

March 18, 2022

Luke T. Anderson
Manager, Relicensing
Brookfield White Pine Hydro LLC
150 Main Street
Lewiston, ME 04240

Sent via email to Luke.Anderson@brookfieldrenewable.com

RE: City of Auburn, City of Lewiston, American Whitewater, Appalachian Mountain Club, Grow L-A, Maine Council of Trout Unlimited Comments In Response to the Draft Study Plan (DSP) for the Lewiston Falls Hydroelectric Project (FERC No. 2302)

Dear Mr. Anderson:

The City of Auburn, City of Lewiston, American Whitewater, Appalachian Mountain Club, Grow L-A, and Maine Council of Trout Unlimited (“Cities and NGOs”) submit the following Comments in response to the filing of the Draft Study Plan for the Lewiston Falls Hydroelectric Project (FERC Project No. 2302) by Brookfield White Pines Hydro LLC (BWPH) dated February 14, 2022.

The above named Cities and NGOs submitted our Comments and Study Requests In Response to the Notice of Intent to File a License Application, Filing of Pre-Application Document (PAD), Commencement of Pre-Filing Process, and Scoping; Request for Comments on the PAD And Scoping Document, and Identification of Issues and Associated Study Requests Regarding the Lewiston Falls Hydroelectric Project (FERC No. 2302) on December 30, 2021. Our questions and concerns are keyed to the study requests under consideration.

Study Requests DSP Comments

This phase of the FERC process is dedicated to identifying the studies needed to inform the licensing process so that licensing decisions can be based on current information and the best available science. We appreciate that Brookfield has responded with a Draft PSP that incorporates some of our requests for information that will inform the NEPA process. The three study requests that we submitted are essential to understanding operational impacts of the future management of the Lewiston Falls Project. The study requests submitted by resource protection agencies that we supported are important as well. We respectfully request that Brookfield consider further comments and modifications as you prepare your final study plan.

Phase I Archaeological Survey

Thank you for proposing Phase I Archaeological Survey requested by the Maine Historic Preservation Commission, Eel studies requested by the National Marine Fisheries Service and Maine Department of Marine Resources, and the flow studies requested by the National Marine Fisheries Service. This stakeholder group sees substantial value in those studies as they relate to quality of life for our residents, recreational fisheries, and overall public health.

Special Dissolved Oxygen Level Study

The Cities and NGOs proposed a Special DO Study. [Lewiston Falls Hydroelectric Project (FERC No. 2302) dated December 30, 2021] Its goals and objectives are:

- *“To monitor dissolved oxygen (DO) below the Lewiston Falls Project to gather data on the effects of water releases over the falls as opposed to through-run through the turbines. Before the Lewiston Falls project was licensed, the falls were watered about 40% of the year, as opposed to the current levels of about 12%. These are by far the most scenic falls in southwestern Maine and arguably the entire state. The cities of Lewiston and Auburn are requesting aesthetic resources and river access and recreational Flow studies that will consider options for periods when additional flows are directed over the falls. Data on the effects of these releases on DO is needed. It should be noted that while the Lewiston Falls Project is operated as a run-of-river project, it is in effect a run-of-release project, with flows also dependent on releases from the Gulf Island Pond Project located two miles upstream.*
- *To monitor DO further downstream below where the Industrial Canal flows enter the river. Past flows were robust in order to power generation by the mills. Current flows are only 50 cfs with periodic higher flows to flush the canals.”*

The study request went on to note:

- “While both of these waters are outside of the project area, both are affected by project operations and other projects operated by the Applicant.
- Of additional note is the fact that The Maine Board of Environmental Protection recently recommended approval of the water quality classification of the reach from Worumbo Dam downstream from Class C, Maine lowest water quality classification, to class B.”

Brookfield chose not to include this study in its Draft Study Plan, stating:

- “Downstream DO conditions will be monitored as part of the MDEP-requested water quality study and therefore not proposed as a separate study [DSP, page 3-1].

Project relicensing studies normally incorporate DO studies at two locations: in the impoundment and at a location agreed upon by the applicant and MDEP below the dam. The DSP proposes three locations: the impoundment, a tailwater location and a ledge pool site [DSP, page 2-3]. The Cities and NGOs do not object to these locations.

