks	1	2	3	4	[✓ 5]
Inflatable kayaks	1	2	3	4	[✓ 5]
Closed canoes	1	2	3	4	[✓ 5]
Self-bailing rafts	1	2	3	4	[✓ 5]
Other (Please specify):	1	2	3	4	[✓ 5]

open canoe, Competent SUP

10) Did you observe or experience any significant safety issues on your run (e.g., swims, pins, wrapped boats, constructed or natural river features, etc.)? Please explain.

Lower straight forward, more water would be better. Min for surfing and navigating below surf hole

11) Please use the space below to provide any other comments about your boating experience at this flow.

Great surf potential to draw people to the area!

Thank You for Your Participation

Lower

Rumford Falls Hydroelectric Project (FERC No. 2333)
FERC Relicensing
Whitewater Study Post-Run Survey

Name: Kyle Duckworth **Date of Run:** 6/9/22

Flow: 800 **cfs**

1) What type of craft did you use for this run?
    a. Hard shell kayak
    b. Inflatable kayak
    c. Closed canoe
    d. Self-bailing raft (include length)
    e. Other (please list) Open Canoe

2) Please identify the put-in and take-out locations you used for this run.

Put-in location: Class II-III Put-in Below Bridge Time: 10:00

Take-out location: Mexico Boat Ramp Time: 1045

3) Please estimate the number of unintended hits, stops, boat drags, and portages you had on this run:
    a. I accidently hit rocks or other obstacles (but did not stop) about 5 times.
    b. I was stopped after hitting rocks or other obstacles about 0 times (but did not have to get out of my boat to continue downstream).
    c. I had to get out to drag or pull my boat off rocks or other obstacles about 0 times.
    d. I had to portage around rapids or sections about 0 times.

4) How many rapids and play spots did you experience at this flow?

a. 5 Rapids 2 Play Spots

5) Please evaluate the availability of the following factors at this flow.

	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Totally Acceptable
Navigability	1	2	[✓ 3]	4	5
Challenging Technical Boating	1	2	3	[✓ 4]	5
Powerful Hydraulics	1	2	[✓ 3]	4	5
Whitewater "Play Areas"	1	2	[✓ 3]	4	5
Size/Difficulty of Rapids	1	2	3	[✓ 4]	5
Overall Whitewater	1	2	[✓ 3]	4	5
Challenge	1	2	[✓ 3]	4	5
Safety	1	2	3	[✓ 4]	5

6) At this flow, what minimum skill level would a paddler need to be to safely paddle this reach?

a. Beginner
[✓ b.] Novice ← for Kayaks
[✓ c.] Intermediate ← for Open Canoe
d. Advanced
e. Expert

7) Are you likely to return for future boating if this flow were to be provided or available?

[✓ a.] Definitely no
b. Possibly
c. Probably
e. Definitely yes

8) Was this flow optimal, or would you prefer a flow that was higher or lower than this flow?

a. Much lower
b. Lower
c. About the same (this flow was optimal)
[✓ d.] Higher
e. Much higher

9) If you feel qualified to offer an opinion of the desirability of this run at this flow using different types of crafts, please respond to the following statements.

This run at this flow would work well for:	Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree
Hard shell kayaks	1	2	3	[✓ 4]	5
Inflatable kayaks	1	2	3	[✓ 4]	5
Closed canoes	1	2	3	[✓ 4]	5
Self-bailing rafts	1	[✓ 2]	3	4	5
Other (Please specify): Open Canoe	1	2	3	[✓ 4]	5

10) Did you observe or experience any significant safety issues on your run (e.g., swims, pins, wrapped boats, constructed or natural river features, etc.)? Please explain.

Sticky Hole at The last ledge drop on river left
Not pleasant to be in with a canoe.

11) Please use the space below to provide any other comments about your boating experience at this flow.

- First Ledge drop after put-in (on river left) needed more water for a clean run.
- Second ledge on left had a surfable wave, but not great in a canoe.
- 3rd Ledge on left had an enticing wavy hole, but if you ~~[illegible]~~ weren't careful you'd end up in the sticky hole next to it.
- Class II rapid above the mill was a little shallow

Thank You for Your Participation

Lower

Rumford Falls Hydroelectric Project (FERC No. 2333)
FERC Relicensing
Whitewater Study Post-Run Survey

Name: MORRILL NASON **Date of Run:** 6/9/2022

Flow: 800 cfs

1) What type of craft did you use for this run?
   - a. Hard shell kayak
   - b. Inflatable kayak
   - c. Closed canoe
   - d. Self-bailing raft (include length)
   - [✓ e.] Other (please list) SHREDDER.

2) Please identify the put-in and take-out locations you used for this run.

Put-in location: BELOW BRIDGE Time: 0945

Take-out location: " " Time: 1015

3) Please estimate the number of unintended hits, stops, boat drags, and portages you had on this run:
   - a. I accidently hit rocks or other obstacles (but did not stop) about 0 times.
   - b. I was stopped after hitting rocks or other obstacles about 0 times (but did not have to get out of my boat to continue downstream).
   - c. I had to get out to drag or pull my boat off rocks or other obstacles about 0 times.
   - d. I had to portage around rapids or sections about 0 times.

4) How many rapids and play spots did you experience at this flow?

a. _3___Rapids _3__Play Spots

5) Please evaluate the availability of the following factors at this flow.

	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Totally Acceptable
Navigability	1	2	3	[✓ 4]	5
Challenging Technical Boating	1	2	[✓ 3]	4	5
Powerful Hydraulics	1	2	[✓ 3]	4	5
Whitewater "Play Areas"	1	2	[✓ 3]	4	5
Size/Difficulty of Rapids	1	2	[✓ 3]	4	5
Overall Whitewater	1	2	[✓ 3]	4	5
Challenge	1	2	[✓ 3]	4	5
Safety	1	2	3	4	[✓ 5]

6) At this flow, what minimum skill level would a paddler need to be to safely paddle this reach?

a. Beginner
b. Novice
[✓ c.] Intermediate
d. Advanced
e. Expert

7) Are you likely to return for future boating if this flow were to be provided or available?

a. Definitely no
b. Possibly
[✓ c.] Probably
e. Definitely yes

8) Was this flow optimal, or would you prefer a flow that was higher or lower than this flow?

a. Much lower
b. Lower
[✓ c.] About the same (this flow was optimal) FOR JUST RUNNING
[✓ d.] Higher PERHAPS FOR SURFING
e. Much higher

9) If you feel qualified to offer an opinion of the desirability of this run at this flow using different types of crafts, please respond to the following statements.

This run at this flow would work well for:	**Strongly Disagree**	**Disagree**	**No Opinion**	**Agree**	**Strongly Agree**
Hard shell kayaks	1	2	[✓ 3]	4	5
Inflatable kayaks	1	2	3	[✓ 4]	5
Closed canoes	1	2	3	[✓ 4]	5
Self-bailing rafts	1	[✓ 2]	3	4	5
Other (Please specify): SHREDDER	1	2	3	[✓ 4]	5

10) Did you observe or experience any significant safety issues on your run (e.g., swims, pins, wrapped boats, constructed or natural river features, etc.)? Please explain.

NONE

11) Please use the space below to provide any other comments about your boating experience at this flow.

Thank You for Your Participation

ATTACHMENT 5

COMPLETED POST-RUN SURVEYS – 1,500 CFS

Rumford Falls Hydroelectric Project (FERC No. 2333)
FERC Relicensing
Whitewater Study Post-Run Survey

Name: Bradford Croteau **Date of Run:** 6-9-2022

Flow: 1500 **cfs**

1) What type of craft did you use for this run?
   - [✓ a.] Hard shell kayak
   - b. Inflatable kayak
   - c. Closed canoe
   - d. Self-bailing raft (include length)
   - e. Other (please list)

Upper

2) Please identify the put-in and take-out locations you used for this run.

Put-in location: upper Time: 11:30

Take-out location: Mexico Time: 1:15

3) Please estimate the number of unintended hits, stops, boat drags, and portages you had on this run:
   - a. I accidently hit rocks or other obstacles (but did not stop) about______times.
   - b. I was stopped after hitting rocks or other obstacles about______times (but did not have to get out of my boat to continue downstream).
   - c. I had to get out to drag or pull my boat off rocks or other obstacles about ______ times.
   - d. I had to portage around rapids or sections about 1 times.

4) How many rapids and play spots did you experience at this flow?

a. 2 Rapids 1 Play Spots

5) Please evaluate the availability of the following factors at this flow.

	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Totally Acceptable
Navigability	1	2	3	[✓ 4]	5
Challenging Technical Boating	1	2	3	[✓ 4]	5
Powerful Hydraulics	1	2	3	[✓ 4]	5
Whitewater "Play Areas"	1	2	3	[✓ 4]	5
Size/Difficulty of Rapids	1	2	3	[✓ 4]	5
Overall Whitewater	1	2	3	[✓ 4]	5
Challenge	1	2	3	[✓ 4]	5
Safety	1	2	3	[✓ 4]	5

6) At this flow, what minimum skill level would a paddler need to be to safely paddle this reach?

a. Beginner
b. Novice
c. Intermediate
d. Advanced
[✓ e.] Expert

7) Are you likely to return for future boating if this flow were to be provided or available?

a. Definitely no
b. Possibly
c. Probably
[✓ e.] Definitely yes

8) Was this flow optimal, or would you prefer a flow that was higher or lower than this flow?

- a. Much lower
- b. Lower
- [✓ c.] About the same (this flow was optimal)
- d. Higher
- e. Much higher

9) If you feel qualified to offer an opinion of the desirability of this run at this flow using different types of crafts, please respond to the following statements.

This run at this flow would work well for:	**Strongly Disagree**	**Disagree**	**No Opinion**	**Agree**	**Strongly Agree**
Hard shell kayaks	1	2	3	4	[✓ 5]
Inflatable kayaks	1	2	[✓ 3]	4	5
Closed canoes	1	2	[✓ 3]	4	5
Self-bailing rafts	1	2	[✓ 3]	4	5
Other (Please specify):	1	2	3	4	5

10) Did you observe or experience any significant safety issues on your run (e.g., swims, pins, wrapped boats, constructed or natural river features, etc.)? Please explain.

NO

11) Please use the space below to provide any other comments about your boating experience at this flow.

____

Thank You for Your Participation

Rumford Falls Hydroelectric Project (FERC No. 2333)
FERC Relicensing
Whitewater Study Post-Run Survey

Name: Ben Schott **Date of Run:** 6/9/22

Flow: 1500 **cfs**

Upper

1) What type of craft did you use for this run?
   - [✓ a.] Hard shell kayak
   - b. Inflatable kayak
   - c. Closed canoe
   - d. Self-bailing raft (include length)
   - e. Other (please list)

2) Please identify the put-in and take-out locations you used for this run.

Put-in location: Top Time: 11:30

Take-out location: Mexico Time: 1:15

3) Please estimate the number of unintended hits, stops, boat drags, and portages you had on this run:
   - a. I accidently hit rocks or other obstacles (but did not stop) about_____times.
   - b. I was stopped after hitting rocks or other obstacles about_____times (but did not have to get out of my boat to continue downstream).
   - c. I had to get out to drag or pull my boat off rocks or other obstacles about _____ times.
   - d. I had to portage around rapids or sections about_____times.

None

4) How many rapids and play spots did you experience at this flow?

a. 3 ___Rapids 2 ___Play Spots

2(V) 1 (III-)

5) Please evaluate the availability of the following factors at this flow.

	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Totally Acceptable
Navigability	1	2	3	4	[✓ 5]
Challenging Technical Boating	1	2	3	4	[✓ 5]
Powerful Hydraulics	1	2	3	4	[✓ 5]
Whitewater "Play Areas"	1	2	3	[✓ 4]	5
Size/Difficulty of Rapids	1	2	3	4	[✓ 5]
Overall Whitewater	1	2	3	4	[✓ 5]
Challenge	1	2	3	4	[✓ 5]
Safety	1	2	3	4	[✓ 5]

6) At this flow, what minimum skill level would a paddler need to be to safely paddle this reach?

a. Beginner
b. Novice
c. Intermediate
[✓ d.] Advanced
[✓ e.] Expert

w/ safety

7) Are you likely to return for future boating if this flow were to be provided or available?

a. Definitely no
b. Possibly
c. Probably
[✓ e.] Definitely yes

8) Was this flow optimal, or would you prefer a flow that was higher or lower than this flow?

- a. Much lower
- b. Lower
- c. About the same (this flow was optimal)
- d. Higher
- e. Much higher

This might be optimal
need to see 2000,
think 1200 might be
really good

9) If you feel qualified to offer an opinion of the desirability of this run at this flow using different types of crafts, please respond to the following statements.

This run at this flow would work well for:	Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree
Hard shell kayaks	1	2	3	4	[✓ 5]
Inflatable kayaks	1	2	[✓ 3]	4	5
Closed canoes	1	2	3	4	[✓ 5]
Self-bailing rafts	1	2	3	4	5
Other (Please specify):	1	2	3	4	5

10) Did you observe or experience any significant safety issues on your run (e.g., swims, pins, wrapped boats, constructed or natural river features, etc.)? Please explain.

Harder to scout 2nd drop and set safety, but
not too hard

11) Please use the space below to provide any other comments about your boating experience at this flow.

left channel opens up on 1st drop. left side, must catch last left eddy before last drop and ferry to right chute left and middle chutes are a no go.
2nd drop harder to scout, line is wider.

A couple fun surfs between 2nd drop and and normal surf wave.

Thank You for Your Participation

Rumford Falls Hydroelectric Project (FERC No. 2333)
FERC Relicensing
Whitewater Study Post-Run Survey

Name: Bradford Croteau **Date of Run:** 6-9-2022

Flow: 1500 cfs

1) What type of craft did you use for this run?
   - [✓ a.] Hard shell kayak
   - b. Inflatable kayak
   - c. Closed canoe
   - d. Self-bailing raft (include length)
   - e. Other (please list)

Lower

2) Please identify the put-in and take-out locations you used for this run.

Put-in location: Lower Time: 11:30

Take-out location: Mexico Time: 1:15

3) Please estimate the number of unintended hits, stops, boat drags, and portages you had on this run:
   - a. I accidently hit rocks or other obstacles (but did not stop) about______times.
   - b. I was stopped after hitting rocks or other obstacles about_____times (but did not have to get out of my boat to continue downstream).
   - c. I had to get out to drag or pull my boat off rocks or other obstacles about ______ times.
   - d. I had to portage around rapids or sections about_____times.

4) How many rapids and play spots did you experience at this flow?

a. 20 Rapids 1 Play Spots

5) Please evaluate the availability of the following factors at this flow.

	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Totally Acceptable
Navigability	1	2	3	4	[✓ 5]
Challenging Technical Boating	1	2	3	4	[✓ 5]
Powerful Hydraulics	1	2	3	4	[✓ 5]
Whitewater "Play Areas"	1	2	3	4	[✓ 5]
Size/Difficulty of Rapids	1	2	3	4	[✓ 5]
Overall Whitewater	1	2	3	4	[✓ 5]
Challenge	1	2	3	4	[✓ 5]
Safety	1	2	3	4	[✓ 5]

6) At this flow, what minimum skill level would a paddler need to be to safely paddle this reach?

a. Beginner
b. Novice
[✓ c.] Intermediate
d. Advanced
e. Expert

7) Are you likely to return for future boating if this flow were to be provided or available?

a. Definitely no
b. Possibly
[✓ c.] Probably
e. Definitely yes

8) Was this flow optimal, or would you prefer a flow that was higher or lower than this flow?
   a. Much lower
   b. Lower
   c. About the same (this flow was optimal)
   d. Higher
   e. Much higher

9) If you feel qualified to offer an opinion of the desirability of this run at this flow using different types of crafts, please respond to the following statements.

This run at this flow would work well for:	**Strongly Disagree**	**Disagree**	**No Opinion**	**Agree**	**Strongly Agree**
Hard shell kayaks	1	2	3	4	5
Inflatable kayaks	1	2	3	4	5
Closed canoes	1	2	3	4	5
Self-bailing rafts	1	2	3	4	5
Other (Please specify):	1	2	3	4	5

10) Did you observe or experience any significant safety issues on your run (e.g., swims, pins, wrapped boats, constructed or natural river features, etc.)? Please explain.

____

____

____

____

____

____

____

____

11) Please use the space below to provide any other comments about your boating experience at this flow.

Thank You for Your Participation

Lower Surf

Rumford Falls Hydroelectric Project (FERC No. 2333)
FERC Relicensing
Whitewater Study Post-Run Survey

Name: Ben Schott **Date of Run:** 6/9/22

Flow: 1500 **cfs**

1) What type of craft did you use for this run?
   - [✓ a.] Hard shell kayak
   - b. Inflatable kayak
   - c. Closed canoe
   - d. Self-bailing raft (include length)
   - e. Other (please list)

2) Please identify the put-in and take-out locations you used for this run.

Put-in location: Top Time: 11:30

Take-out location: Mexico Time: 1:15

3) Please estimate the number of unintended hits, stops, boat drags, and portages you had on this run:
   - a. I accidently hit rocks or other obstacles (but did not stop) about______times.
   - b. I was stopped after hitting rocks or other obstacles about_____times (but did not have to get out of my boat to continue downstream).
   - c. I had to get out to drag or pull my boat off rocks or other obstacles about ______ times.
   - d. I had to portage around rapids or sections about_____times.

None

4) How many rapids and play spots did you experience at this flow?

a. ______Rapids __3__Play Spots
(||| - |

5) Please evaluate the availability of the following factors at this flow.

	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Totally Acceptable
Navigability	1	2	3	4	[✓ 5]
Challenging Technical Boating	1	2	3	4	[✓ 5]
Powerful Hydraulics	1	2	3	4	[✓ 5]
Whitewater "Play Areas"	1	2	3	4	[✓ 5]
Size/Difficulty of Rapids	1	2	3	4	[✓ 5]
Overall Whitewater	1	2	3	4	[✓ 5]
Challenge	1	2	3	4	[✓ 5]
Safety	1	2	3	4	[✓ 5]

6) At this flow, what minimum skill level would a paddler need to be to safely paddle this reach?
   - [✓ a.] Beginner w/ group
   - [✓ b.] Novice [illegible]
   - c. Intermediate
   - d. Advanced
   - e. Expert

7) Are you likely to return for future boating if this flow were to be provided or available?
   - a. Definitely no
   - b. Possibly
   - c. Probably
   - [✓ e.] Definitely yes

8) Was this flow optimal, or would you prefer a flow that was higher or lower than this flow?

- a. Much lower
- b. Lower
- c. About the same (this flow was optimal)
- [✓ d.] Higher
- e. Much higher

9) If you feel qualified to offer an opinion of the desirability of this run at this flow using different types of crafts, please respond to the following statements.

This run at this flow would work well for:	Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree
Hard shell kayaks	1	2	3	4	[✓ 5]
Inflatable kayaks	1	2	3	4	[✓ 5]
Closed canoes	1	2	3	4	[✓ 5]
Self-bailing rafts	1	2	3	4	[✓ 5]
Other (Please specify): Open Canoes	1	2	3	4	[✓ 5]

10) Did you observe or experience any significant safety issues on your run (e.g., swims, pins, wrapped boats, constructed or natural river features, etc.)? Please explain.

Nope

11) Please use the space below to provide any other comments about your boating experience at this flow.

Surfing is fun, but only flat spins, loops need deeper water, but way better than 800

Rapid better as well

Thank You for Your Participation

Rumford Falls Hydroelectric Project (FERC No. 2333)
FERC Relicensing
Whitewater Study Post-Run Survey

Long

Name: Kyle Duckworth **Date of Run:** 6/9/22

Flow: 1500 **cfs**

1) What type of craft did you use for this run?
    a. Hard shell kayak
    b. Inflatable kayak
    c. Closed canoe
    d. Self-bailing raft (include length)
    e. Other (please list) Open Canoe

2) Please identify the put-in and take-out locations you used for this run.

