FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON, DC 20426
August 6, 2020

OFFICE OF ENERGY PROJECTS

Project No. 2333-091 – Maine
Rumford Falls Hydroelectric Project
Rumford Falls Hydro, LLC

VIA FERC Service

Mr. Luke Anderson
Brookfield Renewable
150 Main Street
Lewiston, ME 04240

Reference: Study Plan Determination for the Rumford Falls (P-2333-091) Hydroelectric Project

Dear Mr. Anderson:

Pursuant to 18 C.F.R. § 5.13(c) of the Commission's regulations, this letter contains the study plan determination for Rumford Falls Hydro, LLC's (Rumford Falls Hydro) Rumford Falls Hydroelectric Project located on the Androscoggin River in Oxford County, Maine. The determination is based on the study criteria set forth in section 5.9(b) of the Commission's regulations, applicable law, Commission policy and practice, and the record of information.

Background

On March 10, 2020, Rumford Falls Hydro filed its Proposed Study Plan (PSP) consisting of four studies on water quality, fishery resources, recreation resources, and historical resources in support of its intent to relicense the project. Rumford Falls Hydro held an Initial Study Plan Meeting on April 7, 2020. Comments on the PSP were filed by Commission staff, the town of Rumford, Pennacock Falls Investment LTD, the Maine Historic Preservation Commission (Maine SHPO), the Mahoosac Land Trust, the Maine Council of Trout Unlimited (Trout Unlimited), Mahoosuc Pathways, the Maine Department of Inland Fisheries and Wildlife (Maine DIFW), the Maine Bureau of Parks and Lands (Maine BPL), the Maine Department of Environmental Protection (Maine DEP), Maine Rivers, and 43 individuals.

On July 8, 2020, Rumford Falls Hydro filed a Revised Study Plan (RSP). The RSP contained three new studies on aquatic and aesthetic resources. Comments on the RSP were filed by the Maine BPL, Maine DIFW, Mahoosuc Pathways, Trout Unlimited, and the town of Rumford.

Study Plan Determination

Six of the seven studies proposed by Rumford Falls Hydro are approved as filed and one is approved with staff-recommended modifications (see Appendix A). The whitewater boating study requested by the town of Rumford is approved with staff modifications. Maine DIFW's physical habitat simulation and brown and rainbow trout telemetry studies are not required. The basis for modifying, adopting, or rejecting requested studies are explained in Appendix B. Although Commission staff considered all study plan criteria in section 5.9 of the Commission's regulations, staff only reference the specific study criteria that are particularly relevant to the determination.

Studies for which no issues were raised in comments on the RSP are not discussed in this determination. Unless otherwise indicated, Rumford Falls Hydro must complete all components of the approved studies not modified in this determination as described in the RSP. Pursuant to section 5.15(c)(1) of the Commission's regulations, the initial study report for all studies in the approved study plans must be filed by August 7, 2021.

Nothing in this study plan determination is intended, in any way, to limit any agency's proper exercise of its independent statutory authority to require additional studies. In addition, Rumford Falls Hydro may choose to conduct any study not specifically required herein that it feels would add pertinent information to the record.

If you have any questions, please contact Ryan Hansen at ryan.hansen@ferc.gov or (202) 502-8074.

Sincerely,

for
Terry L. Turpin
Director
Office of Energy Projects

Enclosures: Appendix A – Summary of determinations on proposed and requested studies
Appendix B – Staff's recommendations on requested studies

APPENDIX A

SUMMARY OF DETERMINATIONS ON PROPOSED AND REQUESTED STUDIES

Study	Recommending Entity	Approved	Approved with Modifications	Not Required
Water Quality Study	Rumford Falls Hydro Maine DEP FERC	X		
Angler Creel Survey	Rumford Falls Hydro Maine DIFW	X		
Impoundment Bass Spawning Survey	Rumford Falls Hydro Maine DIFW	X		
Flow Study for Aquatic Habitat Evaluation	Rumford Falls Hydro Maine DEP	X		
Physical Habitat Simulation Study	Maine DIFW Trout Unlimited			X
Brown and Rainbow Trout Telemetry Study	Maine DIFW Trout Unlimited			X
Aesthetic Flow Study	Rumford Falls Hydro FERC	X		
Whitewater Boating Study	Town of Rumford		X	
Recreation Study	Rumford Falls Hydro		X	
Historic Architectural Survey	Rumford Falls Hydro FERC	X		

APPENDIX B

STAFF'S RECOMMENDATIONS ON REQUESTED STUDIES

The following discusses staff's recommendations on requests for additional studies and modifications to proposed studies. We base our recommendations on the study criteria outlined in the Commission's regulations [18 C.F.R. section 5.9(b)(1)-(7)].