In addition to a site in the impoundment and one below the dam, DO studies are required in bypass reaches as well: *“Sampling should also occur in any bypassed segment of the river created by the project.”* [DEP SAMPLING PROTOCOL FOR HYDROPOWER STUDIES December 2017 provided as Attachment A] The Lewiston Falls Project has two bypass reaches, one is Great Falls that the ledge pool sonde will cover, the other the Industrial Canal. While it is arguable that the Industrial Canal is outside the project area, its flows are clearly interconnected with project operations. As previously noted [City of Auburn Letter dated January 11, 2022, Subject: Comments of the Cities of Lewiston and Auburn Maine Regarding the Gulf Island - Deer Rips/Androscoggin No. 3: Article 407: Project Operation and Flow Monitoring Revised Plan Project (P- 2283) and operational connection to the relicensing of Lewiston

Falls/Monty Hydro (P-2302)] the Lewiston Falls Project is run-of-release, not run-of-river, because its operation is so affected by operations at the Gulf Island Project with its large storage capacity.

For these reasons, the Cities and NGOs request that sondes should be deployed at two additional locations: the outflow below Gulf Island dam and above Dresser Rips near the Maine Turnpike Overpass. These locations are imperative for true ambient DO from Gulf Island Dam on down for the next 3-year period and confirmed with DEP. The sampling period should extend to low flow July, August, September and October. Without this information in addition to that from the sondes from the three other sites, analysis of DO cannot be formulated without consideration of Gulf Island Dam releases that actually controls “run-of-river” down river to Brunswick.

The analysis of the DO data included in the Special DO Study is essential to informing the relicensing. The Lewiston Falls Project dams are not proposed for removal and will remain in operation for the foreseeable future. The central challenge of the relicensing is to manage the project efficiently to ensure that the use of the resource is maximized and so that all project designated uses are served. For the Class C waters below Lewiston Falls, these are:

“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 in and on the water; industrial process and cooling water supply; hydroelectric power generation, except as prohibited under Title 12, section 403; navigation; and as a habitat for fish and other aquatic life.” [MSRA 38 § 465 ¶ 4].

There is potential conflict between hydroelectric power generation, fishing, and habitat for aquatic life. Only by understanding how different flow conditions affect DO and overall water quality can these needs be balanced and use of the resource optimized. The test flows that will be conducted as part of the Aesthetic and Recreational Studies will provide a range of flow scenarios, and it makes little sense not to analyze how the different flow components affect DO and resultant water quality downstream. **Only by gaining a thorough understanding of the flow dynamics of this complex project and their effects on DO levels will the process be in a position to determine appropriate terms and conditions for continued project operations that will optimize the project’s ability to accommodate all designated uses described by Maine Statue for Class C waters.**

The waters below Lewiston Falls are special because they are designated critical habitat for the federally endangered Atlantic salmon. The importance of this was recently emphasized by the recent NOAA Fisheries Biological Opinion that stated:

“It is possible that operation of the Lewiston Falls could affect migrating Atlantic salmon by inadvertently trapping or stranding them in the various pools downstream of the Projects, particularly during flashboard replacement and/or during and after spill events. To reduce the potential effects of stranding on Atlantic salmon and other fish species, the licensee will monitor downstream pools after significant spill events and during flashboard replacement and collect any stranded Atlantic salmon and release them back into the river..” [NATIONAL MARINE FISHERIES SERVICE ENDANGERED SPECIES ACT BIOLOGICAL OPINION for Proposed amendment of the license for the Brunswick (FERC No. 2284) and Lewiston Falls (FERC No. 2302) Hydro Projects, pages 108 – 109 ([Accession # 20211228-5096](#))

American eels are a species of concern and this is reflected in the study requests submitted by the Maine Department of Marine Resources ([Accession # 20220114-5002](#)). Eels are better able to ascend the Great Falls when water is being directed over them. This is another factor deserving consideration in deciding future terms and conditions for project operations.

Lastly, the reach downstream is currently being considered for upgrading the water quality classification from C to B, with C being Maine's lowest water quality classification. DO is an important consideration for the water classification upgrade. Optimizing DO levels is a major consideration for project operations going forward. The Cities and NGOs strongly support the upgrade of the water quality classification of the lower Androscoggin River.

For these reasons, it is essential that the additional sondes be deployed, DO data collected, and analyzed in relation to releases over Great Falls and through the industrial canals. The Special DO Study cannot be delayed because the test releases over Great Falls will likely not be done over more than one summer. We urge that Brookfield include the Special DO Study as a vital addition to the Aesthetic Study and the Recreational Study that you appropriately included in the DSP.