Put-in location: Class II-III below bridge Time: 1200

Take-out location: Mexico Boat Ramp Time: 1315

3) Please estimate the number of unintended hits, stops, boat drags, and portages you had on this run:
    a. I accidently hit rocks or other obstacles (but did not stop) about 3 times.
    b. I was stopped after hitting rocks or other obstacles about 0 times (but did not have to get out of my boat to continue downstream).
    c. I had to get out to drag or pull my boat off rocks or other obstacles about 0 times.
    d. I had to portage around rapids or sections about 1 times.

4) How many rapids and play spots did you experience at this flow?

a. 5 Rapids 1 Play Spots

5) Please evaluate the availability of the following factors at this flow.

	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Totally Acceptable
Navigability	1	2	3	[✓ 4]	5
Challenging Technical Boating	1	2	3	[✓ 4]	5
Powerful Hydraulics	1	2	[✓ 3]	4	5
Whitewater "Play Areas"	1	2	3	[✓ 4]	5
Size/Difficulty of Rapids	1	2	3	4	5
Overall Whitewater	1	2	3	[✓ 4]	5
Challenge	1	2	3	[✓ 4]	5
Safety	1	2	[✓ 3]	4	5

6) At this flow, what minimum skill level would a paddler need to be to safely paddle this reach?

a. Beginner
b. Novice
c. Intermediate for Kayak
d. Advanced - for Open Canoe
e. Expert

7) Are you likely to return for future boating if this flow were to be provided or available?

[✓ a. Definitely no]
b. Possibly
c. Probably
e. Definitely yes

8) Was this flow optimal, or would you prefer a flow that was higher or lower than this flow?
  a. Much lower
  b. Lower
  [✓ c.] About the same (this flow was optimal)
  d. Higher
  e. Much higher

9) If you feel qualified to offer an opinion of the desirability of this run at this flow using different types of crafts, please respond to the following statements.

This run at this flow would work well for:	**Strongly Disagree**	**Disagree**	**No Opinion**	**Agree**	**Strongly Agree**
Hard shell kayaks	1	2	3	[✓ 4]	5
Inflatable kayaks	1	2	3	[✓ 4]	5
Closed canoes	1	2	3	[✓ 4]	5
Self-bailing rafts	1	2	3	[✓ 4]	5
Other (Please specify): Open Canoes	1	2	[✓ 3]	4	5

10) Did you observe or experience any significant safety issues on your run (e.g., swims, pins, wrapped boats, constructed or natural river features, etc.)? Please explain.

No

11) Please use the space below to provide any other comments about your boating experience at this flow.

This level covered up most of The shallow areas.

At The 3rd Ledge on The left a nice play hole developed (where previously at 800 cfs a sticky hole was hard to avoid)

Thank You for Your Participation

Rumford Falls Hydroelectric Project (FERC No. 2333)
FERC Relicensing
Whitewater Study Post-Run Survey

Lane

Name: MORRILL NASON **Date of Run:** 6/9/2022

Flow: 1500 cfs

1) What type of craft did you use for this run?
   a. Hard shell kayak
   b. Inflatable kayak
   c. Closed canoe
   d. Self-bailing raft (include length)
   [✓ e.] Other (please list) SHREDDER

2) Please identify the put-in and take-out locations you used for this run.

Put-in location: BELOW BRIDGE Time: 1200

Take-out location: MEXICO BOAT LAUNCH Time: 1300

3) Please estimate the number of unintended hits, stops, boat drags, and portages you had on this run:
   a. I accidently hit rocks or other obstacles (but did not stop) about 0 times.
   b. I was stopped after hitting rocks or other obstacles about 0 times (but did not have to get out of my boat to continue downstream).
   c. I had to get out to drag or pull my boat off rocks or other obstacles about 0 times.
   d. I had to portage around rapids or sections about 0 times.

4) How many rapids and play spots did you experience at this flow?

a. 3 Rapids 1 Play Spots

5) Please evaluate the availability of the following factors at this flow.

	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Totally Acceptable
Navigability	1	2	3	[✓ 4]	5
Challenging Technical Boating	1	2	3	4	[✓ 5]
Powerful Hydraulics	1	2	3	[✓ 4]	5
Whitewater "Play Areas"	1	2	3	4	[✓ 5]
Size/Difficulty of Rapids	1	2	3	4	[✓ 5]
Overall Whitewater	1	2	3	4	[✓ 5]
Challenge	1	2	3	4	[✓ 5]
Safety	1	2	3	[✓ 4]	5

6) At this flow, what minimum skill level would a paddler need to be to safely paddle this reach?

a. Beginner
b. Novice
[✓ c. Intermediate]
d. Advanced
e. Expert

7) Are you likely to return for future boating if this flow were to be provided or available?

a. Definitely no
b. Possibly
c. Probably
[✓ e. Definitely yes]

8) Was this flow optimal, or would you prefer a flow that was higher or lower than this flow?

a. Much lower
b. Lower
[✓ c.] About the same (this flow was optimal)
d. Higher
e. Much higher

9) If you feel qualified to offer an opinion of the desirability of this run at this flow using different types of crafts, please respond to the following statements.

This run at this flow would work well for:	**Strongly Disagree**	**Disagree**	**No Opinion**	**Agree**	**Strongly Agree**
Hard shell kayaks	1	2	3	4	[✓ 5]
Inflatable kayaks	1	2	3	[✓ 4]	5
Closed canoes	1	2	3	[✓ 4]	5
Self-bailing rafts	1	2	[✓ 3]	4	5
Other (Please specify): SHREDDER	1	2	3	[✓ 4]	5

10) Did you observe or experience any significant safety issues on your run (e.g., swims, pins, wrapped boats, constructed or natural river features, etc.)? Please explain.

NONE. GREAT RETURN EDDY @ LAST HOLE (PLAY SPOT).

11) Please use the space below to provide any other comments about your boating experience at this flow.

EASIER PADDLING S-1 @ 1500 THAN 800.

Thank You for Your Participation

ATTACHMENT 6

COMPLETED POST-RUN SURVEYS – 2,000 CFS

Rumford Falls Hydroelectric Project (FERC No. 2333)
FERC Relicensing
Whitewater Study Post-Run Survey

Name: Bradford Croteau **Date of Run:** 6/9/22
Flow: 2200 cfs

1) What type of craft did you use for this run?
   [✓ a.] Hard shell kayak
   b. Inflatable kayak
   c. Closed canoe
   d. Self-bailing raft (include length)
   e. Other (please list)

Upper

2) Please identify the put-in and take-out locations you used for this run.

Put-in location: Upper Time: 1:30
Take-out location: Mexico Time: 4:00

3) Please estimate the number of unintended hits, stops, boat drags, and portages you had on this run:
   a. I accidently hit rocks or other obstacles (but did not stop) about______times.
   b. I was stopped after hitting rocks or other obstacles about_____times (but did not have to get out of my boat to continue downstream).
   c. I had to get out to drag or pull my boat off rocks or other obstacles about ______ times.
   d. I had to portage around rapids or sections about 2 times.

4) How many rapids and play spots did you experience at this flow?

a. 0 Rapids 0 Play Spots

5) Please evaluate the availability of the following factors at this flow.

	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Totally Acceptable
Navigability	1	2	[✓ 3]	4	5
Challenging Technical Boating	1	2	3	4	5
Powerful Hydraulics	1	[✓ 2]	3	4	5
Whitewater "Play Areas"	1	[✓ 2]	3	4	5
Size/Difficulty of Rapids	1	2	[✓ 3]	4	5
Overall Whitewater	1	2	[✓ 3]	4	5
Challenge	1	2	[✓ 3]	4	5
Safety	1	[✓ 2]	3	4	5

6) At this flow, what minimum skill level would a paddler need to be to safely paddle this reach?

a. Beginner
b. Novice
c. Intermediate
d. Advanced
[✓ e. Expert]

7) Are you likely to return for future boating if this flow were to be provided or available?

a. Definitely no
b. Possibly
[✓ c. Probably]
e. Definitely yes

8) Was this flow optimal, or would you prefer a flow that was higher or lower than this flow?

- a. Much lower
- [✓ b.] Lower
- c. About the same (this flow was optimal)
- d. Higher
- e. Much higher

9) If you feel qualified to offer an opinion of the desirability of this run at this flow using different types of crafts, please respond to the following statements.

This run at this flow would work well for:	**Strongly Disagree**	**Disagree**	**No Opinion**	**Agree**	**Strongly Agree**
Hard shell kayaks	1	2	3	4	[✓ 5]
Inflatable kayaks	1	2	[✓ 3]	4	5
Closed canoes	1	2	[✓ 3]	4	5
Self-bailing rafts	1	2	[✓ 3]	4	5
Other (Please specify):	1	2	[✓ 3]	4	5

10) Did you observe or experience any significant safety issues on your run (e.g., swims, pins, wrapped boats, constructed or natural river features, etc.)? Please explain.

Swam at bottom of first Drop

11) Please use the space below to provide any other comments about your boating experience at this flow.

____

____

____

____

____

____

____

____

Thank You for Your Participation

Rumford Falls Hydroelectric Project (FERC No. 2333)
FERC Relicensing
Whitewater Study Post-Run Survey

Name: Ben Schott **Date of Run:** 6/9/22

Flow: 2200 **cfs**

1) What type of craft did you use for this run?
   - [✓ a.] Hard shell kayak
   - b. Inflatable kayak
   - c. Closed canoe
   - d. Self-bailing raft (include length)
   - e. Other (please list)

Upper

2) Please identify the put-in and take-out locations you used for this run.

Put-in location: Top Time: ______

Take-out location: Mexico Time: ______

3) Please estimate the number of unintended hits, stops, boat drags, and portages you had on this run:
   - a. I accidently hit rocks or other obstacles (but did not stop) about 1 times.
   - b. I was stopped after hitting rocks or other obstacles about 1 times (but did not have to get out of my boat to continue downstream).
   - c. I had to get out to drag or pull my boat off rocks or other obstacles about 0 times.
   - d. I had to portage around rapids or sections about 0 times.

pitoned trying different route on 2nd drop, pushed harder to ~~left~~ right than expected

4) How many rapids and play spots did you experience at this flow?

a. 3 Rapids 2 Play Spots

5) Please evaluate the availability of the following factors at this flow.

	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Totally Acceptable
Navigability	1	2	3	[✓ 4]	5
Challenging Technical Boating	1	2	3	4	[✓ 5]
Powerful Hydraulics	1	2	3	[✓ 4]	5
Whitewater "Play Areas"	1	2	3	4	[✓ 5]
Size/Difficulty of Rapids	1	2	3	4	[✓ 5]
Overall Whitewater	1	2	3	4	[✓ 5]
Challenge	1	2	3	4	[✓ 5]
Safety	1	2	3	[✓ 4]	5

6) At this flow, what minimum skill level would a paddler need to be to safely paddle this reach?

a. Beginner
b. Novice
c. Intermediate
d. Advanced
[✓ e. Expert]

7) Are you likely to return for future boating if this flow were to be provided or available?

a. Definitely no
b. Possibly
c. Probably
[✓ e. Definitely yes]

8) Was this flow optimal, or would you prefer a flow that was higher or lower than this flow?

a. Much lower
[✓ b.] Lower 2nd drop
c. About the same (this flow was optimal)
[✓ d.] Higher → 1st drop
e. Much higher

9) If you feel qualified to offer an opinion of the desirability of this run at this flow using different types of crafts, please respond to the following statements.

This run at this flow would work well for:	**Strongly Disagree**	**Disagree**	**No Opinion**	**Agree**	**Strongly Agree**
Hard shell kayaks	1	2	3	4	[✓ 5]
Inflatable kayaks	1	[✓ 2]	3	4	5
Closed canoes	1	2	3	4	[✓ 5]
Self-bailing rafts	1	[✓ 2]	3	4	5
Other (Please specify):	1	2	3	4	5

10) Did you observe or experience any significant safety issues on your run (e.g., swims, pins, wrapped boats, constructed or natural river features, etc.)? Please explain.

piton on 2nd drop trying a left line. flushed off immediately, no injuries, dented boat slightly, will come out w/

11) Please use the space below to provide any other comments about your boating experience at this flow.

1st drop amazing at the level!!

2nd drop is not great @ this level!! ☹

Thank You for Your Participation

Rumford Falls Hydroelectric Project (FERC No. 2333)
FERC Relicensing
Whitewater Study Post-Run Survey

Name: Bradford Croteau **Date of Run:** 6/9/22

Flow: 2200 **cfs**

1) What type of craft did you use for this run?
   - [✓ a.] Hard shell kayak
   - b. Inflatable kayak
   - c. Closed canoe
   - d. Self-bailing raft (include length)
   - e. Other (please list)

Lower

2) Please identify the put-in and take-out locations you used for this run.

Put-in location: Lower Time: 3:00

Take-out location: Mexico Time: 4:00

3) Please estimate the number of unintended hits, stops, boat drags, and portages you had on this run:
   - a. I accidently hit rocks or other obstacles (but did not stop) about NA times.
   - b. I was stopped after hitting rocks or other obstacles about NA times (but did not have to get out of my boat to continue downstream).
   - c. I had to get out to drag or pull my boat off rocks or other obstacles about NA times.
   - d. I had to portage around rapids or sections about NA times.

4) How many rapids and play spots did you experience at this flow?

a. 2 Rapids 1 Play Spots

5) Please evaluate the availability of the following factors at this flow.

	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Totally Acceptable
Navigability	1	2	3	4	[✓ 5]
Challenging Technical Boating	1	2	3	4	[✓ 5]
Powerful Hydraulics	1	2	3	4	[✓ 5]
Whitewater "Play Areas"	1	2	3	4	[✓ 5]
Size/Difficulty of Rapids	1	2	3	4	[✓ 5]
Overall Whitewater	1	2	3	4	[✓ 5]
Challenge	1	2	3	4	[✓ 5]
Safety	1	2	3	4	[✓ 5]

6) At this flow, what minimum skill level would a paddler need to be to safely paddle this reach?

- a. Beginner
- b. Novice
- [✓ c.] Intermediate
- d. Advanced
- e. Expert

7) Are you likely to return for future boating if this flow were to be provided or available?

- a. Definitely no
- b. Possibly
- [✓ c.] Probably
- e. Definitely yes

8) Was this flow optimal, or would you prefer a flow that was higher or lower than this flow?
   a. Much lower
   b. Lower
   [✓ c.] About the same (this flow was optimal)
   d. Higher
   e. Much higher

9) If you feel qualified to offer an opinion of the desirability of this run at this flow using different types of crafts, please respond to the following statements.

This run at this flow would work well for:	**Strongly Disagree**	**Disagree**	**No Opinion**	**Agree**	**Strongly Agree**
Hard shell kayaks	1	2	3	4	[✓ 5]
Inflatable kayaks	1	2	3	4	[✓ 5]
Closed canoes	1	2	3	4	[✓ 5]
Self-bailing rafts	1	2	3	4	[✓ 5]
Other (Please specify):	1	2	3	4	5

10) Did you observe or experience any significant safety issues on your run (e.g., swims, pins, wrapped boats, constructed or natural river features, etc.)? Please explain.

NO

11) Please use the space below to provide any other comments about your boating experience at this flow.

Thank You for Your Participation

Rumford Falls Hydroelectric Project (FERC No. 2333)
FERC Relicensing
Whitewater Study Post-Run Survey

Name: Ben Schott **Date of Run:** 6/9/22

Flow: 2200 **cfs**

1) What type of craft did you use for this run?
    [✓ a.] Hard shell kayak
    b. Inflatable kayak
    c. Closed canoe
    d. Self-bailing raft (include length)
    e. Other (please list)

1 oarer

2) Please identify the put-in and take-out locations you used for this run.

Put-in location: Top Time: ______

Take-out location: Mexico Time: ______

3) Please estimate the number of unintended hits, stops, boat drags, and portages you had on this run:
    a. I accidently hit rocks or other obstacles (but did not stop) about_____times.
    b. I was stopped after hitting rocks or other obstacles about_____times (but did not have to get out of my boat to continue downstream).
    c. I had to get out to drag or pull my boat off rocks or other obstacles about ______ times.
    d. I had to portage around rapids or sections about_____times.

N/A

4) How many rapids and play spots did you experience at this flow?

a. ______Rapids __2__Play Spots

5) Please evaluate the availability of the following factors at this flow.

	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Totally Acceptable
Navigability	1	2	3	4	[✓ 5]
Challenging Technical Boating	1	2	3	4	[✓ 5]
Powerful Hydraulics	1	2	3	4	[✓ 5]
Whitewater "Play Areas"	1	2	3	4	[✓ 5]
Size/Difficulty of Rapids	1	2	3	4	[✓ 5]
Overall Whitewater	1	2	3	4	[✓ 5]
Challenge	1	2	3	4	[✓ 5]
Safety	1	2	3	4	[✓ 5]

6) At this flow, what minimum skill level would a paddler need to be to safely paddle this reach?
  - [✓ a.] Beginner
  - [✓ b.] Novice
  - c. Intermediate
  - d. Advanced
  - e. Expert

7) Are you likely to return for future boating if this flow were to be provided or available?
  - a. Definitely no
  - b. Possibly
  - c. Probably
  - [✓ e.] Definitely yes

8) Was this flow optimal, or would you prefer a flow that was higher or lower than this flow?

   a. Much lower
   b. Lower
   c. About the same (this flow was optimal)
   [✓ d.] Higher
   e. Much higher

9) If you feel qualified to offer an opinion of the desirability of this run at this flow using different types of crafts, please respond to the following statements.

This run at this flow would work well for:	**Strongly Disagree**	**Disagree**	**No Opinion**	**Agree**	**Strongly Agree**
Hard shell kayaks	1	2	3	4	[✓ 5]
Inflatable kayaks	1	2	3	4	[✓ 5]
Closed canoes	1	2	3	4	[✓ 5]
Self-bailing rafts	1	2	3	4	[✓ 5]
Other (Please specify):	1	2	3	4	[✓ 5]

10) Did you observe or experience any significant safety issues on your run (e.g., swims, pins, wrapped boats, constructed or natural river features, etc.)? Please explain.

Not deep enough for loops, maybe more water

11) Please use the space below to provide any other comments about your boating experience at this flow.

Surf is not deep enough for loops, maybe more water

Thank You for Your Participation

Rumford Falls Hydroelectric Project (FERC No. 2333)
FERC Relicensing
Whitewater Study Post-Run Survey

Name: Kyle Duckworth **Date of Run:** 6/9/22

Flow: 2206 **cfs**

lower

1) What type of craft did you use for this run?
   a. Hard shell kayak
   b. Inflatable kayak
   c. Closed canoe
   d. Self-bailing raft (include length)
   e. Other (please list) Open Canoe

2) Please identify the put-in and take-out locations you used for this run.

Put-in location: Below Bridge Time: ? 2pm

Take-out location: Mexico Ramp Time: 3:45

3) Please estimate the number of unintended hits, stops, boat drags, and portages you had on this run:
   a. I accidently hit rocks or other obstacles (but did not stop) about 0 times.
   b. I was stopped after hitting rocks or other obstacles about 0 times (but did not have to get out of my boat to continue downstream).
   c. I had to get out to drag or pull my boat off rocks or other obstacles about 0 times.
   d. I had to portage around rapids or sections about 1 times.

4) How many rapids and play spots did you experience at this flow?

   a. 5 Rapids 1 Play Spots

5) Please evaluate the availability of the following factors at this flow.