I. Required Studies

Recreation Study

Applicant's Proposed Study

Rumford Falls Hydro proposes to conduct a recreation study to evaluate recreation demand at the project. There is one project recreation facility—a carry-in canoe facility at Carlton Bridge, located on the eastern edge of the Swift River just upstream of its confluence with the Androscoggin River. There are 14 additional non-project recreation facilities at the project, six of which are owned by Rumford Falls Hydro. All 15 recreation facilities would be studied. The recreation study includes the following components:

(1) An inventory of existing recreation facilities to summarize current opportunities;

(2) An assessment of the condition of the existing recreation facilities;

(3) A characterization of current recreation use and future demand; and

(4) Collecting user feedback on existing recreation facilities and existing or anticipated future needs.

To characterize current use and future needs, Rumford Falls Hydro proposes to: (a) host a site visit and hold a focus group discussion; (b) conduct spot counts four days per month from late May through early September at recreation sites around the project; (c) administer a survey concurrently with the spot counts to collect information on user characteristics, frequency of visits, primary activities, perceptions of the level of use, condition of amenities, number and type of available amenities, and the need for improvements; and (d) develop an online version of the visitor survey that would allow respondents to provide survey responses electronically.

Because of poor access (i.e., only accessible by boat) and no visibility of areas used for recreation on the island that can be viewed from shore, Rumford Falls Hydro does not propose to include Wheeler Island[1] in the stakeholder site visit, recreation use observations, or visitor surveys as it proposes to do at the other recreation facilities around the project.

Comments on the Study

Sampling Effort

In its comments on the RSP, the Maine Bureau of Parks and Lands (Maine BPL) suggests that some refinements to the sampling plan could help ensure robust and informative user counts, observations, and visitor surveys, but those refinements are best determined after the proposed site visit and focus group discussions. Maine BPL states it wants to participate in the site visit and focus group discussion and will provide its suggested refinements as soon as possible after the site visit and focus group meeting to allow ample time for finalizing data collection details prior to the start of the sample period in late May. Maine BLP suggests that the campsite section of the inventory and assessment form be replaced with an aesthetic question because there are no overnight recreation facilities in the project area or vicinity.

Staff Discussion and Recommendations

While there are no formal camping facilities at the project, Rumford Falls Hydro reported in its pre-application document that Wheeler Island is "a popular recreational area used by locals for camping and other activities." Understanding the conditions under which camping occurs on the island would help inform potential recommendations to meet current and future recreation needs. Therefore, we do not recommend removing the camping question from the inventory and assessment form as recommended by Maine BPL.

In order to have an effective discussion of Wheeler Island at the focus group meeting, we recommend that Rumford Falls Hydro use photos of Wheeler Island, as well as aerial imagery, to facilitate discussions regarding use, access, potential improvements, etc. These photos could include where boaters access the island and any evidence of camping or other uses on the island. We also recommend a specific question relating to usage and improvements on Wheeler Island be added to the online survey. The

[1] Wheeler Island is a small, forested island located in the Upper Dam impoundment. It is not a project recreation facility but is owned by Rumford Falls Hydro and used for recreation purposes by the public.

additional effort would ensure that recreational use and needs on Wheeler Island are assessed and would not increase the cost of the study.

In addition, we recommend that Rumford Falls Hydro add a specific question regarding aesthetics to the facility inventory and assessment form because aesthetics is part of a site's condition and evaluating aesthetics can be achieved with minimal additional effort.

Although refinements to an approved study as suggested by Maine BPL are possible, such changes may need to be reported as variances in the initial study report and the report would need to explain the basis of the variance. The Commission would determine whether the modified study fulfills the study objectives if there are disagreements or other requested study modifications that result from the variances.