Aesthetic Study

We appreciate the proposed stakeholder group's level of involvement in structuring the study and look forward to working with you on this. We have the following comments and requests as you prepare a final plan.

1. Please confirm that this study can occur while the continuous water quality monitoring is in place below the falls. We ask that you monitor water quality during this study's release of water over the falls at station LF2 and provide an analysis of any changes during the releases as part of the water quality study proposed in the DSP.
2. BWPH states that the study *"does not include an aesthetic assessment...of the Lewiston Canal system, as the canal system is no longer owned by BWPH and is no longer part of the FERC-licensed project."* The project has two bypassed reaches that are impacted by project operations. Those include the Lewiston Falls around water quality monitoring station LF-3 and the canals in Lewiston. Please modify the proposed Aesthetic Study to include consideration of impacts of operations on the canals. Studies and evaluations must not be limited to the license boundary area when operational impacts extend beyond the project area. The Project operations directly impact the canal system, as flow rates into the canals directly impact both the aesthetics of these waterways and the outflows to the Androscoggin River. The project is "run-of-release" NOT "run-of-river." The vast majority of flows and water levels are controlled upstream by the Island Pond Project. This fact was noted recently by the City of Auburn. [City of Auburn Letter dated January 11, 2022, Subject: Comments of the Cities of Lewiston and Auburn Maine Regarding the Gulf Island - Deer Rips/Androscoggin No. 3: Article 407: Project Operation and Flow Monitoring Revised Plan Project (P- 2283) and operational connection to the relicensing of Lewiston Falls/Monty Hydro [(P-2302)([Accession # 20220111-5111](#))] Planning efforts by the City envision the canal system as an integral part of providing economic and recreation opportunities. Simard-Payne Memorial Park is essentially surrounded by the canal system and river. The public has the right to experience the visual effects of water flows from

various vantage points. Therefore, the Aesthetics Study must include the canals to evaluate potential effects of Project operations on recreation sites, facilities and uses.

River Access and Recreational Flow Study

The Cities and the NGO's appreciate the proposed stakeholder group's level of involvement in structuring the study and look forward to working with BWPH. The stakeholders support this effort and request that evaluations and site visits be expanded to informal recreation sites not previously identified. Both Lewiston and Auburn are looking for the ability to consider other possible areas within and outside the project boundary that may be identified as areas to improve, expand, or create improved access. We have the following comments and requests as you prepare a final plan.

1. Please confirm that this study can occur while the continuous water quality monitoring is in place below the falls. We ask that you monitor water quality during this study's release of water over the falls at station LF2 and provide an analysis of any changes during the releases as part of the water quality study proposed in the DSP.

2. BWPH states *"the primary goal of the proposed (recreation) study is to...evaluate potential effects of Project operations on recreation sites, facilities and use."* However, it *"does not include assessment of recreation use of, or sites and facilities associated with, the Lewiston canal system"* due to no longer being owned by BWPH or subject to a FERC license. The project has two bypassed reaches that are impacted by project operations. Those include the Lewiston Falls around water quality monitoring station LF-3 and the canals in Lewiston. Please modify the proposed Recreation Study to include consideration of impacts of operations on the canals. Studies and evaluations must not be limited to the license boundary area when operational impacts extend beyond the project area. Project operations directly impact the canal system, as flow rates into the canals directly impact the possible recreational use of these waterways. Planning efforts by the City envision the canal system as an integral part of providing economic and recreation opportunities. Simard-Payne Memorial Park is essentially surrounded by the canal system and river. The public has the right to access all waterways impacted by the Project, not just the river, for purposes of recreation and to experience recreational benefits of natural water flows. As with the Aesthetic Study, the Recreation Study must include the canals to evaluate potential effects of Project operations on recreation sites, facilities and use.

3. The Cities have experienced hindered emergency response to the river due to limited access to the project area, as well as downstream response to incidents that occur in the project area. The Recreation Study should consider an additional emergency access between the Durham Boat Launch and Dresser Rips, in the area of the Maine Turnpike to improve public safety and manage response times for river-based rescues. This area was within the project boundary until an amendment was made in 2020 and continues to be impacted by operational impacts to natural river flows.