	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Totally Acceptable
Navigability	1	2	3	[✓ 4]	5
Challenging Technical Boating	1	2	3	[✓ 4]	5
Powerful Hydraulics	1	2	[✓ 3]	4	5
Whitewater "Play Areas"	1	2	3	[✓ 4]	5
Size/Difficulty of Rapids	1	2	[✓ 3]	4	5
Overall Whitewater	1	2	3	[✓ 4]	5
Challenge	1	2	3	[✓ 4]	5
Safety	1	2	3	[✓ 4]	5

6) At this flow, what minimum skill level would a paddler need to be to safely paddle this reach?

   a. Beginner
   b. Novice
   c. Intermediate ← Kayak
   d. Advanced ← Open Canoe
   e. Expert

7) Are you likely to return for future boating if this flow were to be provided or available?

   [✓ a. Definitely no]
   b. Possibly
   c. Probably
   e. Definitely yes

8) Was this flow optimal, or would you prefer a flow that was higher or lower than this flow?
   a. Much lower
   [✓ b. Lower]
   c. About the same (this flow was optimal)
   d. Higher
   e. Much higher

9) If you feel qualified to offer an opinion of the desirability of this run at this flow using different types of crafts, please respond to the following statements.

This run at this flow would work well for:	Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree
Hard shell kayaks	1	2	3	4	[✓ 5]
Inflatable kayaks	1	2	3	[✓ 4]	5
Closed canoes	1	2	3	[✓ 4]	5
Self-bailing rafts	1	2	3	4	[✓ 5]
Other (Please specify): Open Canoe	1	2	[✓ 3]	4	5

10) Did you observe or experience any significant safety issues on your run (e.g., swims, pins, wrapped boats, constructed or natural river features, etc.)? Please explain.

No

11) Please use the space below to provide any other comments about your boating experience at this flow.

The best play spot on the run is the bottom ledge on the left. The kayakers preferred it at this level. In an open canoe, I was better able to play the hole at the 1500 cfs. level. However the vast majority of potential users would be kayaks, so I'd go with their preference.

Thank You for Your Participation

ATTACHMENT 7

COMPLETED COMPARATIVE ASSESSMENTS

Upper Reach

Rumford Falls Hydroelectric Project (FERC No. 2333)
FERC Relicensing
Whitewater Study Flow Comparison Survey

Name: Bradford Croteau **Date:** 6-9-2022

1) Craft used?
   - [✓ a.] Hard shell kayak
   - b. Inflatable kayak
   - c. Closed canoe
   - d. Self-bailing raft (include length)
   - e. Other (please list)

2) What is your skill level?
   - a. Novice (comfortable running Class II whitewater)
   - b. Intermediate (comfortable running Class III whitewater)
   - c. Advanced (comfortable running Class IV whitewater)
   - [✓ d.] Expert (comfortable running Class V whitewater)

3) Which flows did you participate in? Please select from the list below.

Study Flows	Participated	Did Not Participate
800 cfs	✓	
1,500 cfs	✓	
2,000 cfs	✓	

4) Approximately how many times have you boated this reach before this study? one

5) A number of factors can affect your satisfaction with a whitewater trip. How important are each of these factors to you?

	Not Important		Somewhat Important		Very Important
Navigability	1	2	3	4	[✓ 5]
Challenging Technical Boating	1	2	3	[✓ 4]	5
Powerful Hydraulics	1	2	3	[✓ 4]	5
Whitewater "Play Areas"	1	2	3	[✓ 4]	5
Size/Difficulty of Rapids	1	2	3	4	[✓ 5]
Overall Whitewater Challenge	1	2	3	[✓ 4]	5
Safety	1	2	3	4	[✓ 5]
Crowding	1	2	3	4	[✓ 5]
Long Run(s)	1	2	3	[✓ 4]	5
Short Run(s)	1	2	[✓ 3]	4	5
Low Number of Portages	1	2	3	4	[✓ 5]
High Number of Rapids	1	2	3	[✓ 4]	5
Low Number of Rapids	[✓ 1]	2	3	4	5
Easy Access	1	2	3	[✓ 4]	5
Easy Shuttles	1	2	3	[✓ 4]	5

6) Please evaluate the study flows for your craft and skill level. In making your evaluations, please consider all the flow-dependent characteristics that contribute to a high-quality trip (*note, please evaluate only the study flows that you participated in*).

	800 cfs	1,500 cfs	2,000 cfs
Totally Acceptable	[✓ 5]	[✓ 5]	5
Acceptable	4	4	4
Marginal	3	3	[✓ 3]
Unacceptable	2	2	2
Totally Unacceptable	1	1	1

7) Which of the following best describes your desired paddling experience (s) for this reach (*Note, you may select more than one)*:

Type of Experience	Description	Desired Experience	
Technical	I am interested in "technical" whitewater trips at relatively low flows	[✓ Yes]	No
Standard	I am interested in "standard" whitewater trips at relatively moderate flows	[✓ Yes]	No
High Challenge	I am interested in "high challenge" whitewater trips at relatively high flows	[✓ Yes]	No

8) Based on the boating trips that you participated in for this study, please specify the flow(s) that, in your opinion, provide the following for your desired experience(s) *(note you can specify flows that you have not seen, but which you think would provide the following for your desired experience[s]).* Please list craft, desired experience (from Question 7), and related acceptable flow. If providing input on more than one craft or type of experience, please use the back of this form.

a. What is the minimum flow needed to boat this reach in your craft?

i. Craft: Hard Shell Kayak Experience: Expert Flow: 800 cfs

b. Based on your skill level, factors that affect your satisfaction with a whitewater trip, and the flow-dependent characteristics of this reach, what is the minimum acceptable flow for this reach (the lowest flow at which you would return to paddle it)?

ii. Craft: Kayak Experience: Expert Flow: 800 cfs

c. What is the optimal range of flows that provides the best whitewater characteristics for this run?

iii. Craft: Kayak Experience: Expert Flow: 800 cfs to: 1500 cfs

d. What is the highest safe flow for your craft and skill level?

iv. Craft: Kayak Experience: Expert Flow: 1500 cfs

9) Please evaluate the acceptability of current river access for your craft and skill level, assuming that no shuttle(s) are available:

	Put In	Take Out
Totally Acceptable	5	[✓ 5]
Acceptable	[✓ 4]	4
Marginal	3	3
Unacceptable	2	2
Totally Unacceptable	1	1

10) Where would you prefer to put in to and take out of this reach if suitable parking and river access were available at that location, and what type of access facilities would facilitate a high-quality paddling experience?

a. Put In Location: Upstream of Drop Facilities: Beach / Boat launch

b. Take Out Location: Totally acceptable Facilities: ________________

11) In your experience, what whitewater reaches in the region do you find similar to this one at your optimum flow for this reach? Also, please select how often you boat these reaches.

b. Whitewater reach name or description: Raquette, Colten Falls
   i. Trips per Year: [✓ 0-3] 4-8 9-15 15+

c. Whitewater reach name or description: Upper Maggallaway
   i. Trips per Year: 0-3 4-8 9-15 15+

d. Whitewater reach name or description: ________________
   i. Trips per Year: 0-3 4-8 9-15 15+

Thank You for Your Participation

Rumford Falls Hydroelectric Project (FERC No. 2333)
FERC Relicensing
Whitewater Study Flow Comparison Survey

Name: Ben Elliott **Date:** 6/9/21

1) Craft used? Upper
   - [✓ a.] Hard shell kayak
   - b. Inflatable kayak
   - c. Closed canoe
   - d. Self-bailing raft (include length)
   - e. Other (please list)

2) What is your skill level?
   - a. Novice (comfortable running Class II whitewater)
   - b. Intermediate (comfortable running Class III whitewater)
   - c. Advanced (comfortable running Class IV whitewater)
   - [✓ d.] Expert (comfortable running Class V whitewater)

3) Which flows did you participate in? Please select from the list below.

Study Flows	Participated	Did Not Participate
800 cfs	✓	
1,500 cfs	✓	
2,000 cfs	✓	

4) Approximately how many times have you boated this reach before this study?

4 times

5) A number of factors can affect your satisfaction with a whitewater trip. How important are each of these factors to you?

	Not Important		Somewhat Important		Very Important
Navigability	1	2	3	4	[✓ 5]
Challenging Technical Boating	1	2	[✓ 3]	4	5
Powerful Hydraulics	1	2	[✓ 3]	4	5
Whitewater "Play Areas"	1	2	3	[✓ 4]	5
Size/Difficulty of Rapids	1	2	3	[✓ 4]	5
Overall Whitewater Challenge	1	2	3	[✓ 4]	5
Safety	1	2	3	[✓ 4]	5
Crowding	1	2	[✓ 3]	4	5
Long Run(s)	1	2	[✓ 3]	4	5
Short Run(s)	1	2	[✓ 3]	4	5
Low Number of Portages	1	2	3	[✓ 4]	5
High Number of Rapids	1	2	3	4	[✓ 5]
Low Number of Rapids	1	2	[✓ 3]	4	5
Easy Access	1	2	3	[✓ 4]	5
Easy Shuttles	1	2	3	[✓ 4]	5

6) Please evaluate the study flows for your craft and skill level. In making your evaluations, please consider all the flow-dependent characteristics that contribute to a high-quality trip (*note, please evaluate only the study flows that you participated in*).

	800 cfs	1,500 cfs	250 2,000 cfs
Totally Acceptable	5	[✓ 5]	5 1st drop
Acceptable	[✓ 4]	4	4
Marginal	3 A	3	3 2nd drop
Unacceptable	2	2	2
Totally Unacceptable	1	1	1

7) Which of the following best describes your desired paddling experience (s) for this reach (*Note, you may select more than one)*:

Type of Experience	**Description**	**Desired Experience**	
Technical	I am interested in "technical" whitewater trips at relatively low flows	[✓ Yes]	No
Standard	I am interested in "standard" whitewater trips at relatively moderate flows	[✓ Yes]	No
High Challenge	I am interested in "high challenge" whitewater trips at relatively high flows	[✓ Yes]	No

8) Based on the boating trips that you participated in for this study, please specify the flow(s) that, in your opinion, provide the following for your desired experience(s) *(note you can specify flows that you have not seen, but which you think would provide the following for your desired experience[s]).* Please list craft, desired experience (from Question 7), and related acceptable flow. If providing input on more than one craft or type of experience, please use the back of this form.

a. What is the minimum flow needed to boat this reach in your craft?

i. Craft: hard shell Experience: IV+ w/ strong group Flow: 800 cfs

b. Based on your skill level, factors that affect your satisfaction with a whitewater trip, and the flow-dependent characteristics of this reach, what is the minimum acceptable flow for this reach (the lowest flow at which you would return to paddle it)?

ii. Craft: hardshell Experience: IV+ Flow: 1000 cfs

c. What is the optimal range of flows that provides the best whitewater characteristics for this run?

iii. Craft: hardshell Experience: IV+ – V Flow: 800 cfs to: 1500 cfs

d. What is the highest safe flow for your craft and skill level?

iv. Craft: hardshell Experience: V Flow: 2500+ cfs

2nd drop
not great
between
2000-2500
cfs

9) Please evaluate the acceptability of current river access for your craft and skill level, assuming that no shuttle(s) are available:

	Put In	Take Out
Totally Acceptable	5	[✓ 5]
Acceptable	4	4
Marginal	[✓ 3] Stairs would be great	3
Unacceptable	2	2
Totally Unacceptable	1	1

lots of poisin ivy

10) Where would you prefer to put in to and take out of this reach if suitable parking and river access were available at that location, and what type of access facilities would facilitate a high-quality paddling experience?

a. Put In Location: upper putin Facilities: Stairs, no poisin ivy

b. Take Out Location: Mexico boat launch Facilities: already good

or ~~Stai~~ library takeout — needs stairs

11) In your experience, what whitewater reaches in the region do you find similar to this one at your optimum flow for this reach? Also, please select how often you boat these reaches.

b. Whitewater reach name or description: Racquette R., ~~Moose R~~ NY (Colton Falls)

i. Trips per Year: 0-3 [✓ 4-8] 9-15 15+

c. Whitewater reach name or description: Moose River (bottom) NY

i. Trips per Year: 0-3 [✓ 4-8] 9-15 15+

d. Whitewater reach name or description: ____________________

i. Trips per Year: 0-3 4-8 9-15 15+

Thank You for Your Participation

Rumford Falls Hydroelectric Project (FERC No. 2333)
FERC Relicensing
Whitewater Study Flow Comparison Survey

Name: Ben Schott **Date:** 6/9/22

Lower

1) Craft used?
   - [✓ a.] Hard shell kayak
   - b. Inflatable kayak
   - c. Closed canoe
   - d. Self-bailing raft (include length)
   - e. Other (please list)

2) What is your skill level?
   - a. Novice (comfortable running Class II whitewater)
   - b. Intermediate (comfortable running Class III whitewater)
   - c. Advanced (comfortable running Class IV whitewater)
   - [✓ d.] Expert (comfortable running Class V whitewater)

3) Which flows did you participate in? Please select from the list below.

Study Flows	Participated	Did Not Participate
800 cfs	✓	
1,500 cfs	✓	
2,000 cfs	✓	

4) Approximately how many times have you boated this reach before this study?

4

5) A number of factors can affect your satisfaction with a whitewater trip. How important are each of these factors to you?

	Not Important		Somewhat Important		Very Important
Navigability	1	2	3	4	[✓ 5]
Challenging Technical Boating	1	2	[✓ 3]	4	5
Powerful Hydraulics	1	2	[✓ 3]	4	5
Whitewater "Play Areas"	1	2	3	[✓ 4]	5
Size/Difficulty of Rapids	1	2	3	[✓ 4]	5
Overall Whitewater Challenge	1	2	3	[✓ 4]	5
Safety	1	2	3	[✓ 4]	5
Crowding	1	2	[✓ 3]	4	5
Long Run(s)	1	2	[✓ 3]	4	5
Short Run(s)	1	2	[✓ 3]	4	5
Low Number of Portages	1	2	3	[✓ 4]	5
High Number of Rapids	1	2	3	4	[✓ 5]
Low Number of Rapids	1	2	[✓ 3]	4	5
Easy Access	1	2	3	[✓ 4]	5
Easy Shuttles	1	2	3	[✓ 4]	5

6) Please evaluate the study flows for your craft and skill level. In making your evaluations, please consider all the flow-dependent characteristics that contribute to a high-quality trip (*note, please evaluate only the study flows that you participated in*).

	800 cfs	1,500 cfs	2,000 cfs
Totally Acceptable	5	5	[✓ 5]
Acceptable	4	[✓ 4]	4
Marginal	[✓ 3]	3	3
Unacceptable	2	2	2
Totally Unacceptable	1	1	1

7) Which of the following best describes your desired paddling experience (s) for this reach (*Note, you may select more than one)*:

Type of Experience	**Description**	**Desired Experience**	
Technical	I am interested in "technical" whitewater trips at relatively low flows	[✓ Yes]	No
Standard	I am interested in "standard" whitewater trips at relatively moderate flows	[✓ Yes]	No
High Challenge	I am interested in "high challenge" whitewater trips at relatively high flows	[✓ Yes]	No

8) Based on the boating trips that you participated in for this study, please specify the flow(s) that, in your opinion, provide the following for your desired experience(s) *(note you can specify flows that you have not seen, but which you think would provide the following for your desired experience[s])*. Please list craft, desired experience (from Question 7), and related acceptable flow. If providing input on more than one craft or type of experience, please use the back of this form.

a. What is the minimum flow needed to boat this reach in your craft?

i. Craft: Many Experience: beginner in group Flow: 1000^+ cfs

b. Based on your skill level, factors that affect your satisfaction with a whitewater trip, and the flow-dependent characteristics of this reach, what is the minimum acceptable flow for this reach (the lowest flow at which you would return to paddle it)?

ii. Craft: ~~1200~~ Many Experience: beginner in group Flow: 1200 cfs

c. What is the optimal range of flows that provides the best whitewater characteristics for this run?

iii. Craft: Many Experience: beginner Flow: 1200 cfs to: 2500^+ cfs

d. What is the highest safe flow for your craft and skill level?

iv. Craft: Hardshell Experience: ✓ Flow: unknown cfs

9) Please evaluate the acceptability of current river access for your craft and skill level, assuming that no shuttle(s) are available:

	Put In	Take Out
Totally Acceptable	5	[✓ 5]
Acceptable	4	4
Marginal	[✓ 3]	3
Unacceptable	2	2
Totally Unacceptable	1	1

10) Where would you prefer to put in to and take out of this reach if suitable parking and river access were available at that location, and what type of access facilities would facilitate a high-quality paddling experience?

a. Put In Location: library Facilities: stairs

b. Take Out Location: Mexico Facilities: Great

11) In your experience, what whitewater reaches in the region do you find similar to this one at your optimum flow for this reach? Also, please select how often you boat these reaches.

b. Whitewater reach name or description: Middle Mad River VT
   i. Trips per Year: 0-3 [✓ 4-8] 9-15 15+

c. Whitewater reach name or description: Lower lower Kennebec
   i. Trips per Year: [✓ 0-3] 4-8 9-15 15+

d. Whitewater reach name or description: ______
   i. Trips per Year: 0-3 4-8 9-15 15+

Thank You for Your Participation

Lower Reach

Rumford Falls Hydroelectric Project (FERC No. 2333)
FERC Relicensing
Whitewater Study Flow Comparison Survey

Name: Bradford Croteau **Date:** 6-9-2022

1) Craft used?
   - [✓ a.] Hard shell kayak
   - b. Inflatable kayak
   - c. Closed canoe
   - d. Self-bailing raft (include length)
   - e. Other (please list)

2) What is your skill level?
   - a. Novice (comfortable running Class II whitewater)
   - b. Intermediate (comfortable running Class III whitewater)
   - c. Advanced (comfortable running Class IV whitewater)
   - [✓ d.] Expert (comfortable running Class V whitewater)

3) Which flows did you participate in? Please select from the list below.

Study Flows	Participated	Did Not Participate
800 cfs	✓	
1,500 cfs	✓	
2,000 cfs	✓	

4) Approximately how many times have you boated this reach before this study? None

5) A number of factors can affect your satisfaction with a whitewater trip. How important are each of these factors to you?

	Not Important		Somewhat Important		Very Important
Navigability	1	2	3	4	[✓ 5]
Challenging Technical Boating	1	2	3	[✓ 4]	5
Powerful Hydraulics	1	2	3	[✓ 4]	5
Whitewater "Play Areas"	1	2	3	[✓ 4]	5
Size/Difficulty of Rapids	1	2	3	4	[✓ 5]
Overall Whitewater Challenge	1	2	3	[✓ 4]	5
Safety	1	2	3	4	[✓ 5]
Crowding	1	2	3	4	[✓ 5]
Long Run(s)	1	2	3	[✓ 4]	5
Short Run(s)	1	2	[✓ 3]	4	5
Low Number of Portages	1	2	3	4	[✓ 5]
High Number of Rapids	1	2	3	[✓ 4]	5
Low Number of Rapids	[✓ 1]	2	3	4	5
Easy Access	1	2	3	[✓ 4]	5
Easy Shuttles	1	2	3	[✓ 4]	5

6) Please evaluate the study flows for your craft and skill level. In making your evaluations, please consider all the flow-dependent characteristics that contribute to a high-quality trip (*note, please evaluate only the study flows that you participated in*).