Focus Group Meeting and Site Visit

Applicant's Proposed Study

Rumford Falls Hydro proposes to visit 14 recreation sites (excluding Wheeler Island) with interested stakeholders and hold a focus group meeting on the same day. During the site visit, participants would discuss the key recreation assets of the facilities, seasonal uses, historic and present uses, access, suitability for use of existing resources, and potential needs for rehabilitation and improvements at the facilities. The site visit would take place in spring 2021. Rumford Falls Hydro would summarize the results of the site visit and focus group discussion into a summary document and share it with the meeting participants. Information from the summary document would be incorporated into the larger recreation study report.

Comments on the Study

In its July 27 comments on the RSP, Mahoosuc Pathways argues that the allotted time for the site visit and discussion is too short to allow for adequate travel time between sites, discovery, and discussion. Mahoosuc Pathways states the site evaluations alone will take in excess of a full day. Mahoosuc Pathways adds that no provision has been made to evaluate sites other than those identified in the recreation study plan, nor is it apparent that the focus group has the freedom to identify additional sites within the project or project vicinity for site evaluation and inclusion in the study plan.

Mahoosuc Pathways recommends that the focus group be initially convened in fall of 2020 to discuss merits and issues with the listed sites to be evaluated. Information obtained from the discussion would be used as an individual site evaluation preview guide and help to determine whether technical evaluations and data will be required.

Mahoosuc Pathways argues that the focus group should have the authority to recommend additional sites that would be added to the 2021 site evaluation and survey list (example: trails on the west and east banks of the Swift River, Mt. Ziron trail head, downstream boat launches in Mexico and Dixfield, etc.). After these discussions, site evaluation visits would be scheduled in consultation with the focus group participants based on a reasonable estimate as to how long each evaluation is likely to take place, allowing for a thorough inspection of each site and factoring in transport time between sites. Mahoosuc Pathways believes multiple evaluation and discussion days should be scheduled as needed to complete the task.

Staff Discussion and Recommendations

Scheduling of Site Visit

Allotting one day (8 hours) to visit all 14 recreation sites would provide participants less than one hour to get to the sites, evaluate conditions, and discuss recreation needs. Adding a focus group meeting following the site visit would likely require agency and city representatives to extend their day past normal duty hours and could prohibit participation by interested public that could not afford to be away from their jobs and homes for such extended periods. Therefore, it is unlikely that the study plan objectives could be achieved as proposed by Rumford Falls Hydro (section 5.9(b)(1)). We recommend that Rumford Falls Hydro coordinate the schedule of the site visit and focus group meeting with interested participants to the extent practicable. Rumford Falls Hydro should plan to provide at least one hour at each of the 14 recreation sites to provide ample time to get to each of the sites (estimated to be between 5 and 15 minutes), evaluate conditions, and discuss recreation needs. While participants may not need to stay at a site for the full hour, planning for that time would provide a buffer for transport and more thorough discussions at some sites than others. Given logistical considerations, this would likely require at least two days for the site visits. The focus group meeting may need to be held on a separate day from the site visits to allow participants to consider what they saw during the site visits and better schedule their other responsibilities.

Sites to be Visited

The study objectives are to inventory and assess existing recreation facilities at the project and determine how well they are meeting recreation demands. Mahoosuc Pathways has had ample time to identify the recreation sites that it believes should be considered in the evaluation. The additional sites it now proposes to be evaluated (trails on the west and east banks of the Swift River, Mt. Ziron trail head, downstream boat launches in Mexico and Dixfield, etc.) are located well outside the project boundary, do not affect project recreation, and are not affected by project operation due to their

distance from the project. The trails on the west and east banks of the Swift River are located on a different river, approximately ½ mile north of the project. The Mt. Ziron trail head is located approximately 200 ft. south of the project boundary, on the southern side of South Rumford Falls Road, and the trail does not include any project lands or waters. We are not aware of a boat launch located in Dixfield, which is located approximately five miles downstream from the project. Rumford Falls Hydro already intends to include the Mexico boat launch in its sampling efforts. Therefore, there is no basis for adding these sites to the inventory or assessment.

Water Access Sites

While Rumford Falls Hydro intends to discuss the need for additional river access opportunities relative to the numerous boat launches on the Androscoggin River upstream and downstream of the project as part of its recreation study, the study plan is not clear on how it would identify possible locations for additional access and their site limitations, if the need for such improvements are warranted. Additional river access was a common recommendation raised during scoping and study plan development because of the existing long portages, poor trails, and challenging terrain and safety concerns. Therefore, we recommend that the site visits specifically identify and discuss possible locations for boating access improvements around the upper development.