4. The PSP Recreation Survey should include in-person and survey box response collection as well as an online survey tool, not either/or as proposed in the PSP. We request that the online survey take place for at least 3 months during the summer of 2022 with 14 days advance notice so that it can be shared among stakeholders and the public. In-person surveys should occur during at least two weekend days for 8 hours, including June 18th and one other day TBD by focus group. We also request a survey occur at least 2 project and 2 non-project sites in the

vicinity of project TBD by focus group. Stakeholders are willing to help with additional survey site collection if needed. Starting in May, there are currently 18 events occurring in or going through Simard-Payne Park including *YMCA-Fit Fest* in Festival Plaza June 5th, *Riverfest* in Simard Payne Park June 17-18, *Great Falls Brewfest* in Simard Payne June 25, *Great Falls Balloon Fest* in Simard Payne on August 18-21, *L-A Bridge Run* on August 28, *Dempsey Challenge* September 24-25. All of these events and others occur along the river and canal because of their natural beauty and ability to attract human activity to the river. The study schedule should take these events into consideration to document usage.

5. For clarification we offer the following details about the goals of a recreation study. The Licensee and stakeholders group should develop a study methodology with the goal of assessing the presence, quality, access, flow information, and flow ratings for paddling opportunities in a stepwise manner. Through this study, the Licensee should seek to:

- a. identify recreational paddling opportunities in the project boundary and downriver in order to determine a full range of boating opportunities available under different modes of operation;
- b. describe flow-quality relationships and identify acceptable and optimal ranges for boating using various craft;
- c. describe potential effects of operations and identify boater's sensitivity to current operations and alternate flow regimes;
- d. broadly characterize recreational paddling-relevant hydrology of the existing operating regime, and qualitatively describe the relationship between paddling opportunities and project operations;
- e. determine whether current or future demand exists for whitewater and recreational boating within the context of regional opportunities and those provided through current operation;
- f. determine the number of days flows for whitewater boating (Dresser Rips) and recreational boating are available under the projects' current operation;
- g. identify resource needs (e.g., aquatic habitat) and competing recreational uses (e.g., canoeing, or fishing) that are or would be affected by flows suitable for boating;
- h. identify public access obstacles; and, characterize effects on current project operations associated with providing various flows for recreational paddling.

Given the lack of information available about boating in the project boundary and downriver at Dresser Rips, the Licensee should take the following steps as part of the study:

1. Reach out to the whitewater boating community to assist with surveys of area boaters to assist in the development of the survey instruments and identify qualified boaters who will assist with the on-water assessment. During this initial phase, the Licensee should study the hydrology of the river reach to determine the gradient and identify the presence of ledges, boulders and other structural elements that would indicate a potential opportunity for whitewater boating at Dresser Rips as well as recreational boating downstream of the hydro facility.
2. The Licensee should conduct test flows in collaboration with representatives from the boating community to determine whether various flow levels create whitewater features such

as eddies, waves and holes that could be used for instruction, playboating if scheduled boating opportunities were provided.

3. The Licensee should study the extent to which the project operations effect valuable whitewater and recreational boating opportunities in order to develop protection, mitigation, and enhancement (PME) measures.

Denied NMFS Study

In its study request, NMFS states that the goal of this study *“is to determine if operational changes to the Project can improve the overall aquatic habitat of the Androscoggin River by dampening the effects of upstream hydropeaking projects, reducing the flashiness and number of flow reversals.”* [[Accession # 20211223-5166](#)] Brookfield’s decision to not adopt this study puts this goal in jeopardy. While we and the agencies do not hold Brookfield responsible for the peaked inflows that it receives from upstream projects, we do think that the 1,600 acre-feet of headpond storage could play a role in reregulating the inflows the project receives. Improved recreational fisheries by minimizing negative impacts of project operations is important to the Cities. This study would address cumulative impacts and help inform decisions about project operations impacts on fisheries and is necessary for the NEPA analysis.