	800 cfs	1,500 cfs	2,000 cfs
Totally Acceptable	[✓ 5]	[✓ 5]	[✓ 5]
Acceptable	4	4	4
Marginal	3	3	3
Unacceptable	2	2	2
Totally Unacceptable	1	1	1

7) Which of the following best describes your desired paddling experience (s) for this reach (*Note, you may select more than one)*:

Type of Experience	Description	Desired Experience	
Technical	I am interested in "technical" whitewater trips at relatively low flows	[✓ Yes]	No
Standard	I am interested in "standard" whitewater trips at relatively moderate flows	[✓ Yes]	No
High Challenge	I am interested in "high challenge" whitewater trips at relatively high flows	[✓ Yes]	No

8) Based on the boating trips that you participated in for this study, please specify the flow(s) that, in your opinion, provide the following for your desired experience(s) *(note you can specify flows that you have not seen, but which you think would provide the following for your desired experience[s]).* Please list craft, desired experience (from Question 7), and related acceptable flow. If providing input on more than one craft or type of experience, please use the back of this form.

a. What is the minimum flow needed to boat this reach in your craft?

i. Craft: Kayak Experience: Expert Flow: 1500 cfs

b. Based on your skill level, factors that affect your satisfaction with a whitewater trip, and the flow-dependent characteristics of this reach, what is the minimum acceptable flow for this reach (the lowest flow at which you would return to paddle it)?

ii. Craft: Kayak Experience: Expert Flow: 1500 cfs

c. What is the optimal range of flows that provides the best whitewater characteristics for this run?

iii. Craft: Kayak Experience: Expert Flow: 1500 cfs to: 3000 cfs

d. What is the highest safe flow for your craft and skill level?

iv. Craft: Kayak Experience: Expert Flow: unlimited cfs

9) Please evaluate the acceptability of current river access for your craft and skill level, assuming that no shuttle(s) are available:

	Put In	Take Out
Totally Acceptable	5	[✓ 5]
Acceptable	[✓ 4]	4
Marginal	3	3
Unacceptable	2	2
Totally Unacceptable	1	1

10) Where would you prefer to put in to and take out of this reach if suitable parking and river access were available at that location, and what type of access facilities would facilitate a high-quality paddling experience?

a. Put In Location: library Facilities:

b. Take Out Location: Mexico Facilities:

11) In your experience, what whitewater reaches in the region do you find similar to this one at your optimum flow for this reach? Also, please select how often you boat these reaches.

b. Whitewater reach name or description: Pontook / andro
   i. Trips per Year: 0-3 [✓ 4-8] 9-15 15+

c. Whitewater reach name or description: Errol Rapid / upper andro
   i. Trips per Year: 0-3 [✓ 4-8] 9-15 15+

d. Whitewater reach name or description:
   i. Trips per Year: 0-3 4-8 9-15 15+

Thank You for Your Participation

Rumford Falls Hydroelectric Project (FERC No. 2333)
FERC Relicensing
Whitewater Study Flow Comparison Survey

Name: Kyle Duckworth **Date:** 6/9/22

1) Craft used?
   a. Hard shell kayak
   b. Inflatable kayak
   c. Closed canoe
   d. Self-bailing raft (include length)
   e. Other (please list) Open Canoe

Lower

2) What is your skill level?
   a. Novice (comfortable running Class II whitewater)
   b. Intermediate (comfortable running Class III whitewater)
   [✓ c.] Advanced (comfortable running Class IV whitewater)
   d. Expert (comfortable running Class V whitewater)

3) Which flows did you participate in? Please select from the list below.

Study Flows	Participated	Did Not Participate
800 cfs	✓	
1,500 cfs	✓	
2,000 cfs	✓	

4) Approximately how many times have you boated this reach before this study?

0

5) A number of factors can affect your satisfaction with a whitewater trip. How important are each of these factors to you?

	Not Important		Somewhat Important		Very Important
Navigability	1	2	3	[✓ 4]	5
Challenging Technical Boating	1	2	[✓ 3]	4	5
Powerful Hydraulics	1	[✓ 2]	3	4	5
Whitewater "Play Areas"	1	2	3	[✓ 4]	5
Size/Difficulty of Rapids	1	2	[✓ 3]	4	5
Overall Whitewater Challenge	1	2	[✓ 3]	4	5
Safety	1	2	3	4	[✓ 5]
Crowding	1	2	[✓ 3]	4	5
Long Run(s)	1	2	[✓ 3]	4	5
Short Run(s)	[✓ 1]	2	3	4	5
Low Number of Portages	1	2	3	[✓ 4]	5
High Number of Rapids	1	2	3	[✓ 4]	5
Low Number of Rapids	[✓ 1]	2	3	4	5
Easy Access	1	2	[✓ 3]	4	5
Easy Shuttles	1	2	[✓ 3]	4	5

6) Please evaluate the study flows for your craft and skill level. In making your evaluations, please consider all the flow-dependent characteristics that contribute to a high-quality trip (*note, please evaluate only the study flows that you participated in*).

	800 cfs	1,500 cfs	2,000 cfs
Totally Acceptable	5	5	5
Acceptable	4	[✓ 4]	[✓ 4]
Marginal	[✓ 3]	3	3
Unacceptable	2	2	2
Totally Unacceptable	1	1	1

7) Which of the following best describes your desired paddling experience (s) for this reach (*Note, you may select more than one)*:

Type of Experience	**Description**	**Desired Experience**	
Technical	I am interested in "technical" whitewater trips at relatively low flows	[✓ Yes]	No
Standard	I am interested in "standard" whitewater trips at relatively moderate flows	[✓ Yes]	No
High Challenge	I am interested in "high challenge" whitewater trips at relatively high flows	Yes	No

8) Based on the boating trips that you participated in for this study, please specify the flow(s) that, in your opinion, provide the following for your desired experience(s) *(note you can specify flows that you have not seen, but which you think would provide the following for your desired experience[s]).* Please list craft, desired experience (from Question 7), and related acceptable flow. If providing input on more than one craft or type of experience, please use the back of this form.

a. What is the minimum flow needed to boat this reach in your craft?

i. Craft: Open Canoe Experience: Advanced Flow: 800 cfs

b. Based on your skill level, factors that affect your satisfaction with a whitewater trip, and the flow-dependent characteristics of this reach, what is the minimum acceptable flow for this reach (the lowest flow at which you would return to paddle it)?

ii. Craft: Open Canoe Experience: Advanced Flow: 1200 cfs

c. What is the optimal range of flows that provides the best whitewater characteristics for this run?

iii. Craft: Open Canoe Experience: Advanced Flow: 1200 cfs to: 1500 cfs

d. What is the highest safe flow for your craft and skill level?

iv. Craft: Open Canoe Experience: Advanced Flow: 3000 ? cfs

9) Please evaluate the acceptability of current river access for your craft and skill level, assuming that no shuttle(s) are available:

	Put In	Take Out
Totally Acceptable	5	[✓ 5]
Acceptable	[✓ 4]	4
Marginal	3	3
Unacceptable	2	2
Totally Unacceptable	1	1

10) Where would you prefer to put in to and take out of this reach if suitable parking and river access were available at that location, and what type of access facilities would facilitate a high-quality paddling experience?

a. Put In Location: Behind Library Facilities: Porta John, Improved Path

b. Take Out Location: Boat Ramp Facilities: Porta John

11) In your experience, what whitewater reaches in the region do you find similar to this one at your optimum flow for this reach? Also, please select how often you boat these reaches.

b. Whitewater reach name or description: __________
   i. Trips per Year: 0-3 4-8 9-15 15+

c. Whitewater reach name or description: __________
   i. Trips per Year: 0-3 4-8 9-15 15+

d. Whitewater reach name or description: __________
   i. Trips per Year: 0-3 4-8 9-15 15+

Thank You for Your Participation

Cant Think of a similar run in length, difficulty, features, and flow level That I have paddled

Rumford Falls Hydroelectric Project (FERC No. 2333)
FERC Relicensing
Whitewater Study Flow Comparison Survey

Lower

Name: MORRILL NASON **Date:** 6/9/2022

1) Craft used?
    - a. Hard shell kayak
    - b. Inflatable kayak
    - c. Closed canoe
    - d. Self-bailing raft (include length)
    - [✓ e.] Other (please list) SHREDDER

2) What is your skill level?
    - a. Novice (comfortable running Class II whitewater)
    - [✓ b.] Intermediate (comfortable running Class III whitewater)
    - c. Advanced (comfortable running Class IV whitewater)
    - d. Expert (comfortable running Class V whitewater)

3) Which flows did you participate in? Please select from the list below.

Study Flows	Participated	Did Not Participate
800 cfs	✓	
1,500 cfs	✓	
2,000 cfs		✓

4) Approximately how many times have you boated this reach before this study?

NONE

5) A number of factors can affect your satisfaction with a whitewater trip. How important are each of these factors to you?

	Not Important		Somewhat Important		Very Important
Navigability	1	2	3	[✓ 4]	5
Challenging Technical Boating	1	2	3	[✓ 4]	5
Powerful Hydraulics	1	2	3	4	[✓ 5]
Whitewater "Play Areas"	1	2	3	[✓ 4]	5
Size/Difficulty of Rapids	1	2	3	4	[✓ 5]
Overall Whitewater Challenge	1	2	3	[✓ 4]	5
Safety	1	2	3	4	[✓ 5]
Crowding	1	2	[✓ 3]	4	5
Long Run(s)	1	[✓ 2]	3	4	5
Short Run(s)	1	[✓ 2]	3	4	5
Low Number of Portages	1	2	3	4	[✓ 5]
High Number of Rapids	1	2	3	[✓ 4]	5
Low Number of Rapids	1	2	3	4	[✓ 5]
Easy Access	1	2	[✓ 3]	4	5
Easy Shuttles	1	2	3	[✓ 4]	5

6) Please evaluate the study flows for your craft and skill level. In making your evaluations, please consider all the flow-dependent characteristics that contribute to a high-quality trip (*note, please evaluate only the study flows that you participated in*).

	800 cfs	1,500 cfs	2,000 cfs
Totally Acceptable	5	[✓ 5]	5
Acceptable	[✓ 4]	4	4
Marginal	3	3	3
Unacceptable	2	2	2
Totally Unacceptable	1	1	1

7) Which of the following best describes your desired paddling experience (s) for this reach (*Note, you may select more than one)*:

Type of Experience	Description	Desired Experience	
Technical	I am interested in "technical" whitewater trips at relatively low flows	[✓ Yes]	No
Standard	I am interested in "standard" whitewater trips at relatively moderate flows	[✓ Yes]	No
High Challenge	I am interested in "high challenge" whitewater trips at relatively high flows	Yes	No

8) Based on the boating trips that you participated in for this study, please specify the flow(s) that, in your opinion, provide the following for your desired experience(s) *(note you can specify flows that you have not seen, but which you think would provide the following for your desired experience[s]).* Please list craft, desired experience (from Question 7), and related acceptable flow. If providing input on more than one craft or type of experience, please use the back of this form.

a. What is the minimum flow needed to boat this reach in your craft?

i. Craft: SHREDDER Experience: T/S Flow: ~~1000~~ 800 cfs

b. Based on your skill level, factors that affect your satisfaction with a whitewater trip, and the flow-dependent characteristics of this reach, what is the minimum acceptable flow for this reach (the lowest flow at which you would return to paddle it)?

ii. Craft: SHREDDER Experience: T/S Flow: 1200 cfs

c. What is the optimal range of flows that provides the best whitewater characteristics for this run?

iii. Craft: SHREDDER Experience: T/S Flow: 1200 cfs to: 1500 cfs

d. What is the highest safe flow for your craft and skill level?

iv. Craft: SHREDDER Experience: T/S Flow: 1800 cfs

9) Please evaluate the acceptability of current river access for your craft and skill level, assuming that no shuttle(s) are available:

	Put In	Take Out
Totally Acceptable	5	[✓ 5]
Acceptable	[✓ 4]	4
Marginal	3	3
Unacceptable	2	2
Totally Unacceptable	1	1

10) Where would you prefer to put in to and take out of this reach if suitable parking and river access were available at that location, and what type of access facilities would facilitate a high-quality paddling experience?

a. Put In Location: END OF DIRT PARKING AREA NEXT TO CLASS I/III PUTIN Facilities: STAIRWAY / POTTY ?

b. Take Out Location: SAME Facilities: SAME

11) In your experience, what whitewater reaches in the region do you find similar to this one at your optimum flow for this reach? Also, please select how often you boat these reaches.

b. Whitewater reach name or description: RAPID RIVER
   i. Trips per Year: [✓ 0-3] 4-8 9-15 15+

c. Whitewater reach name or description: MAGALLOWAY BELOW PWR HSE @ 1200
   i. Trips per Year: [✓ 0-3] 4-8 9-15 15+

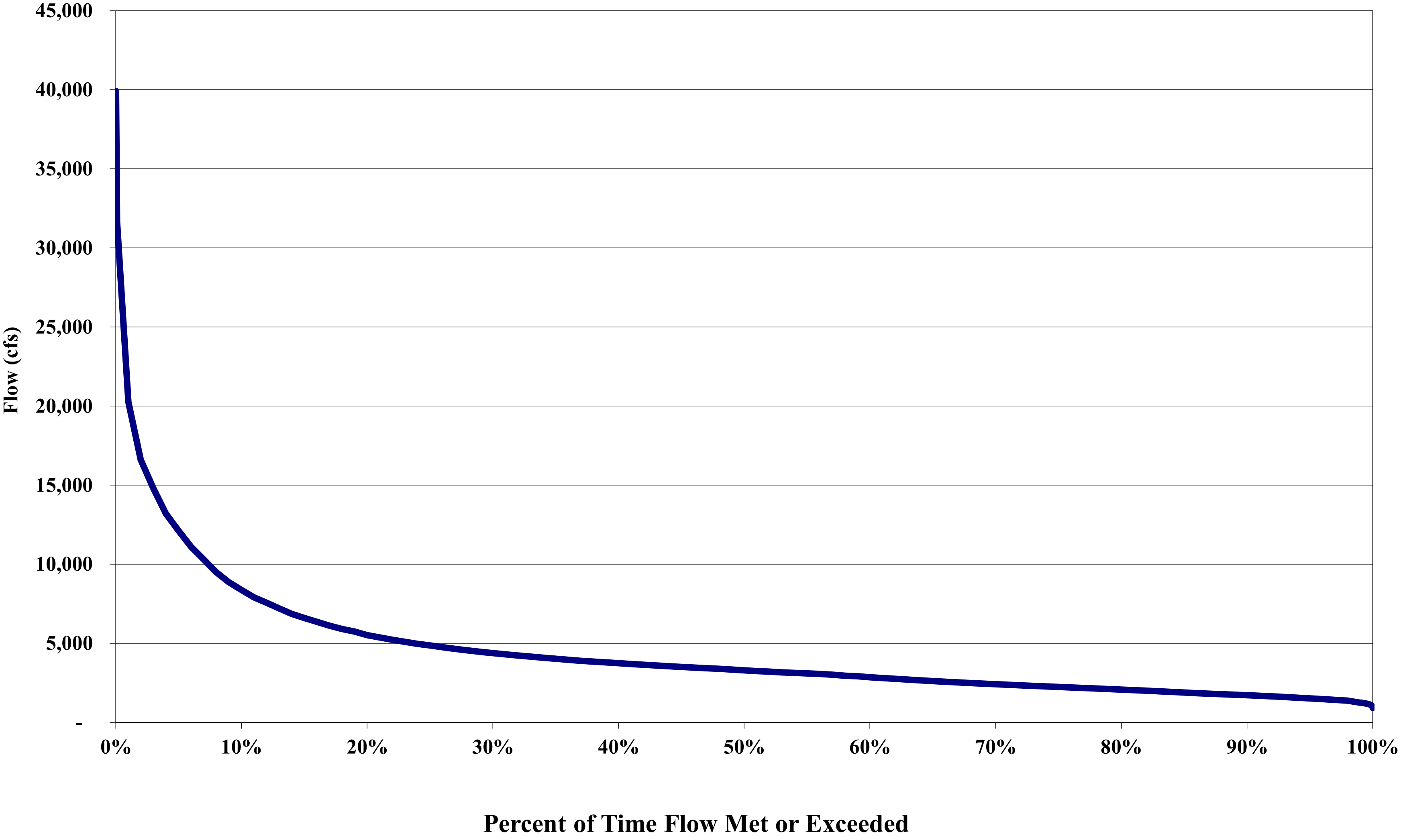
d. Whitewater reach name or description: SWIFT, WALKER BK TO GAGING STA @ 1000 → 1200
   i. Trips per Year: [✓ 0-3] 4-8 9-15 15+