The additional information obtained from scheduling more time for the site visit and focus group meeting and evaluating access improvements around the upper dam is worth the added cost to conduct the study ($5,000).

Rumford Falls Trail

Applicant's Proposed Study

Rumford Falls Hydro proposes to limit the inventory and assessment, stakeholder site visit, recreation observations, and in-person visitor surveys of the Rumford Falls Trail to the portion of the trail that occurs on Rumford Falls Hydro land.

Comments on the Study

In its July 27, 2020 comments on the RSP, Mahoosuc Pathways states, without elaboration, that limiting the assessment to only the portion of the Rumford Falls Trail that is solely on the land Rumford Falls Hydro owns is unacceptable. Mahoosuc Pathways believes that the condition of the entire Rumford Falls Trail needs to be "evaluated and included in remediation projects."

Staff Discussion and Recommendations

Rumford Falls Trail is a 1.6-mile loop consisting of sidewalks and a gravel road. The trail begins at the Rumford Information Visitor Center off Bridge Street in downtown Rumford near the Middle Dam impoundment. Heading in a counter-clockwise direction from the visitor center, the route follows the sidewalk along U.S. Route 2 for 0.5 mile, then heads east onto South Rumford Road where it crosses the Androscoggin River on a high bridge that offers views of the dam and the town of Rumford. On the opposite side of the bridge, a gated gravel road heads northwards (downstream) parallel to the river. Along this section are lookouts that provide views of the dam and Rumford Falls. After approximately 0.7 mile, the gravel road intersects Bridge Street (ME Route 108). The trail heads left on the sidewalk and continues over two additional bridges and past Veteran's Park before returning to the visitor center parking lot (Maine Trail Finder 2019). Due to potential rockslides along the gravel road portion of the trail, much of the gravel road has been closed to visitors since 2015.

Rumford Falls Hydro does not explain why it only proposes to evaluate conditions on the portion of Rumford Falls Trail that is on land it owns. Nonetheless, Rumford Falls Hydro's proposal to collect recreation observations and visitor surveys at four recreation sites along the trail (J. Eugene Boivin Park, Veteran's Park, Rumford Information Center, and at the trailhead near the South Rumford Road) should provide sufficient information about the use of the Rumford Falls Trail except along the gravel road portion of the trail. Because most of the trail consists of public sidewalks along roads, more intensive surveying of these portions of the trail would not likely provide useful information about project recreation needs.

The project record offers little to explain why the gravel trail portion of Rumford Falls Trail is unsafe and what could be done to reopen the trail. To better understand the public safety considerations and limitations and the potential benefits and use of opening the gravel portion of the trail to public use, we recommend that the site condition assessment of the Rumford Falls Trail specifically identify any safety and access considerations that limit use of any portion of the trail and identify measures that would be necessary to reopen the trail. The additional information would not increase the costs of the study but would provide information to determine if reopening the trail is warranted and at what cost.

Whitewater Boating Study

Requested Study

The town of Rumford requests that Rumford Falls Hydro conduct a whitewater recreation 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 boat launch

in the town of Mexico. The town of Rumford believes the study is needed because water quality in the project reach has improved significantly since the current license was issued in 1994 and therefore presents new opportunities for water-based recreation that would assist the economic development of the Rumford area.

The town requests that Rumford Falls Hydro hire a consultant to conduct the whitewater recreation study and produce a report that addresses: (1) the feasibility and safety of whitewater recreation in the bypassed reach, (2) satisfactory flow rates (current and future) for safe whitewater boating, and (3) economic benefits that whitewater boating would provide the town. If satisfactory conditions for whitewater recreation are found, then the town of Rumford requests that Rumford Falls Hydro develop and provide "operation criteria" for providing whitewater recreation at the project.