Bruder et. al. [Bruder, A., Tonolla, D., Schweizer, S.P., Vollenweider, S., Langhans, S.D., and Wüest, A. 2016. A conceptual framework for hydropeaking mitigation. *Science of the Total Environment* **568**: 1204-1212 [DOI: 10.1016/j.scitotenv.2016.05.032](#)] lists several structural and operational measures that could be evaluated to reregulate flows at Lewiston Falls. Just such an approach was enacted at the Gulf Island / Deer Rips project (P-2283). License Article 406 and Water Quality Certificate condition 3 requires the project to down ramp flows *“from full generating flow to the required minimum flow ... be restricted to a rate no faster than linearly over 20 minutes”* [[Accession # 20060823-3018](#)]. Moreira et. al. [Moreira, M., Hayes, D.S., Boavida, I., Schletterer, M., Schmutz, S., and Pinheiro, A. 2019. Ecologically-based criteria for hydropeaking mitigation: A review. *Science of the Total Environment* **657**: 1508-1522 [DOI: 10.1016/j.scitotenv.2018.12.107](#)] reviewed the literature for stranding rates of rainbow trout and coho salmon under varying downramping velocities. The data suggest that as down ramping rates increase, a higher % of the population is stranded. The 2016 Flow Demonstration Study provided charts of depth differential over time [[Accession # 20160329-5151](#)] Figures 15, 16 and 17 in this report indicate that when generation ceases, a very rapid decline occurs, with depths dropping by approximately one foot in less than 15 minutes (~4 ft/hr, ~2 cm/min) which in turn suggests that fish can get stranded. Such a rapid decrease in depth also suggests that suitable habitat for various fish species can disappear rapidly.

This study is consistent with the objectives of our Special DO Study and the BIOP issued by the NMFS previously cited. We ask that Brookfield work cooperatively with the agencies to find creative solutions to reregulating the hydropeaked inflows the project receives.

Denied MDMR Eel Studies

The Cities and NGOs appreciate inclusion of the Upstream American Eel Study and Downstream American Eel Study in the DSP, and ask that you reconsider the Size and Timing of Downstream Eel Migration Study and Downstream Eel Passage Study that were submitted by the Maine Department of Marine Resources (MDMR).

Your acceptance of the first two studies acknowledges the importance of this threatened species that forms a major portion of the biomass in a number of reaches of Maine waters. We also note that eel passage will certainly be a feature of the Brunswick Project license downstream at head of tide that will be coming up in a few years, so the importance of eels to the Lewiston Falls Project will continue to grow.

The Lewiston Falls Project is a complex project, and as we have already stated, releases will have to be carefully coordinated to maximize the use of the resource for aquatic habitat, hydropower generation, recreation and aesthetics. Timing scenic releases with downstream eel migration may allow for maximum effectiveness and permit the project to operate without additional features such as narrower trashrack spacing or deep gate eel passage. Without information to inform the process, there will be no way to determine what measures are most appropriate. While the DSP included two references to eel timing information, neither reference includes information from the Androscoggin River and both references are dated. Since those references were published there has been substantial improvement in access to historic habits for eels by installation of eel specific passage structures. In addition, management of eels in the northeast has changed dramatically. Therefore, it is critically important to collect project specific information on eel size and timing to inform license conditions and the Commission's NEPA review.

As the Lewiston Canal System represents an alternative route of downstream migration that no longer involves turbines, this may also prove to represent another way to achieve eel passage without the need for narrower trashrack spacing or deep gate eel passage.

Please include these important studies in your Study Plan.

Note on MDIFW Comments

The Cities and NGOs would also like to note that the comments filed by the Maine Department of Fish and Wildlife (MDIFW) [MDIFW Letter dated March 14, 2022, Re: MDIFW Comments on Draft Study Plan for the Lewiston Falls Hydroelectric Project (FERC No. 2302) ([Accession # 20220314-5070](#))] *"The PAD states that the Project is licensed to operate with up to 4 feet of impoundment fluctuation, yet "is normally operated as run-of-river with impoundment fluctuations of one foot or less." MDIFW requests clarification on the exact operational mode for the Project, as 4-foot impoundment fluctuations would be inconsistent with a run-of-river facility."* This assessment that the project is not "run-of-river" is consistent with ours, and further underlines the need for the additional sondes and analysis contained in our Special DO Study Request.

Conclusion

The situation surrounding the Lewiston Falls Project is complex. Unless water is provided from the Gulf Island Pond when watering the falls, water levels below may drop precipitously in the impoundments upstream, complicating recreational use of the impoundments, degrading water quality, impacting habitat, and the overall aesthetics of the project area. Information most relevant and important to future operations can only be gathered by careful coordination of flows from the dams upstream, the water going through the turbines at Monty Station, water through the industrial canal, and DO monitoring downstream at the locations specified in our Study Request. The failure to do so may result in a finding that the aesthetic releases most desired by the Cities and NGOs would be precluded due to the effects on temperature and DO levels on the impoundments above Great Falls.