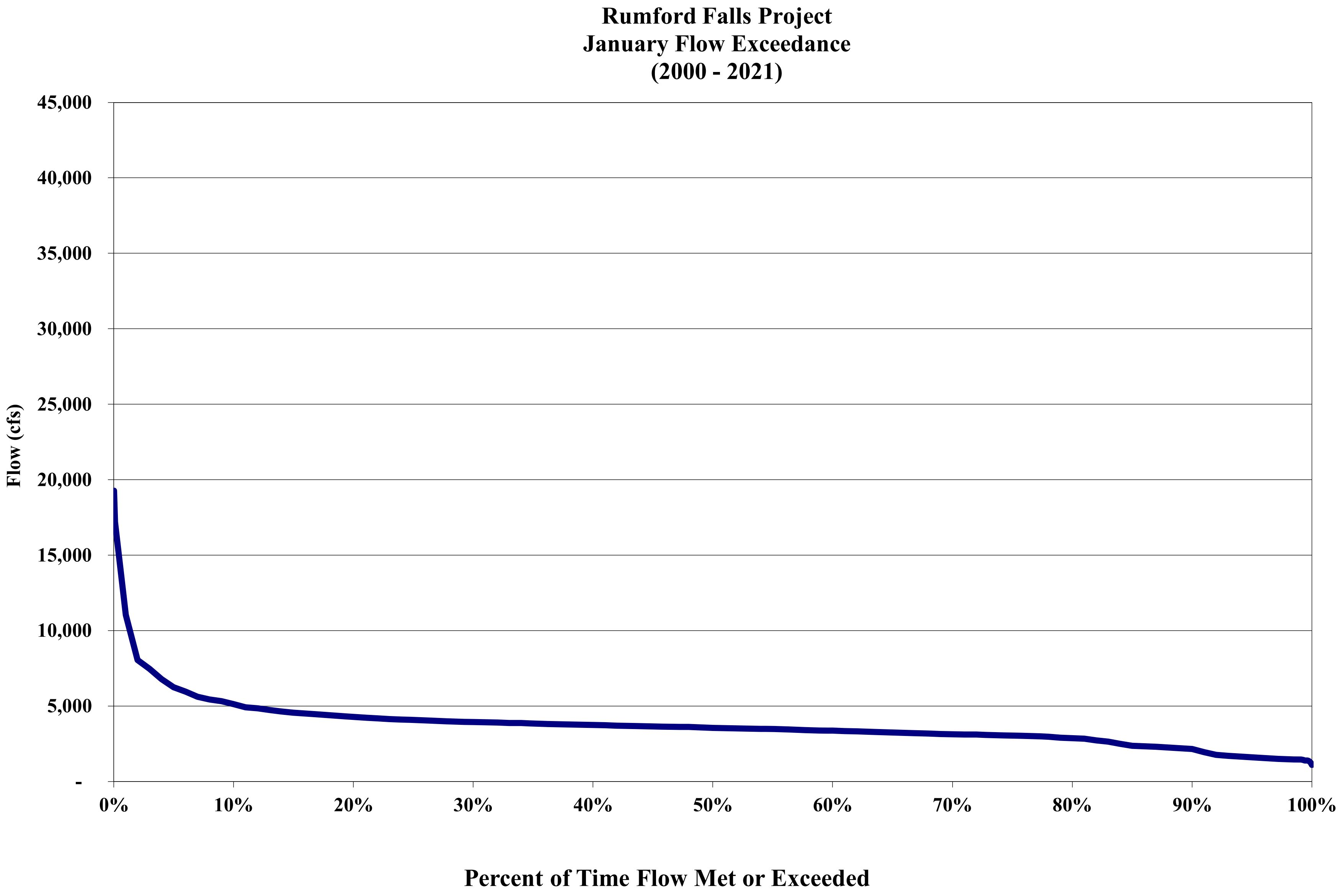
Thank You for Your Participation

ATTACHMENT 8

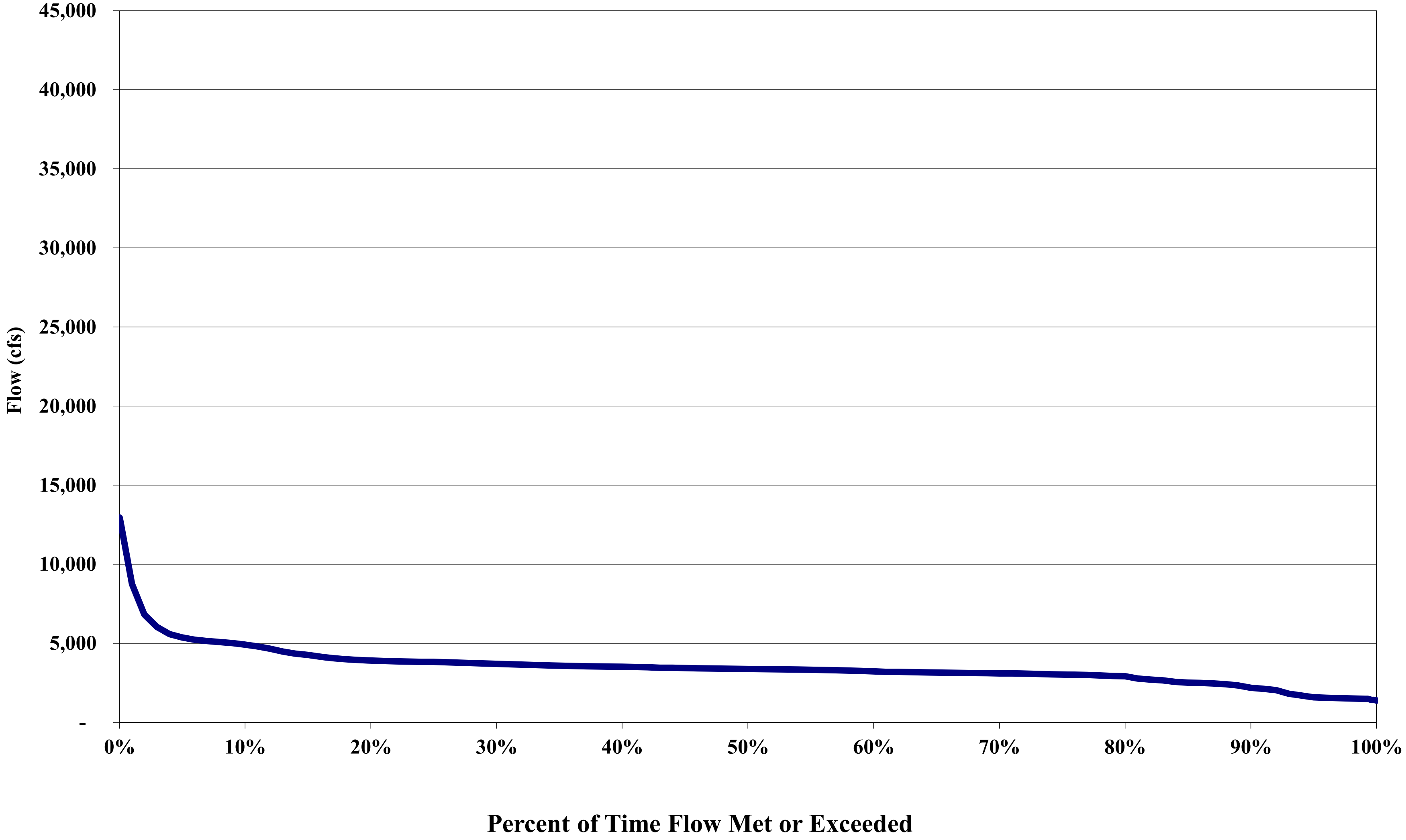
FLOW DURATION CURVES

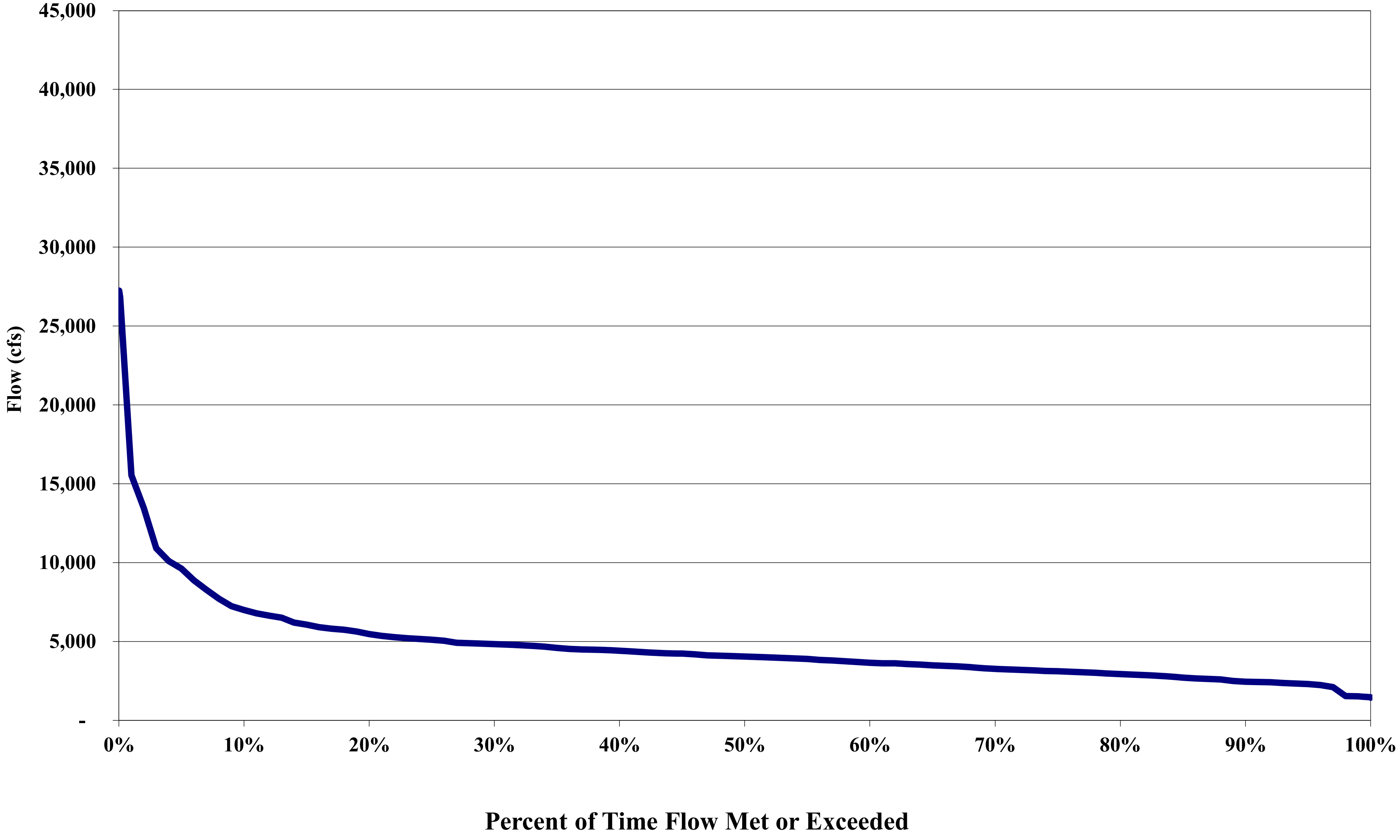
Rumford Falls Project
Annual Flow Exceedance
(2000 - 2021)




Rumford Falls Project
January Flow Exceedance
(2000 - 2021)
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
-
Flow (cfs)
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Percent of Time Flow Met or Exceeded

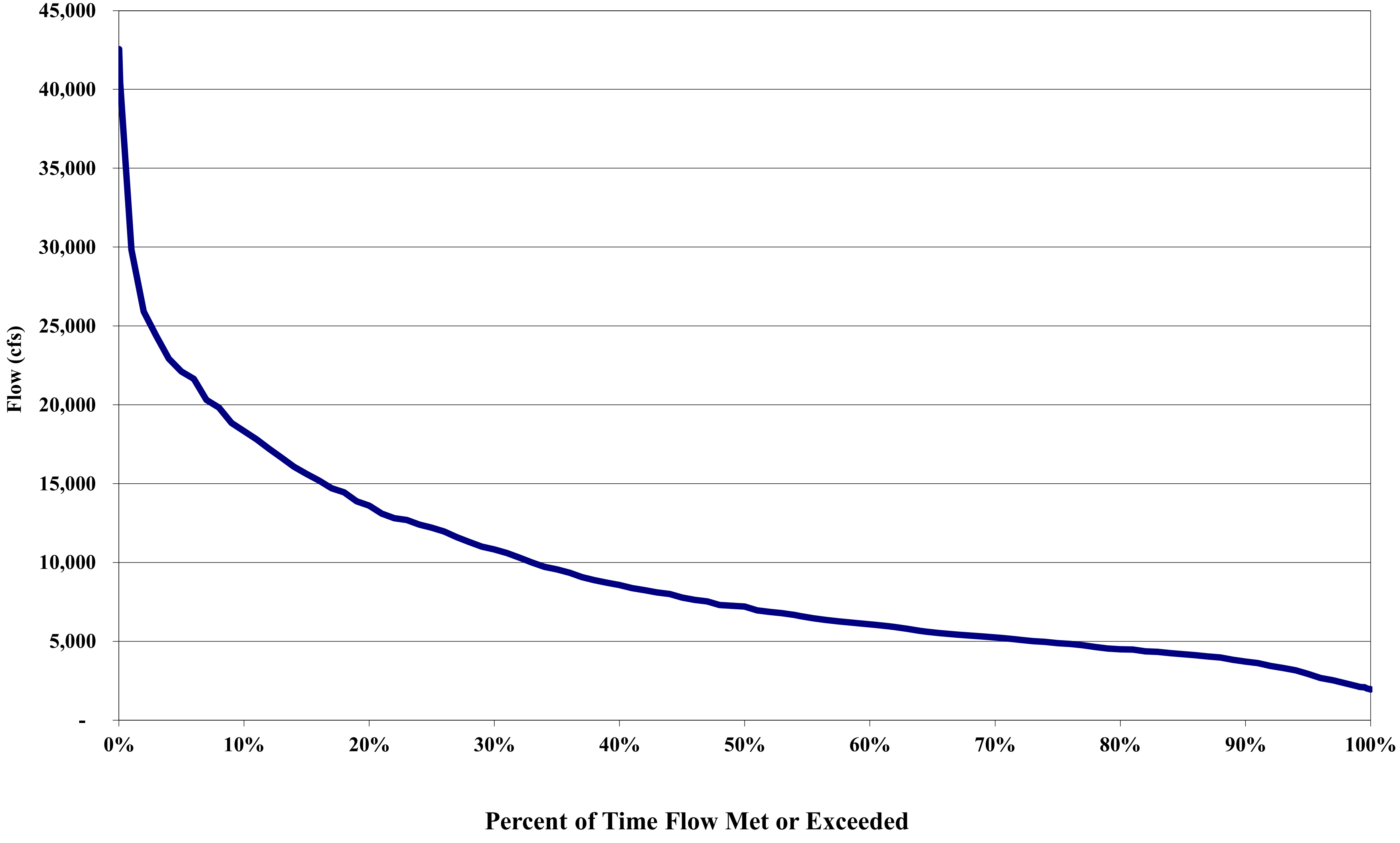
Rumford Falls Project
February Flow Exceedance
(2000 - 2021)



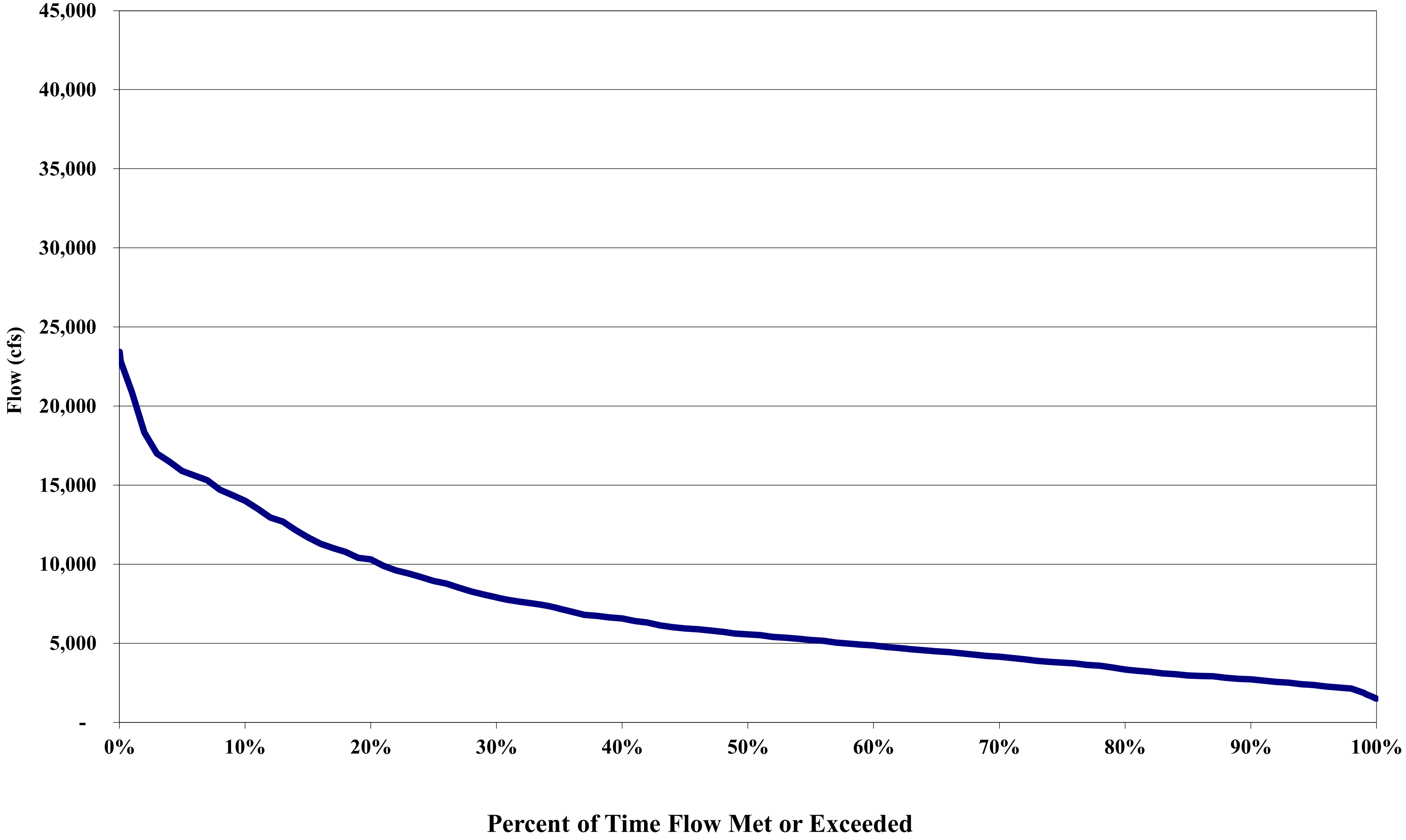


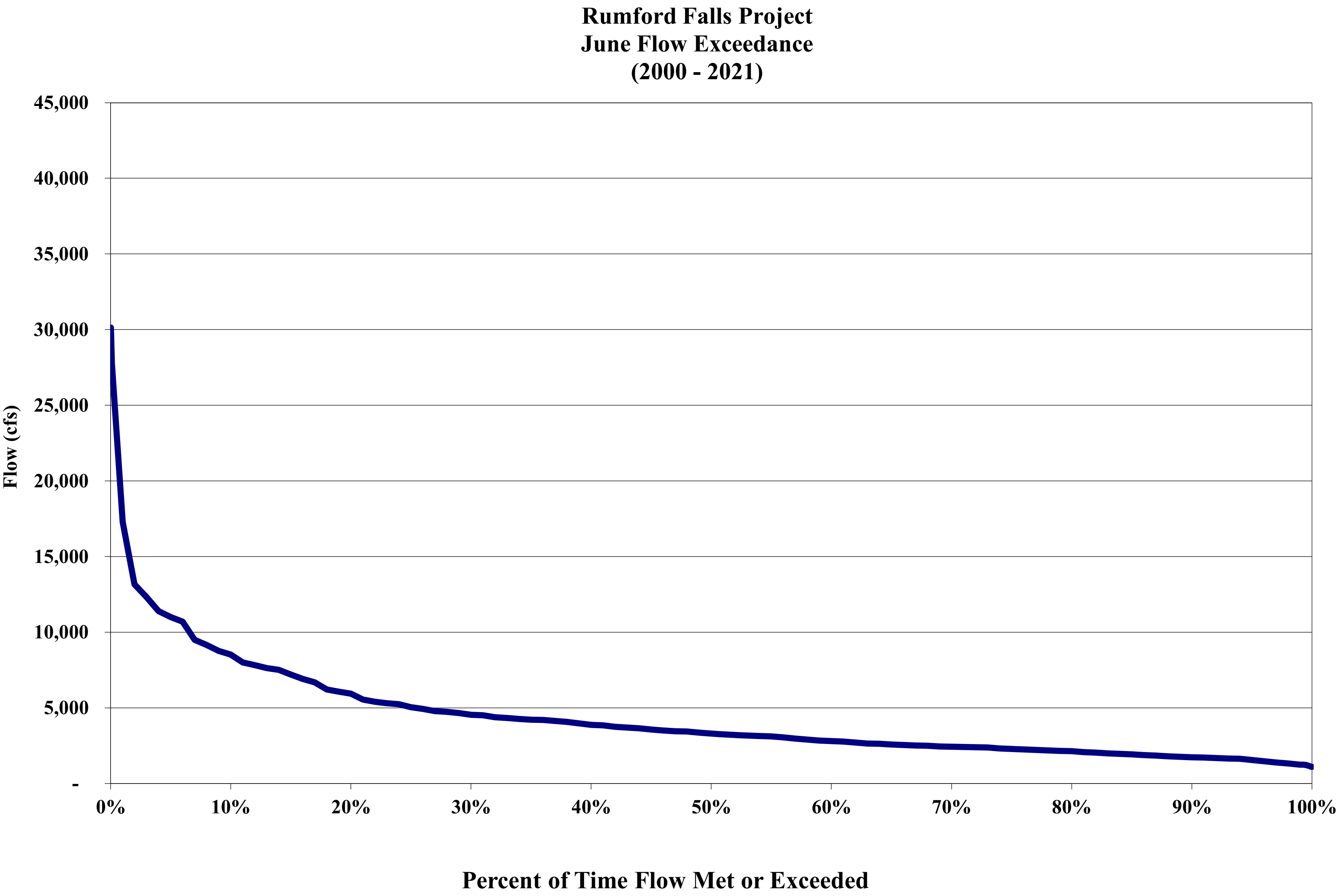
Rumford Falls Project
March Flow Exceedance
(2000 - 2021)