Applicant's Response to Study Request

Rumford Falls Hydro is opposed to the study because it does not believe whitewater activities are safe or commercially feasible at the project. In support of its assertion, Rumford Falls Hydro states that the whitewater run would provide a very limited opportunity that is unlikely to be economically viable as a commercial run because the run is only approximately one mile in length and includes one short rapid. Rumford Fall Hydro also states that there are other more desirable whitewater opportunities nearby on the Swift River.[2] Rumford Falls Hydro states that current and likely future project operations would not be safe for whitewater use because the project bypassed reach serves as the spillway for the lower development which could subject boaters to sudden high flows between 1,500 and 3,000 cfs if the units trip offline. Rumford Falls Hydro reasons that the steep gradient of the Middle Dam bypassed reach and shorelines, as well as other factors such as width of the river and potential to further manage risk associated with potential obstructions that may be present in that reach, could significantly change the whitewater classification of the reach during a sudden release of high flows and thus could expose paddlers or tubers to unanticipated challenges and hazards. Rumford Falls Hydro adds that the steep banks, industrial setting, and gated and fenced private property adjoining this reach create access issues for potential boaters and rescue personnel.

Comments on the Study

[2] The 13-mile reach of the Swift River from the town of Roxbury to the Rumford Falls Project's Carry-in Launch on the Swift River near its confluence with the Androscoggin River is an established boating reach classified as Class II-III whitewater by American Whitewater (2020).

On July 27, 2020, the town of Rumford filed comments on the RSP reiterating the need for the study. The town of Rumford states that in its view, Rumford Falls Hydro lacks the expertise to judge whether the bypassed reach would provide a commercially viable whitewater business opportunity. The town of Rumford adds that comments from two official Maine guides, with experience in whitewater boating, indicate that the bypassed reach would provide a commercially viable whitewater boating opportunity.

Staff Discussion and Recommendations

Project operations reduce the flows in the lower bypassed reach to as low as 21 cfs for much of the recreation season, which may affect whitewater boating opportunities below the middle dam. The reach below the Middle Dam to the powerhouse has a river gradient of approximately 1.8 percent, contains at least one set of rapids that experienced whitewater users believe would be used by boaters if sufficient flow is available, and is located close to potential local boaters (i.e., within the town of Rumford). However, there is no information about what flows would be suitable for whitewater boating. The lack of information about the type of whitewater opportunities that might be provided in the bypassed reach, including the safety and quality of those experiences, makes it difficult to assess the benefit and cost of potentially enhancing whitewater opportunities at the project, including comparing those benefits to those that are provided by the Swift River (section 5.9(b)(4) and (5)). A whitewater boating study would affirm whether and under what conditions boating and tubing would be unsafe.

The methodology set forth in Whittaker et al. (2005) *Flows and Recreation: A Guide for River Professionals* is commonly used in whitewater flow studies at hydropower projects and is consistent with generally accepted practices in the scientific community (section 5.9(b)(6)). Whittaker et al. (2005) includes a phased approach to evaluating whitewater boating opportunities when, as is the case here, opportunities are flow-dependent but lack precise information about flow needs, project effects, and there is no history of previous boating use. These methods can also account for other recreation opportunities that are flow dependent that may conflict with boating flows such as flows necessary for fisherman.

Rumford Falls Hydro is proposing to follow the Whittaker et al. (2017) to examine the aesthetic character of water flowing over Rumford Falls (Aesthetic Flow Study) through controlled flow releases. It is also proposing to release four target flows (the existing 21-cfs minimum flow required by the current license, and three higher flows, chosen in consultation with Maine DIFW) to examine aquatic habitat in the Middle Dam bypassed reach (Flow Study for Aquatic Habitat Evaluation). Because the phases of Whittaker et al. (2005 and 2017) (a literature review, a hydrology assessment, structured interviews/discussions with interested stakeholders, controlled flow releases) are similar for an aesthetic study and a boating study, there would be efficiencies gained from

coordinating the Aesthetic Flow Study and the Aquatic Habitat Flow Study with a Whitewater Boating Study. However, because the study objectives are different, additional meetings/discussion and potentially, field studies will be required.

Because of the lack of information to address boatable flows in the bypassed reach and potentially competing uses such as angling, we recommend that Rumford Falls Hydro conduct a whitewater boating study following the methods described in Whittaker et al. (2005). As provided in Whittaker et al. (2005), the on-water phase of the controlled flow release study may not be warranted if land-based reconnaissance efforts determine the reach lacks suitable conditions to support whitewater boating. Given Maine DIFW's objective of improving angling opportunities in the bypassed reach as discussed above regarding the Recreation Study, we also recommend that the study consider the flows needed to support angling in the bypassed reach and how whitewater releases may influence those opportunities. Whittaker et al. (2005) follows similar methods to consider competing recreational opportunities. We estimate the study would cost $30,000 to complete.