Failure to accomplish the important studies as described above will render an informed NEPA analysis of the project impossible and may cause problems and possible delays with the relicensing. Furthermore, without proper studies that inform the process of determining future operations of the Lewiston Falls Project, the goals and objectives in the numerous community plans referenced in our December 30, 2021 filing stand to be significantly compromised. Without additional details of what reregulation would entail, the Cities and NGOs do not have a complete understanding of potential impacts.

The undersigned appreciate the opportunity to comment on the DSP, have confidence that FERC's trust in the Applicant expressed by authorizing use of the TLP for such a complex project has not been misplaced, and appreciate BWPH's commitment to work through these issues.

Please contact Eric Cousens at 207 333- 6601, extension 1154 if you wish to discuss our comments or schedule a stakeholder meeting for that purpose before the issuance of the final Study Plan.

Respectfully,

City of Auburn
Eric J. Cousens
Director of Planning and Permitting

American Whitewater
Bob Nasdor
Northeast Stewardship & Legal Director

Grow L+A
Peter Rubins
Board member, Chair Grow L+A River Working Group

City of Lewiston
David Hediger
Director of Planning and Code Enforcement

Trout Unlimited
Stephen G. Heinz
Maine TU Council FERC Coordinator

AMC
Eliza Townsend
Maine Conservation Policy Director

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FERC Docket P-2302

MDEP - Kathy Howatt, Robert Mohlar, Brian Kavanaugh, Nick Livesay

MDEP - Casey Clark

MDIFW - Jim Pellerin, John Perry

BPL - Jim Vogel

NOAA Fisheries - Bill McDavitt

NPS - Kevin Mendil, Julie Isbill

Androscoggin River Watershed Council

Androscoggin Valley Council of Governments

Attachments:

DEP SAMPLING PROTOCOL FOR HYDROPOWER STUDIES December 2017

ATTACHMENT A

DEP SAMPLING PROTOCOL FOR HYDROPOWER STUDIES December 2017

LAKES, PONDS, AND IMPOUNDMENTS

Trophic State Study

Sampling personnel must be certified annually for this sampling protocol by DEP's Division of Environmental Assessment Lakes Section.

Each basin shall be sampled at the deepest location twice each month for at least five consecutive months during one open water season as follows.

<u>Parameter</u>	<u>Sampling method</u>	<u>Detection limits</u>
Secchi disk	transparency water scope	0.1 meter
Temperature	profile*	0.1 C
Dissolved oxygen	profile*	0.1 mg/l
Total phosphorus	epilimnetic core	0.001 mg/L
Chlorophyll a	epilimnetic core	0.001 mg/L (trichromatic)
Color	epilimnetic core	1.0 SPU
pH	epilimnetic core	0.1 SU
Total alkalinity	epilimnetic core	1.0 mg/l

*Profiles shall consist of temperature and dissolved oxygen measurements taken every meter up to 15 meters, every other meter to 25 meters, then every 5 meters thereafter.

In addition, during late summer (mid to late August depending on latitude and weather conditions), water samples shall be collected and analyzed from up to three depths in the water column for the parameters below except Chlorophyll a. If the waterbody is thermally stratified ($\Delta T \geq 1$ C/m at any depth below the top 3 m depth), samples will be collected from an epilimnetic core, at the top of the hypolimnion, and at one meter above the sediment. If the waterbody is not thermally stratified, only one sample is needed, that being from an integrated core from the surface to two times the Secchi disk depth or within 1 m of the bottom whichever is less.

<u>Parameter</u>	<u>Detection limit</u>
Total phosphorus	0.001 mg/l
Nitrate	0.01 mg/l
Chlorophyll a (uncorrected)	0.001 mg/l (trichromatic determination)
Color	1.0 SPU
DOC	0.25 mg/l
pH	0.1 SU
Total alkalinity	1.0 mg/l
Total iron`	0.005 mg/l
Total dissolved aluminum	0.010 mg/l
Total calcium	1.0 mg/l
Total magnesium	0.1 mg/l
Total sodium	0.05 mg/l
Total potassium	0.05 mg/l

Total silica	0.05 mg/l
Specific conductance	1 ms/cm
Chloride	1.0 mg/l
Sulfate	0.5 mg/l

Additional sampling may be required due to the hydraulic or physical characteristics of a given waterbody or to the presence of significant water quality problems.