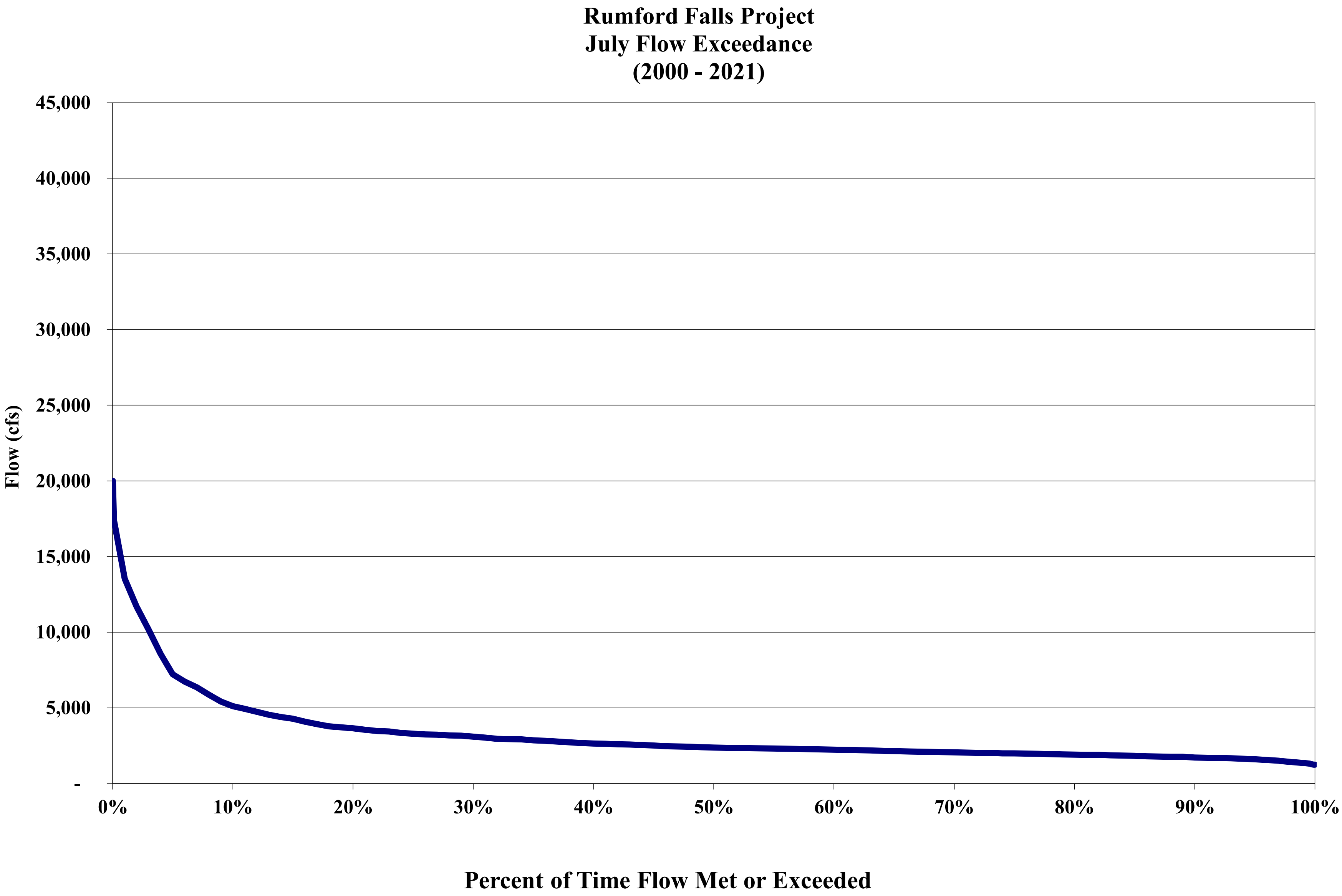
Rumford Falls Project
April Flow Exceedance
(2000 - 2021)

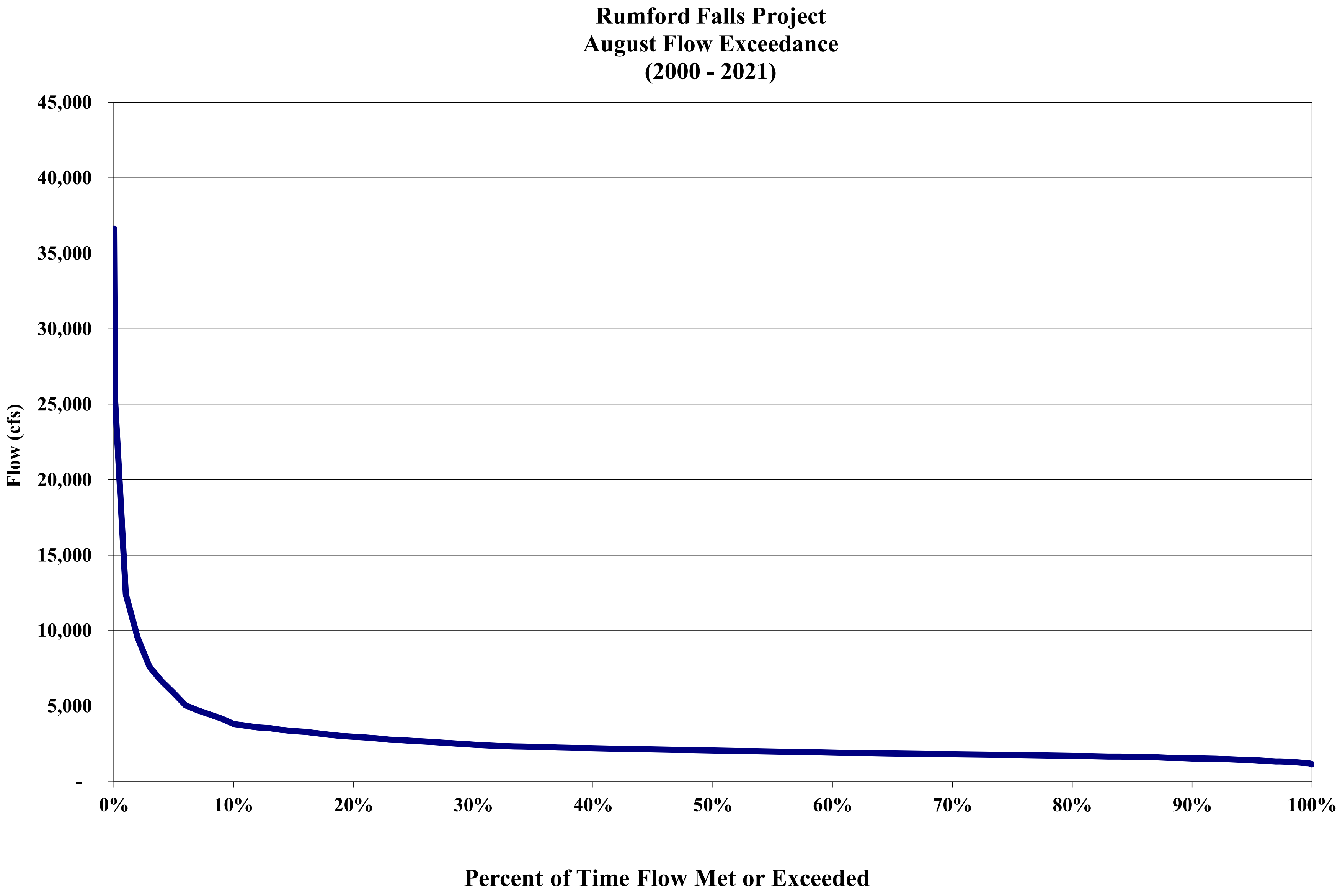


Rumford Falls Project
May Flow Exceedance
(2000 - 2021)

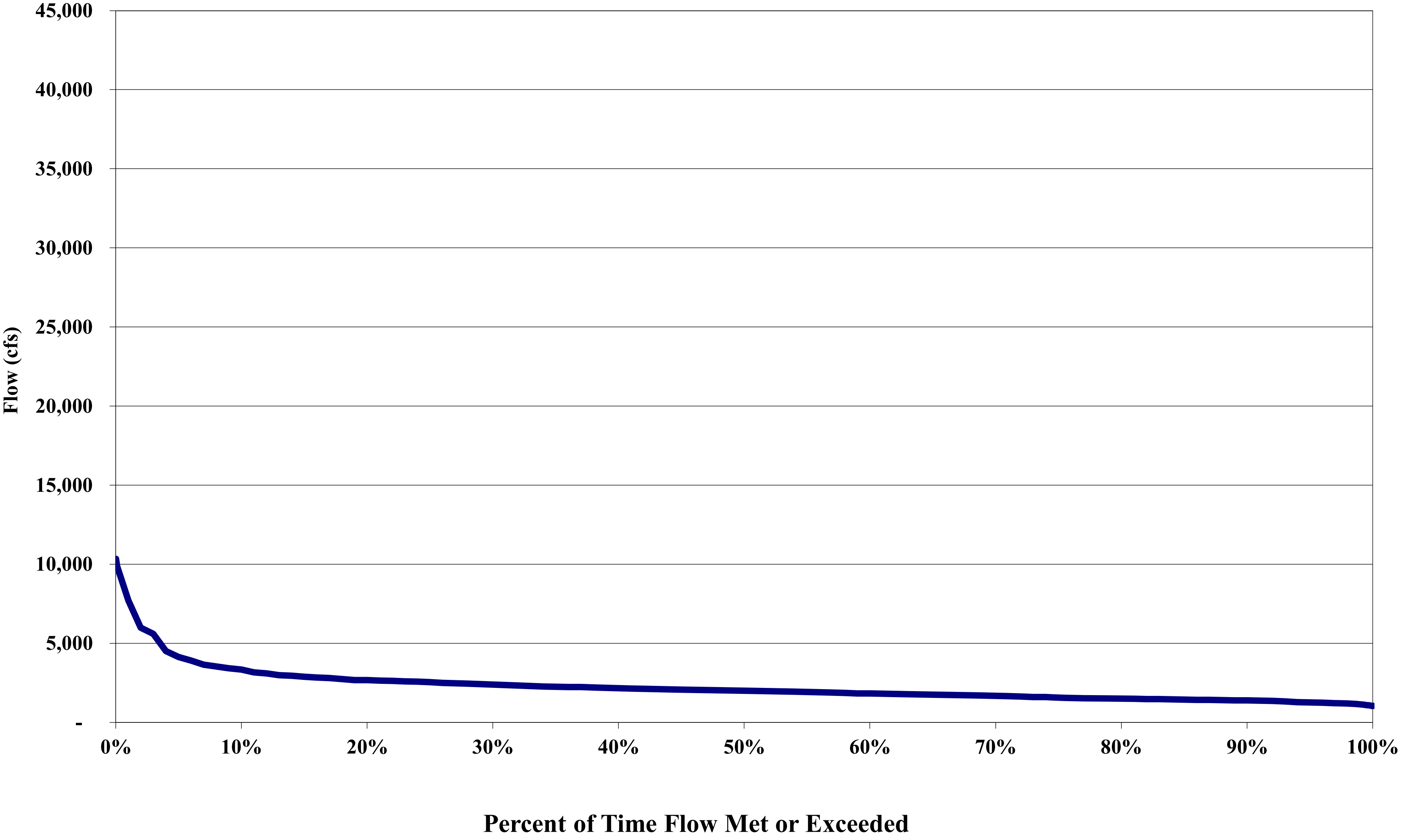


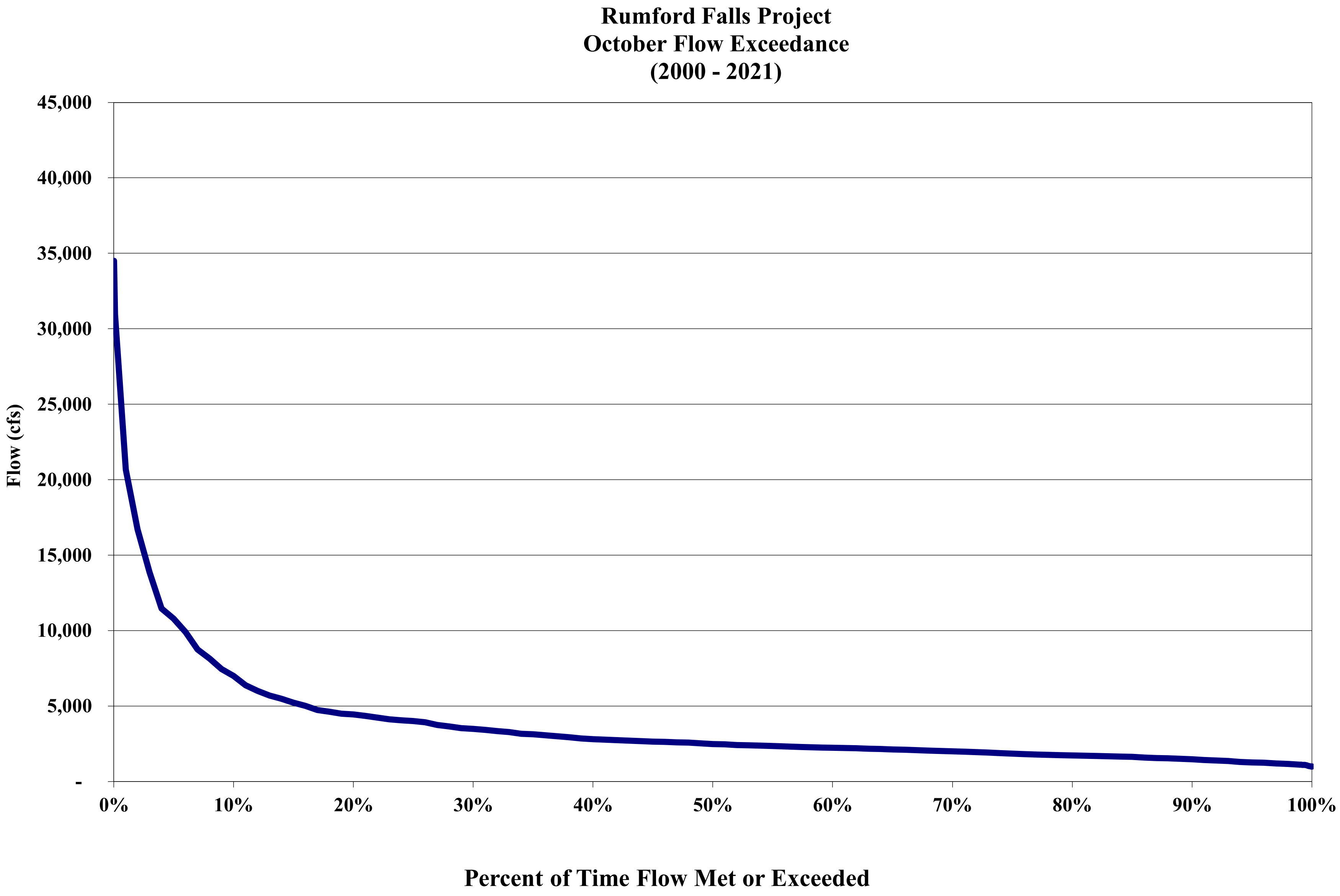

Rumford Falls Project
June Flow Exceedance
(2000 - 2021)
Flow (cfs)
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
-
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Percent of Time Flow Met or Exceeded


Rumford Falls Project
July Flow Exceedance
(2000 - 2021)
Flow (cfs)
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
-
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Percent of Time Flow Met or Exceeded


Rumford Falls Project
August Flow Exceedance
(2000 - 2021)
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
-
Flow (cfs)
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Percent of Time Flow Met or Exceeded

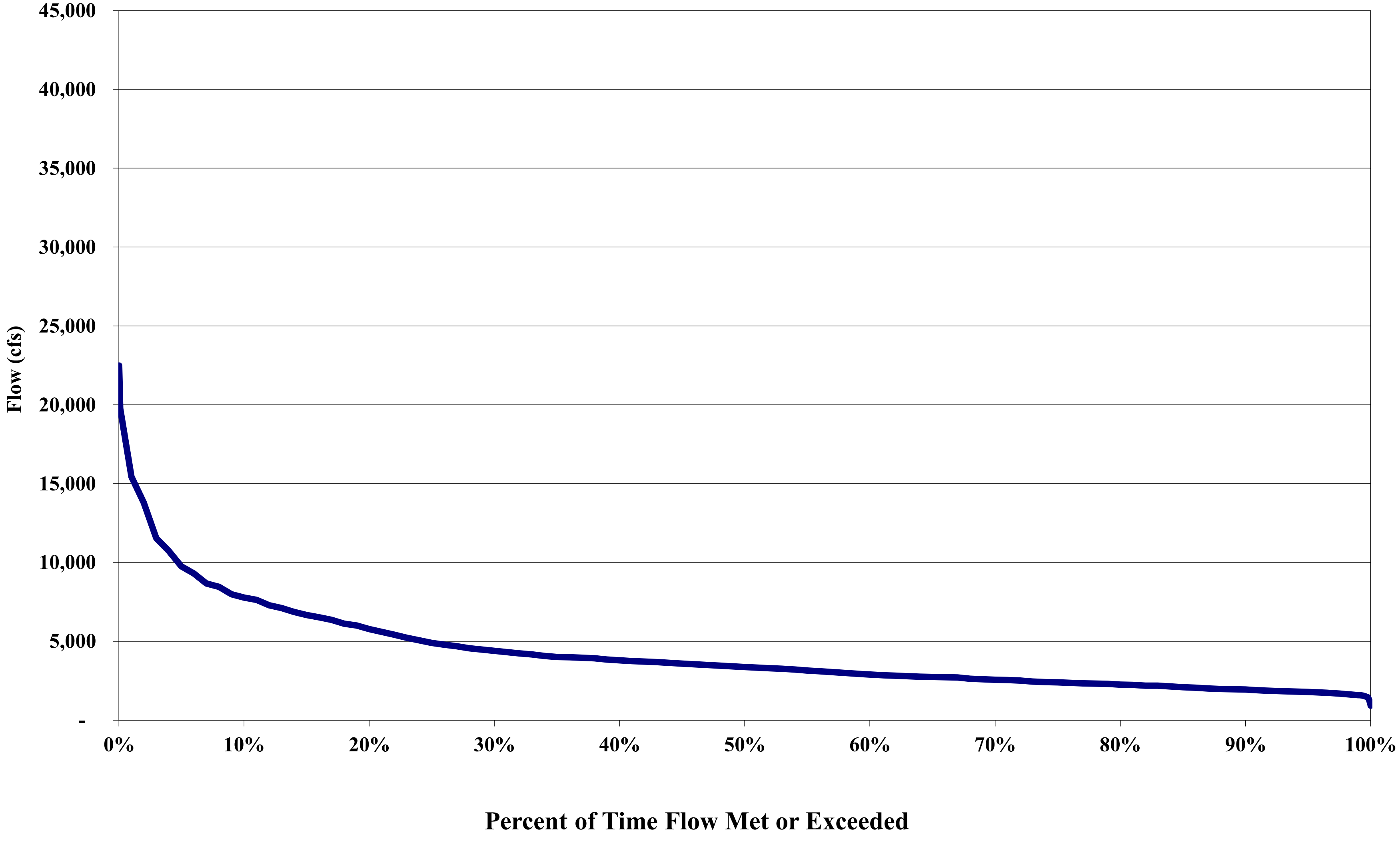
Rumford Falls Project
September Flow Exceedance
(2000 - 2021)