Regarding the town of Rumford's request for an economic analysis of whitewater recreation opportunities, the Commission does not typically require such analyses. The Federal Power Act does not require the Commission to place a dollar value on nonpower benefits nor does the Commission evaluate these resources in terms of their economic value. As the Commission has stated previously "for non-power resources such as aquatic habitat, fish and wildlife, recreation, and cultural and aesthetic values, to name just a few, the public interest cannot be evaluated adequately only by dollars and cents."[3] Rather, our analysis includes the effects of the proposed action on public access to existing recreation opportunities at the project in terms of recreational use, access, and demand and weighs those public benefits against the developmental and non-developmental benefits provided by the project.

II. Studies Not Required

Physical Habitat Simulation Study

Requested Study

In its study request filed on January 28, 2020, Maine DIFW requested that Rumford Falls Hydro conduct a physical habitat simulation (PHABSIM) study in the

[3] *Hydroelectric Licensing under the Federal Power Act*, 104 FERC ¶ 61,109 at pp. 45-46 (2003), *order on reh'g* 106 FERC ¶ 61,037 (2004) (citing *Great Northern Paper, Inc.*, 85 FERC ¶ 61,316 at pp. 62,244 – 62,245 (1998).

bypassed reach between the Middle Dam and the project's downstream powerhouse. Maine DIFW states that the goal of this study is to evaluate minimum flow alternatives to assess flow-aquatic habitat relationships to determine which flows maximize aquatic habitat for trout and smallmouth bass and assess how minimum flow alternatives affect recreational fishing opportunities (i.e., angler safety) in the bypassed reach.

Specifically, Maine DIFW's requested study would utilize a PHABSIM modeling analysis to quantify flow and habitat relationships expressed as Weighted Usable Area for adult rainbow trout, brown trout, and smallmouth bass. The modeling analysis would include developing habitat suitability indices (HSI) for both trout species and smallmouth bass. Additionally, MDIFW requested to be present during the incremental flows to visually assess and rate alternative minimum flows for effects on aquatic habitat and safe recreational angling opportunities in the bypassed reach.

Applicant's Proposed Study

In its RSP, Rumford Falls Hydro argues that because most of the bypassed reach consists of pool habitat that would be insensitive to flow changes, the information obtained from a traditional PHABSIM study would be limited. In the alternative, Rumford Falls Hydro proposes in its Flow Study for Aquatic Habitat Evaluation (Flow Study) to evaluate flow-aquatic habitat relationships in the bypassed reach using a semi-quantitative demonstration flow assessment. The study would include mapping aquatic habitat in the bypassed reach and establishing 3-5 transects chosen in consultation with Maine DIFW in representative mesohabitats (identified via habitat mapping) in the reach. Rumford Falls Hydro would release four target flows, including the existing 21-cfs minimum flow required by the current license, and three higher flows chosen in consultation with Maine DIFW. A field team would measure depth, velocity, substrate type, and cover type at multiple points along each transect for each flow. Rumford Falls Hydro would develop habitat suitability criteria (HSC) for each species in consultation with Maine DIFW to quantify how much habitat is suitable within each representative mesohabitat at each test flow. The HSC would be based on a binary system where habitat is quantified as either suitable or unsuitable.

Comments on the Study

In its July 24, 2020, comments on the RSP, Maine DIFW states that it continues to request a flow study using PHABSIM and incorporating HSI for adult trout and smallmouth bass. Maine DIFW again states that it would like to be present during the incremental flow releases to do some qualitative analysis and to evaluate angler wade-ability/safety at various flows.

Discussion and Staff Recommendation

While the objectives of Maine DIFW's requested PHABSIM study and Rumford Falls Hydro's proposed semi-quantitative Flow Study are the same (section 5.9(b)(1)), and both would produce results that quantify the amount of habitat available for each target species at a given minimum flow, there are differences between the studies that primarily include: (1) the number of minimum flows to be evaluated, (2) the level of precision afforded by the different methods, and (3) the associated level of effort and cost.

Maine DIFW's requested PHABSIM study would include developing hydraulic and fish habitat models that would allow for a more comprehensive and precise evaluation of flow-aquatic habitat relationships for fish in the bypassed reach. This is because the models can interpolate between, and extrapolate beyond, the test flows measured in the field. A PHABSIM model would allow the study to more efficiently evaluate many different minimum flow alternatives if desired. PHABSIM would also allow for incorporation of more precise HSIs that are based on continuous HSC rather than binary HSC. Continuous HSC incorporate the habitat preferences for fish based on a scale where 0 is not suitable and 1 is the most suitable, but also takes into account that there is some variability in habitat quality within this range (i.e., not all suitable habitat is of the same quality/suitability).

Rumford Falls Hydro's proposed study would be based entirely on field measurements collected at the four proposed test flows and would not include developing hydraulic or fish habitat models. This would limit the number of minimum flow alternatives that can be evaluated by the study to only those measured in the field. In addition, Rumford Falls Hydro's proposed study would rely on binary HSC, which is simpler and only considers whether habitat conditions fall in the range of suitable habitat for a given species, without considering that within this range there are differences in habitat quality/suitability.

Maine DIFW did not provide an estimated cost of its recommended PHABSIM study but states that it would likely require several days of field work and subsequent analyses. Rumford Falls Hydro estimates that its semi-quantitative Flow Study would cost approximately $35,000 but did not estimate the level of effort. We estimate that Maine DIFW's PHABSIM study would require twice the man-hours of Rumford Falls Hydro's study mostly due to the model development and verification required of a PHABSIM study and would have an estimated cost between $75,000-$100,000.

Overall, while Rumford Falls Hydro's proposed study is simpler and less precise than Maine DIFW's requested PHABSIM study, either method would provide adequate information to inform staff's analysis of flow-aquatic habitat relationships for the three target species in the project's bypassed reach (section 5.9(b)(4)). Because Rumford Falls

Hydro's flow study would provide sufficient information to inform staff's analysis at a lower cost (18 CFR section 5.9 (b)(7)) than Maine DIFW's requested PHABSIM study, we do not recommend requiring Rumford Falls Hydro to conduct a PHABSIM study.

Rumford Falls Hydro does not address MDIFW's request to be present during the incremental flow releases to visually assess and rate alternative minimum flows for effects on aquatic habitat and safe recreational angling opportunities in the bypassed reach. Coordinating the flow releases with Maine DIFW to the extent practicable would allow Maine DIFW to use its expertise in judging angling opportunities. While Maine DIFW's judgement of suitable angling flows is valued, other interested participants may view opportunities differently. Therefore, we recommend that fishing opportunities also be considered as an element of the Whitewater Boating Study discussed above.

Brown and Rainbow Trout Telemetry Study

Proposed Study

Maine DIFW requests that Rumford Falls Hydro conduct a telemetry study to (1) evaluate the movement of annually stocked brown and rainbow trout immediately above and below the dams, and how these movements are influenced by project operation; and (2) determine if there have been changes in project discharges over time that could be contributing to displacement of these species over their historically more robust levels. Maine DIFW states that as a result of its stocking efforts, the Androscoggin River in the Rumford area supports a seasonal brown and rainbow trout put-and-take fishery, with some holdover fish. Maine DIFW states in its study request that "historically, the brown and rainbow trout fisheries were more robust in the upper Androscoggin River. However, around 2005 these fisheries collapsed, and have been unable to rebound despite annual MDIFW stocking. It was believed that many of the brown trout stocked in the impoundment migrated to the upper river reaches, and perhaps they are no longer surviving or exhibiting that behavior."

Specific goals and objectives of the proposed study include:

- to collect biometric data to characterize brown and rainbow trout population dynamics, movements and behaviors of newly stocked brown and rainbow trout, and movements and behaviors of older-age brown and rainbow trout;

- to determine the effects of project operation on the movement and behaviors of stocked brown and rainbow trout; and

- to aid fishery managers in determining the cause of the decline in brown and rainbow trout fisheries upstream and downstream from the project.