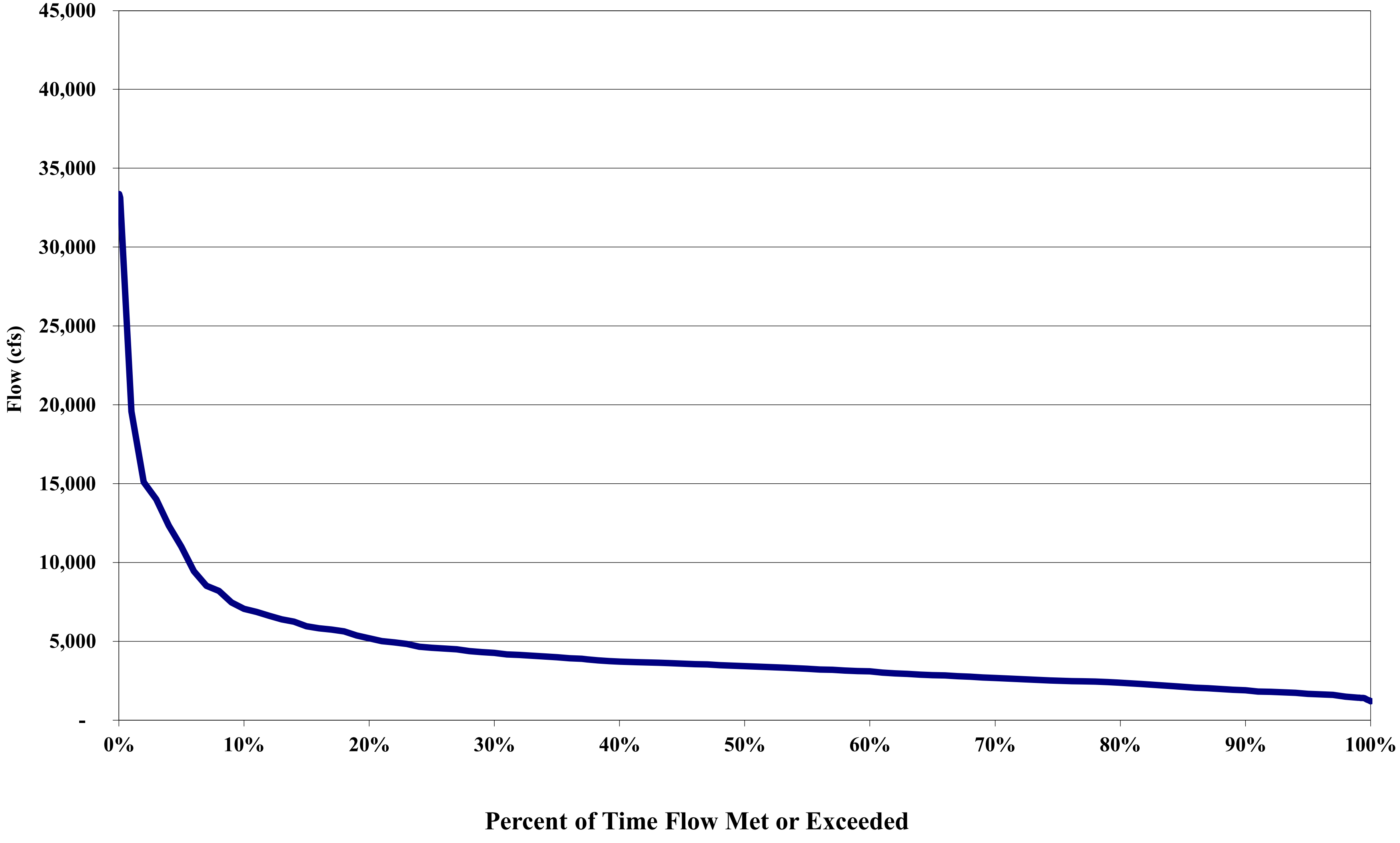


Rumford Falls Project
October Flow Exceedance
(2000 - 2021)

Rumford Falls Project
November Flow Exceedance
(2000 - 2021)



Rumford Falls Project
December Flow Exceedance
(2000 - 2021)



ATTACHMENT 9

INTERVIEW SUMMARIES

Telephone Record

Date: Friday, May 14, 2021

Project: Rumford Falls Hydroelectric Project

Call to: George O'Keefe, Town of Rumford, Economic Development Director

Call from: Kelly MacVane, HDR

Subject: Whitewater Study – Level 1 Interview

Background and Experience

- Class I-III whitewater experience mainly on Moose River and Allagash River in Maine using canoes and kayaks.
- Mainly sailing, canoeing, kayaking experience.

Experience in Reach

- Whitewater in Swift River considered adequate.
- Regarding adequacy of support facilities in bypass reach – west side access considered good and east side access more difficult as stairs would be needed.
- Access from behind Library provides access to the lower reach which is more suitable for all levels. Stated there are also some footpaths near baseball fields that may provide access to lower reach.
- Do have some safety concerns and individuals would need to know personal skill level.
- Would like to see Rumford Falls Hydro LLC (RFH) look at area of Class 5+ rapid with an underwater camera to view any potential hazards.
- Did not mention specific flow ranges but would like to see flow ranges that allow canoe/kayaks to go over the slide (Class IV rapid).
- Believes suitable watercrafts would be canoe/kayak/raft for Project area. No tubes.
- Reach most popular on weekends in July and August between 10am and 4pm.
- Stated May/June good for naturally occurring whitewater flows.
- Believes repeated runs can be done in reach throughout the day.

Additional Information to Share

- Provided photos of the reach under various flow conditions.

Telephone Record

Date: Friday, April 09, 2021

Project: Rumford Falls Hydroelectric Project

Call to: John Preble, Rumford Resident

Call from: Kelly MacVane, HDR

Subject: Whitewater Study – Level 1 Interview

Background and Experience

- Has been engaged in whitewater since 17 years old.
- Former competitive whitewater canoer. Long history of whitewater playboating.
- Born and raised in Rumford and currently lives in Rumford.
- Considers himself a Class III – IV boater.
- Has belonged to many canoe clubs that no longer exist, current member of Penobscot Paddle and Chowder Society (30+ years), American Whitewater, Maine Canoe and Kayak Racing Organization, and Inland Woods + Trails.
- Interested in whitewater boating opportunities and recreational trail access.

Experience in Reach

- Has experience in reach. Considers the reach to draw reasonably skilled whitewater paddlers with the skill level ranging throughout reach. Stated should be experts only under Portland Street bridge.
- Reach suitable for whitewater canoes, kayaks, and small rafts.
- Regarding flow, 1,700 cfs would be too high in the upper reach and 1,200 cfs would be too low for "the rock garden" (lower reach). Considers 1,500 cfs to be an ideal flow for the upper and lower areas of the reach.
- Although whitewater boating can be done year-round, he stated June, July, August, and early September are the typical boating months. Would be interested in seeing scheduled releases 4-5 hours in duration on the weekends during the typical boating months.
- Suggested put in behind Rumford Town Hall or behind the Town Library. Does not suggest using the put-in at the Middle Dam. Suggested takeout at the Town of Mexico boat ramp. Carleton Street Bridge takeout is difficult given the low flows in the Swift River in the summer.
- Two particular areas within the reach of interest for whitewater boating – the upper reach contains two class IV to V+ rapids. These areas require more skill. The lower reach contains a play area referred to as "the rock garden" and is a good area for beginners to practice.

Additional Information to Share

- Provided photos of different water levels in reach.

Telephone Record

Date: Wednesday, April 07, 2021

Project: Rumford Falls Hydroelectric Project

Call to: Karen Wilson, Rumford Resident

Call from: Kelly MacVane, HDR

Subject: Whitewater Study – Level 1 Interview

Background and Experience

- Has been whitewater boating for 26 years. In the past worked as a whitewater guide in New Hampshire. Currently lives in Rumford.
- Considers self a Class IV skill level.
- Member of Inland Woods + Trails.
- Typically boats at Errol, below Pontook, below Aziscohos, and the Magalloway River. Typically travels to these areas during scheduled controlled releases.

Experience in Reach

- Considers the Middle Dam bypass reach a skill level of Class IV – Class V. Suggested paddlers with a lower skill level may put in behind the Rumford Town Library.
- Typically, boating in the reach occurs during spring run off and weekends. Would like to see weekend releases. Suggested release times of 9am – 3pm and suggested modeling after the Magalloway River controlled releases.
- Stated suitable watercraft for the reach would be whitewater kayaks and rafts. Would not suggest open water boats for upper reach area (Class IV – V).
- Would like the project to implement a flow phone where boaters could call and identify flows.

Additional Information to Share

- None

Telephone Record

Date:	Wednesday, May 05, 2021
Project:	Rumford Falls Hydroelectric Project
Call to:	Jim Pellerin, Maine Department of Inland Fisheries and Wildlife
Call from:	Kelly MacVane, HDR
Subject:	Whitewater Study – Level 1 Interview

Summary:

- Goal of MDIFW is to improve angling opportunities in the bypassed reach.
- MDIFW currently has limited recreational fishery information but will have the results of the Creel Survey in 2022.
- MDIFW has concerns with controlled whitewater releases as it relates to blasting fish out of the reach and angler safety.
- MDIFW would prefer whitewater boaters take advantage of the natural whitewater conditions in the spring.
- Safety of anglers is a high priority.

ATTACHMENT 10

COMPLETED ANGLER FLOW SURVEYS

Rumford Falls Hydroelectric Project (FERC No. 2333)
FERC Relicensing
Whitewater Study
Angler Survey – Individual Flow Evaluation

Name: David Howatt **Date:** 6/9/22

Flow: 800 cfs

1) Please rate each of the following characteristics for this flow. (*Circle one number for each flow*)

	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Total Acceptable
Safety					
Ability to safely wade stream channel	1	2	[✓ 3]	4	5
Ability to walk on shoreline or bank	1	2	3	4	[✓ 5]
Angling Experience					
Ability to see fish	1	2	3	[✓ 4]	5
Ability to land fish	1	2	3	[✓ 4]	5
Number of quality fishing spots	1	2	3	4	[✓ 5]
Fishing success (Didn't fish)	1	2	3	4	5
Fishing challenge	1	2	3	[✓ 4]	5

2) Overall, how would you characterize the angling experience at this flow? (*Circle one number*)

Totally Acceptable	Unacceptable	Neutral	Acceptable	Total Acceptable
1	2	3	[✓ 4]	5

3) Overall, how would you characterize this flow as it relates to the angling experience? (*Check one*)

☐ Much too low

☐ Slightly too low

☒ Optimal

☐ Slightly too high

☐ Much too high

4) Are there any comments regarding safety, fishability, or overall angling experience that you would like to share?

5 good pools + other fast-water runs. All very fishable.
Excellent conditions to target feeding salmonids
Wading, while possible, would not be advised
8" salmonid observed leaping under E side of bridge.

Thank You for Your Participation

Rumford Falls Hydroelectric Project (FERC No. 2333)
FERC Relicensing
Whitewater Study
Angler Survey – Individual Flow Evaluation

Name: David Howatt **Date:** 6/9/22

Flow: 1500 cfs

1) Please rate each of the following characteristics for this flow. (*Circle one number for each flow*)

	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Total Acceptable
Safety					
Ability to safely wade stream channel	1	2	[✓ 3]	4	5
Ability to walk on shoreline or bank	1	2	3	[✓ 4]	5
Angling Experience					
Ability to see fish	1	2	[✓ 3]	4	5
Ability to land fish	1	2	3	[✓ 4]	5
Number of quality fishing spots	1	2	3	[✓ 4]	5
Fishing success (Didn't fish)	1	2	3	4	5
Fishing challenge	1	2	3	[✓ 4]	5

2) Overall, how would you characterize the angling experience at this flow? (*Circle one number*)

Totally Acceptable	Unacceptable	Neutral	Acceptable	Total Acceptable
1	2	3	[✓ 4]	5

3) Overall, how would you characterize this flow as it relates to the angling experience? (*Check one*)

- ☐ Much too low
- ☐ Slightly too low
- ☐ Optimal
- ☒ Slightly too high
- ☐ Much too high

4) Are there any comments regarding safety, fishability, or overall angling experience that you would like to share?

2 of 5 pools were less fishable. Most runs were unfishable

Higher flow created fishable pockets behind ledges

Wading still possible, but more dangerous

Thank You for Your Participation

ATTACHMENT 11

COMPLETED ANGLER COMPARATIVE ASSESSMENT

Rumford Falls Hydroelectric Project (FERC No. 2333)
FERC Relicensing
Whitewater Study
Angler Survey – Comparative Evaluation

Name: David Howatt **Date:** 6/9/22

1) Which flows did you participate in? (*Check all that apply*)

☒ 800 cfs ☒ 1,500 cfs ☐ 2,000 cfs

2) Please provide an overall evaluation for the following flows based on your experience during the study considering all conditions that make up a high-quality angling experience. (*Circle one rating for each flow*)

Flow	Totally Unacceptable	Unacceptable	Neutral	Acceptable	Total Acceptable
800 cfs	1	2	3	[✓ 4]	5
1,500 cfs	1	2	3	[✓ 4]	5
2,000 cfs	1	2	3	4	5

3) Please specify the flow that you believe would be the most appropriate for an optimal angling experience. (*You may specify a flow that you observed or a flow you did not observe*). >1000 cfs

4) Are there any other comments regarding safety, fishability, or overall angling experience that you would like to share?

800 cfs definity provided better angling opportunity
While 1500 cfs still provided good opportunity,
the runs had too much current. The newly created
side pockets were good, but may be bass and rough
fish more than salmonids.

Thank You for Your Participation

APPENDIX D

OUTLET STREAM AQUATIC HABITAT STUDY REPORT

Outlet Stream Aquatic Habitat Study

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). The goal of the Water Quality Study was to demonstrate that the Project meets water quality standards and the specific objectives were to complete the following:

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

2. Temperature and dissolved oxygen (DO) monitoring within the Middle Dam bypass reach and in the lower powerhouse discharge;

3. A Benthic Macroinvertebrate (BMI) Study in the Middle Dam bypass reach; and,

4. An Outlet Stream Aquatic Habitat Study conducted in the Project's Middle Dam bypass reach.

The sampling methodologies and results for Water Quality Study objectives 1, 2, and 3 were filed with the Commission as a part of the August 6, 2021 Initial Study Report (ISR). At the time of filing the ISR, RFH had discussed the preliminary results from the Outlet Stream Aquatic Habitat Study (i.e., objective 4) with the Maine Department of Environmental Protection (MDEP), and it was agreed that information from the Flow Study for Aquatic Habitat Evaluation study (Appendix B of the Updated Study Report [USR]), including some additional analysis, would be incorporated into this study to evaluate minimum flow in the Middle Dam bypass reach.

2.0 Background

The Outlet Stream Aquatic Habitat Study was conducted within the Middle Dam bypass reach to demonstrate what minimum flows in that section are adequate to provide habitat for fish and other aquatic life. MDEP has determined that, generally, flows providing wetted conditions in a weighted average of ¾ of the cross-sectional area of the affected river or stream, as measured from bankfull conditions, are sufficient to meet aquatic life and habitat standards (MDEP 2020). RFH and MDEP visited the Middle Dam bypass reach on June 24, 2020. Following their visual review of the full length of the Middle Dam bypass reach, MDEP indicated that placement of two transects would be sufficient to quantify adequacy of the bypass flow relative to the ¾ wetted criteria. The two cross sections that were identified in consultation with the MDEP were located (1) towards the center of the pool immediately downstream of the Middle Dam and upstream of the large cascade and (2) through the cobble/boulder habitat located downstream of the large cascade and upstream of the backwater effect of the lower powerhouse tailrace.

Initially, GEI Consultants, Inc. was retained during the summer of 2020 to prepare a 2-D HEC-RAS hydraulic model of the Middle Dam bypass reach to estimate flows providing wetted conditions of ¾ of the cross-sectional area relative to bankfull conditions at the two transect locations identified in consultation with MDEP. On May 20, 2021, RFH consulted with MDEP on the initial results of the preliminary model runs, for the upper and lower transect locations, which indicated unusually high ¾ cross-sectional flows. It was agreed that, because of the steep gradient of the river, ledge falls, and the high seasonal flows that occur, the modeling approach, was not suitable for evaluating what minimum flows in that section are adequate to provide habitat for fish and other aquatic life. MDEP stated that MDEP policy[1] allows for the Department to establish flows that meet aquatic life and habitat standards using site-specific methods such as instream flow studies, in cases where the project has been shown to meet all water quality standards, and for hydrologic environments, such as this with steep embankments and gradients: "*Where site-specific study data (e.g., the results of an IFIM or other in-stream flow study) are provided to support an alternative flow or water level*".

During a subsequent consultation meeting on July 1, 2021, RFH provided MDEP with an overview of the 2020 Water Quality Study findings relative to attainment of State water quality standards at the Project for both DO and the existing macroinvertebrate community. Following review of those items RFH proposed to utilize another planned study, Flow Study for Aquatic Habitat Evaluation, collectively with the data obtained during the Water Quality Study (i.e., DO, macroinvertebrate

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[1] Bureau of Land and Water Quality Hydropower Project Flow and Water Level Policy, 2/4/02.

data), to inform decisions regarding suitable minimum flows in the Middle Dam bypass reach. MDEP agreed with this approach and recommended that the Flow Study for Aquatic Habitat Evaluation include habitat suitability criteria for macroinvertebrates, to ensure that any modifications to flow through the Middle Dam bypass reach would not adversely affect that community. In addition to the macroinvertebrate community, MDEP sought to have the Flow Study for Aquatic Habitat Evaluation demonstrate connectivity for aquatic species to pass through the reach from the Middle Dam downstream to the confluence with the lower powerhouse tailrace.

3.0 Site-Specific Data for Evaluating Bypass Flow

3.1 Demonstration of Achieving State Water Quality Standards

The Androscoggin River is classified by 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 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 allow 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.

As detailed in the ISR, 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. No DO concentrations were below the 5.0 milligrams per liter (mg/L) instantaneous or the 6.5 mg/L 30-day average DO state standard for Class C waters during this study. Similarly, vertical profiles for DO were collected twice monthly between June and October 2020 from the Upper and Middle Dam impoundments[2]. 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 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.

Macroinvertebrate rock basket samplers were deployed in the Middle Dam bypass reach on July 30, 2020, and retrieved 29 days later on August 27, 2020. Taxonomic and habitat information were subsequently provided to MDEP, and the final Department determination indicated that the macroinvertebrate community in the Middle Dam bypass reach attained Class A standards.

3.2 Flow Study for Aquatic Habitat Evaluation

The goal of the Flow Study for Aquatic Habitat Evaluation was to assess the quality and quantity of suitable habitat in relation to discharge within the Middle Dam bypass reach for a variety of aquatic species. This habitat evaluation assessment utilized two concurrent approaches: an empirical Demonstration Flow Assessment (DFA), and a quantitative flow-habitat model using one-dimensional (1-D) hydraulic modeling as applied within the System for Environmental Flow Assessment (SEFA) computer model. See the Flow Study for Aquatic Habitat Evaluation report in Appendix B of this USR for details on methodologies and results; the information below is summarized from that report.