In its January 28, 2020, study request and in its June 8, 2020, comments on the proposed study plan, Maine DIFW argues that project operations may influence trout survival and returns to anglers through mortality from turbine entrainment and lack of suitable flows and warm water temperatures in the bypass reach which likely prevents trout from utilizing that very fishable area. In addition, stocked trout may be attracted to the powerhouse outflow where there is little to no angler accessibility. Maine DIFW states that the telemetry study is necessary for it to better understand why both brown and rainbow trout fisheries in the upper river declined and how best to manage the newer fishery below the project, whether by determining if it is a function of brown trout life history, or if project operations are influencing the fisheries in ways yet to be determined. Maine DIFW states that "if trout behavior(s) are problematic then the resource agencies and Rumford Falls Hydro can work towards viable solutions such as smaller bar grating, reduction in attraction flows towards the canal during certain times, stocking changes (i.e. timing, location, fish size), bypass flow improvements, and the development of better angler access."

Applicant's Response to Study Request

Rumford Falls Hydro is opposed to the study because it believes that there is no nexus between project operation and effects on the presence or abundance of seasonally stocked trout in the project area. Rumford Falls Hydro asserts that Maine DIFW has provided no evidence to suggest that the trout fishery declined in the Rumford reach and the project has not altered its run-of-river operations with limited reservoir drawdowns since 1994 when it was relicensed. Consequently, Rumford Falls Hydro maintains that the information provided by Maine DIFW does not provide a clear connection between project operation and the movements of hatchery-reared trout. Further, Rumford Falls Hydro states that it is unclear how a telemetry study of fish stocked in the Androscoggin River outside of the FERC project boundary[4] would be used to develop future license requirements.

Comments on the Study

In its July 23, 2020, comments on the RSP, Maine DIFW reiterated the need for the telemetry study and the reasons for the study as outlined above. In its July 27, 2020, comments on the RSP, Trout Unlimited also reiterated its support for the telemetry study, noting that such studies should be considered common practice as they have been conducted on Rapid River/Umbagog Lake and Magalloway River/Umbagog Lake,

[4] Maine DIFW annually stocks 3,000 hatchery-reared trout upstream of the project impoundment in Hanover and 1,850 trout downstream of the project boundary in the town of Mexico.

Moosehead Lake, Brassua Lake and in reservoirs or tailwaters of hydroelectric projects whose licenses are currently held by Brookfield.

Discussion and Staff Recommendation

Since 1994, the Rumford Falls project has operated as a run-of-river facility and limited drawdowns of the project impoundments to no more than one foot as required by its current license. These license requirements have resulted in a stable aquatic environment both upstream and downstream of the project. Flow and water levels have been relatively constant for decades and temperature measurements from the project impoundments show that the Androscoggin River in the project area maintains water temperatures that meet state requirements for aquatic habitat. For these reasons, we have no reason to suspect or conclude that project operations are adversely affecting trout movement or survival ((18 CFR 5.9(b)(5)).

Regardless, Rumford Falls Hydro's proposed water quality study, angler creel survey study, and flow study for aquatic habitat evaluation will provide information to determine whether additional flows are needed in the bypassed reaches to improve aquatic habitat for trout and fishing. Further, there is adequate information (trash rack spacing, turbine design and flow) to assess potential project-related turbine entrainment and mortality ((18 CFR 5.9(b)(4)). For all of these reasons, there is no project-specific basis for requiring the brown and rainbow trout telemetry study recommended by Maine DIFW.

- **Literature Cited**

American Whitewater. 2020. Swift River Rt 17 Bridge to Mexico. Accessible at: https://www.americanwhitewater.org/content/River/detail/id/913/ (Accessed July 29 2020).

Maine Trail Finder. 2019. Rumford Falls Trail. Accessible at: https://www.mainetrailfinder.com/trails/trail/rumford-falls-trail. (Accessed July 29 2020).

Whittaker, D., B. Shelby, and J. Gangemi. 2005. Flows and Recreation: A Guide to Studies for River Professionals. Accessible at: https://www.nps.gov/ncrc/programs/hydro/flowrec.pdf

Whittaker, D. and B. Shelby. 2017. Flows and Aesthetics: A Guide to Concepts and Methods. Accessible at: https://www.hydroreform.org/sites/default/files/Flows%20and%20aesthetics--

%20A%20guide%20to%20concepts%20and%20methods%202017_Final_web.pdf