Both approaches utilized a suite of five cross-sectional transects distributed within pool, run, and riffle habitats in the Middle Dam bypass reach. The DFA manually collected depth, mean column velocity, and substrate data along each transect at four flows: 54, 90, 193, and 265 cfs. Binary habitat suitability criteria (HSC) were developed to represent optimal, suitable, or unsuitable habitat for adult life-stages of smallmouth bass, rainbow trout, and brown trout, as well as for benthic macroinvertebrates (BMI). The HSC curves used for fish and BMI in this study were based on suitability data developed from previous studies and publicly available within the instream flow community. The combination of empirical depths, velocities, and substrate types measured at each

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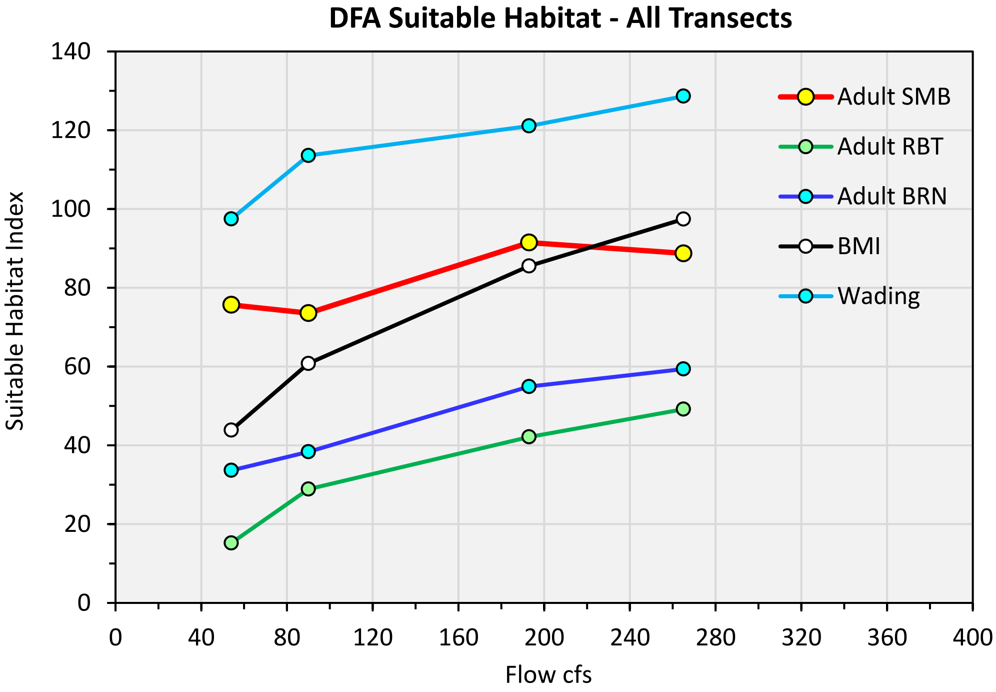
[2] As specified in the ISR, in October 2020, only the Upper Dam impoundment was sampled due to sampling constraints. RFH coordinated with MDEP regarding this sampling event and the MDEP indicated the data collected was sufficiently representative of conditions; therefore, additional sampling was not required.

of the four flows was used to describe the relationship between flow and the amount of optimal or suitable habitat for each target species.

The 1-D model utilized the same substrate data but collected independent depth and velocity profiles at a single calibration flow ranging from 193 cfs to 265 cfs, depending on the transect. Water surface elevation data was collected at all four flow levels, and the hydraulic model was used to estimate the distribution of depths and velocities at all modeled flows from a minimum of 20 cfs to a maximum of 400 cfs. HSC representing the same species and life-stages were used in the 1-D model by taking the DFA binary HSC and transforming the criteria into continuous criteria prior to modeling.

Figure 1 shows the results of the DFA assessment in the upper graph, with 1-D modeling results displayed in the lower graph. Both analyses generally show the amount of suitable habitat continues to increase as flows increase for most target species, although the rate of increase in habitat with increase in flow declines as flows exceed 100 cfs to 150 cfs. Figure 2 shows that the percent gain in suitable habitat increases rapidly as flows increase from 20 cfs to about 100 cfs, after which the relative increase in suitable habitat slows significantly and gains in habitat are only 10% or less per 20 cfs increment at flows between 80 cfs and 160 cfs. This trend is not only seen for the target fish species, but for BMI as well, which were also shown by the BMI study to fulfill Class A standards under existing flow conditions. Even lower gains in physical habitat as measured by cross-sectional area (ft^2) or wetted perimeter (ft) are evident in Figures 1 and 2, with incremental gains of only 5% or less at flows over 80 cfs.

Figure 1
The relationship between the quantity of suitable habitat and discharge for target species in the Middle Dam bypass reach. Upper figure shows habitat based on the DFA Analysis, lower figure based on the 1-D Analysis. SMB=smallmouth bass, RBT=rainbow trout, BRN=brown trout, BMI=benthic macroinvertebrates. Lower figure also shows changes in cross-sectional area and wetted perimeter with flow.



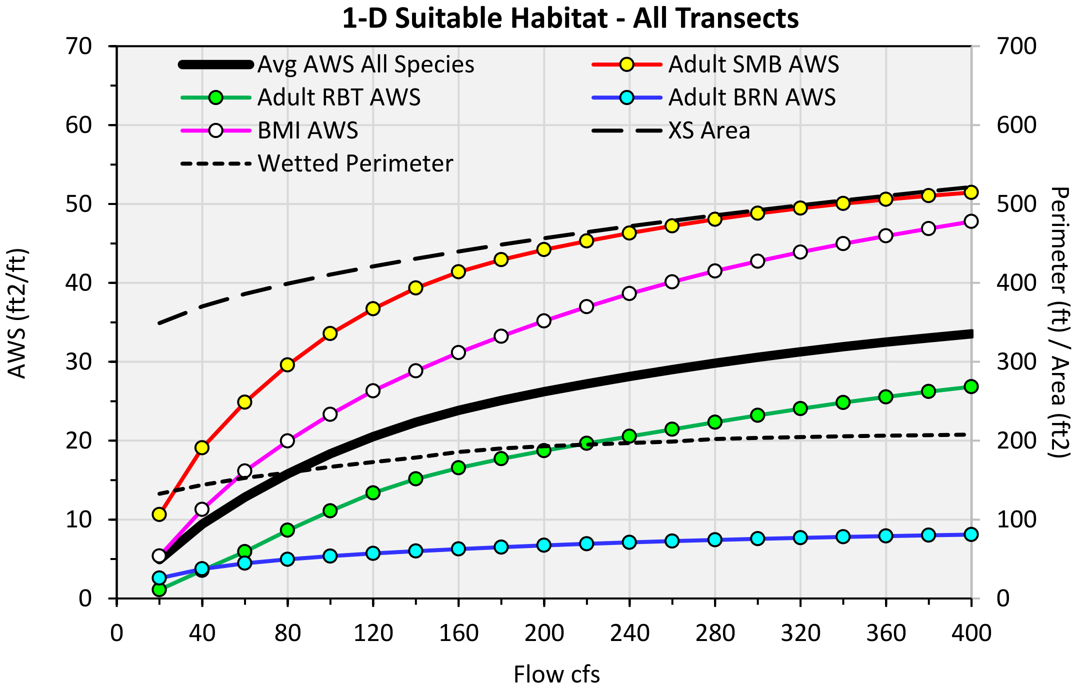
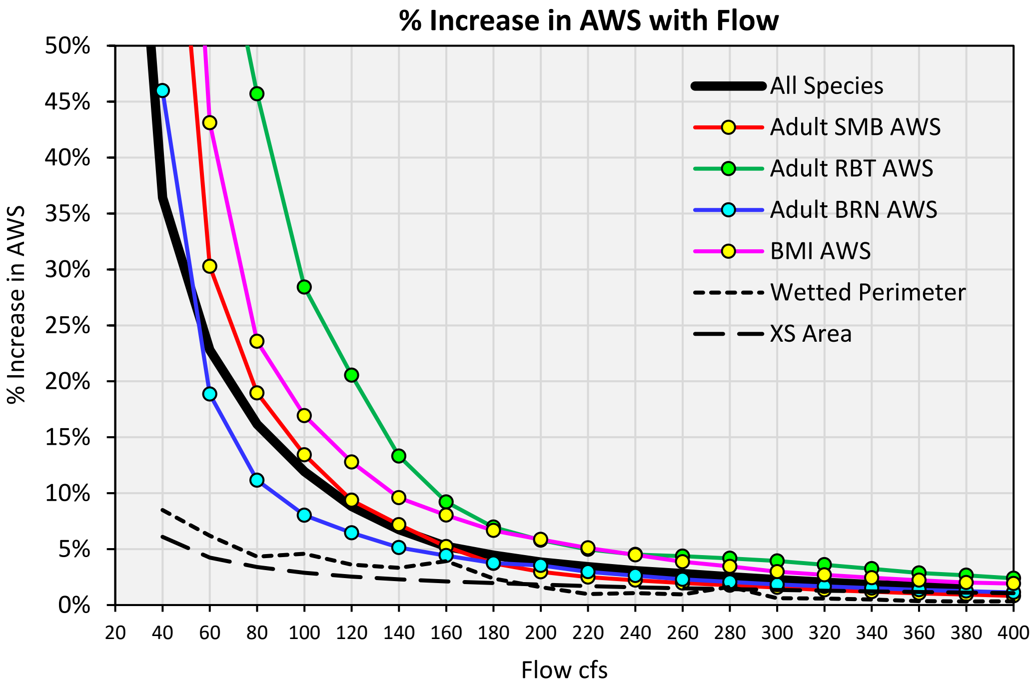


Figure 2
Percent increase in suitable habitat with each 20 cfs increment in flow for target species in the Middle Dam bypass reach. SMB=smallmouth bass, RBT=rainbow trout, BRN=brown trout, BMI=benthic macroinvertebrates. Also shown is percent change in cross-sectional area and wetted perimeter with flow.



3.3 Demonstration of Downstream Connectivity

During consultation related to the development of the alternative approach to inform decisions regarding suitable minimum flows in the Middle Dam bypass reach, MDEP indicated that the presence of connectivity to permit the downstream passage of aquatic organisms should be demonstrated. As summarized in the Flow Study for Aquatic Habitat Evaluation, a detailed mesohabitat mapping event was conducted during June 2021 and identified a total of nine sequential unique map habitat units (HMUs) originating at the pool habitat immediately downstream of Middle Dam and ending with the lower most riffle habitat which converged with the backwatered tailwater habitat associated with the lower powerhouse (Figure 3). The mesohabitat mapping exercise was conducted under the existing minimum flow condition and as demonstrated in the photo series taken during that exercise (see Attachment 1 of the Flow Study for Aquatic Habitat Evaluation), the existing minimum flow condition did provide connectivity for downstream passage throughout the entire Middle Dam bypass reach.

Figure 3
Middle Dam bypass reach habitat mapping units as characterized during mesohabitat mapping on June 8, 2021.

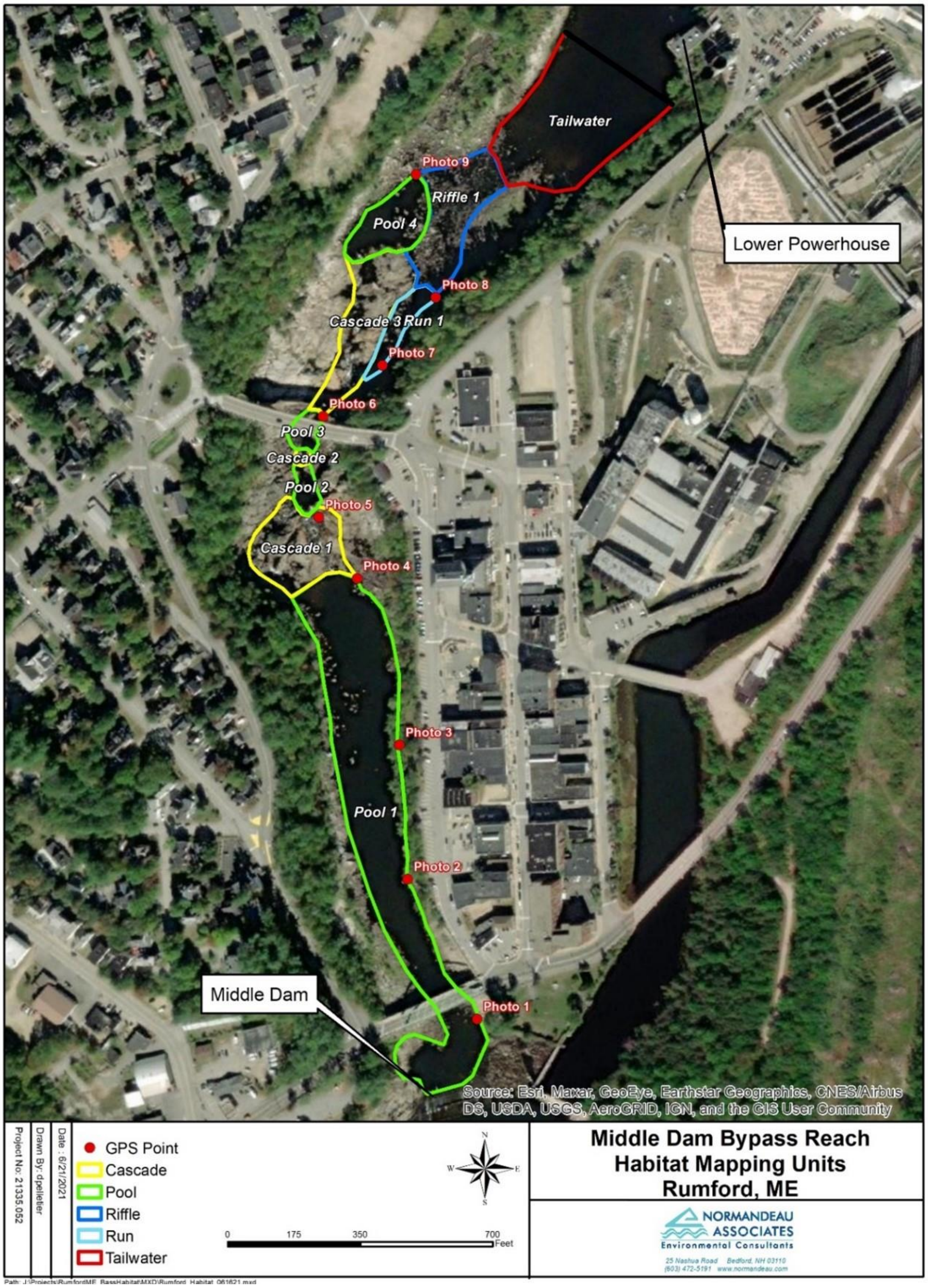


Table 1 summarizes the mean and maximum water depth at the five transect locations assessed as part of the 1-D model for the full range of modeled flows from 20 cfs up to 400 cfs. Water depth (i.e., connectivity) is evident for the upper portion of the Middle Dam bypass reach based on the mean depth conditions (i.e., 4.5-6.3 feet) under the modeled bypass flow nearest to the current minimum flow leakage as gaged during the Flow Study For Aquatic Habitat Evaluation (i.e., 60 cfs). Although the mean channel depths at transects in the lower portion of the Middle Dam bypass reach ranged from 0.7 to 1.8 feet in depth under the 54 cfs flow condition, the presence of a channel thalweg in excess of two feet at each of the three transect locations provides an indicator of connectivity through that stretch.

Table 1
Mean and maximum water depths estimated for the five Middle Dam bypass reach transects by 1-D modeling as part of the Flow Study for Aquatic Habitat Evaluation.

Modeled Flow (cfs)	Transect 1		Transect 2		Transect 3		Transect 4		Transect 5	
	Mean Depth (ft)	Max Depth (ft)	Mean Depth (ft)	Max Depth (ft)	Mean Depth (ft)	Max Depth (ft)	Mean Depth (ft)	Max Depth (ft)	Mean Depth (ft)	Max Depth (ft)
20	4.3	7.7	6.1	10.8	1.8	5.5	0.5	1.6	0.8	2.3
40	4.4	7.9	6.2	11.0	1.8	5.7	0.6	1.8	0.8	2.4
60	4.5	8.0	6.3	11.1	1.8	5.8	0.7	2.0	0.8	2.5
80	4.5	8.1	6.3	11.2	1.9	5.9	0.7	2.1	0.8	2.6
100	4.6	8.2	6.4	11.3	1.9	6.0	0.7	2.1	0.8	2.6
120	4.6	8.3	6.5	11.4	1.9	6.1	0.7	2.2	0.8	2.6
140	4.6	8.4	6.5	11.4	1.8	6.2	0.8	2.3	0.8	2.7
160	4.7	8.4	6.6	11.5	1.7	6.2	0.8	2.3	0.9	2.7
180	4.7	8.5	6.6	11.6	1.7	6.3	0.8	2.4	0.9	2.7
200	4.7	8.5	6.6	11.6	1.7	6.4	0.8	2.5	0.9	2.7
220	4.8	8.6	6.6	11.7	1.8	6.4	0.9	2.5	0.9	2.8
240	4.8	8.6	6.7	11.7	1.8	6.5	0.9	2.5	0.9	2.8
260	4.8	8.7	6.7	11.8	1.8	6.5	0.9	2.6	0.9	2.8
280	4.9	8.7	6.7	11.8	1.8	6.6	0.9	2.6	0.9	2.8
300	4.9	8.8	6.8	11.8	1.9	6.6	0.9	2.7	0.9	2.8
320	4.9	8.8	6.8	11.9	1.9	6.7	1.0	2.7	0.9	2.8
340	4.9	8.8	6.8	11.9	1.9	6.7	1.0	2.7	1.0	2.9
360	5.0	8.9	6.9	12.0	1.9	6.7	1.0	2.8	1.0	2.9
380	5.0	8.9	6.9	12.0	2.0	6.8	1.1	2.8	1.0	2.9
400	5.0	8.9	6.9	12.0	2.0	6.8	1.1	2.8	1.0	2.9

4.0 Summary

Water quality studies conducted during 2020 demonstrated that under the current Project operations, DO concentrations meet or exceed the standards for Class C waters. Additionally, the macroinvertebrate community in the Middle Dam bypass reach attains Class A standards, which shows that the existing operations of the Project are providing suitable habitat for these organisms. In addition to the water quality and BMI studies, the Flow Study for Aquatic Habitat Evaluation study looked specifically at the relationship between Middle Dam bypass reach flows and the quantity of suitable habitat for several species of fish and macroinvertebrates. Both the qualitative DFA and the quantitative 1-D modeling studies showed that higher release flows provided increases in suitable habitat; however, the increases in habitat were most evident in the lower flow ranges (e.g., <100 cfs), whereas at flows exceeding 100-150 cfs, the additional gains in suitable habitat were comparatively minor. Additionally, the macroinvertebrate community has already been shown to meet Class A standards in the bypass reach.

The question of reach connectivity for the downstream passage of aquatic life was assessed visually during habitat mapping associated with the Flow Study for Aquatic Habitat Evaluation during which the Middle Dam bypass reach flow was observed to pass from one adjacent HMU to the next. When considered as an index of connectivity, the modeled mean and maximum water depths at habitat transects throughout the Middle Dam bypass reach provided thalweg depth conditions of two feet or greater under all conditions down to the measured minimum leakage flow of approximately 54 cfs. Although the mean channel depths at transects in the lower portion of the Middle Dam bypass reach were lower at depths under the 54 cfs flow condition, the presence of a channel thalweg in excess of two feet at each of the three transect locations provides an indicator of connectivity through that stretch.

Taken together, these results suggest that habitat conditions under current bypass flows or under conditions of moderately increased flows provide suitable water quality conditions and an abundance of suitable physical habitat for a healthy and functioning ecosystem for both fish and BMI as well as adequate connectivity for their downstream movement.

5.0 Variances from FERC-Approved Study Plan

RFH completed a transect-based habitat study and utilized HEC-RAS modeling to determine whether Project operations met the standard MDEP guideline for wetted width (i.e., maintain ¾ of bankfull cross-sectional area) within the Middle Dam bypass reach. RFH met with MDEP technical staff over three dates (i.e., April 8, 2021, May 20, 2021, and July 1, 2021) to review the preliminary HEC-RAS model findings, and it was agreed that because of the steep gradient of the river and the high seasonal flows that occur, the HEC-RAS modeling approach, resulting in very high ¾ cross-sectional flows, was not suitable for evaluating what minimum flows in that section are adequate to provide habitat for fish and other aquatic life. MDEP also concurred that information from the Flow Study for Aquatic Habitat Evaluation collectively with the data obtained during the 2020 water quality study (i.e., DO, macroinvertebrates), would inform decisions regarding suitable minimum flows in the Middle Dam bypass reach. The Flow Study for Aquatic Habitat Evaluation and Water Quality Study was conducted pursuant to RFH's RSP, and findings from these studies may be used by MDEP to assess the attainment of aquatic life and habitat studies per their Hydropower Project Flow and Water Level Policy.

6.0 References

Maine Department of Environmental Protection (MDEP). 2020. Comment on Pre-Application Document and Study Request Rumford Falls Hydroelectric Project (FERC No. 2333).