Habitat Study

For lakes, ponds, and riverine impoundments, determination of attainment of the designated use habitat for fish and other aquatic life' will be determined as follows. Using a depth of twice the mean summer Secchi disk transparency, determined from the Trophic State Study or historic DEP data, as the bottom of the littoral zone, the volume and surface area dewatered by the drawdown will be calculated to determine if at least 75% of the littoral zone remains watered at all times. Alternatively, studies of fish and other aquatic life communities, including freshwater mussels, may be conducted to demonstrate that the project maintains 'structure and function of the resident biological community' despite a drawdown that results in less than 75% of the littoral zone remaining watered at all times.

Fishing (Mercury Contamination) Study

To ensure that the project does not contribute to the Statewide Fish Consumption Advisory due to mercury, projects with excessive drawdowns (generally >10 feet) may be required to analyze sport fish from the project waterbody and one or more reference waters for mercury. Contact DEP for specific requirements for each project.

RIVERS AND STREAMS

Temperature and Dissolved Oxygen Study

Applicability

This rivers and streams sampling protocol shall apply to tailwater areas that are not impoundments where existing data are insufficient to determine existing and future water quality.

Sampling Stations

Sampling shall occur in the tailwater downstream from the turbine/gate outlet or dam at a location representative of downstream flow as agreed by DEP on a case by case basis. Initially, measurements of temperature and dissolved oxygen should be made along a transect across the stream at the first, second and third quarter points across the width. If there is no violation of dissolved oxygen criteria and no significant (<0.4 mg/l) difference in concentrations among the quarter points, subsequent measurements may be made at the location shown to be representative of the main flow. Otherwise, measurements should be made at the location of the lowest concentration and the location of the main flow. Sampling should also occur in any bypassed segment of the river created by the project. Additional sampling stations may be required in the upstream or downstream areas where significant point or

nonpoint sources exist or where slow moving or deep water occurs. The number and spacing of any additional stations will be determined by DEP on a case-by-case basis.

Parameters

Temperature and dissolved oxygen shall be sampled at mid-depth in rivers less than 2 m deep or in a profile of 1 meter increments of depth in rivers greater than 2 m deep. In rivers where it is already known that attainment of required statutory dissolved oxygen criteria is questionable, sampling for additional parameters (e.g. BOD, nitrogen, phosphorus) may be necessary.

Frequency and Timing

Sampling should be conducted during the summer low flow high temperature period, with the ideal conditions being the 7Q10 flow (the 7 day average low flow with a 10 year recurrence interval) combined with daily average water temperatures exceeding 24 oC. Measurements of temperature and dissolved oxygen shall be made every hour with a datasonde in remote unattended mode continuously during July and August, unless high flows well above seasonal median flows occur.

Alternatively, with concurrence by DEP, sampling could be undertaken one day per week for a minimum of ten weeks throughout the summer low flow, high temperature period. Each discrete grab sampling event for temperature and dissolved oxygen would consist of a minimum of two daily runs, the first of which should occur before 7 AM and the second of which should occur after 2 PM. Sampling results will not be considered complete unless a minimum of 5 sampling days meets the following conditions: The product of the water temperature (oC) and the flow duration (the percentage of the time a given flow is statistically exceeded) at the time of sampling exceeds 1500. For cycling hydropower projects, in addition to twice daily monitoring, continuous monitoring may be required at some locations for a duration equivalent to the period of one cycle of the storage and the release of flow.

For either method, a summer in which low flows and high temperatures are not experienced may result in additional sampling requirements for the next summer. Low flow conditions may occur naturally, as an unregulated river or may be artificially induced, as in the case of upstream flow regulation or flows downstream from a cycling or peaking power project or in the case of a bypassed segment which receives flow only by spillage, leakage or specific releases.

Available Data

The use of data already available is encouraged provided that adequate QA/QC procedures have been followed. Old data may not be acceptable for considerations of meeting minimum sampling requirements, but could still provide useful information. Acceptance/rejection of data will be determined on a case by case basis, but generally data more than 10 years old may be rejected.

Habitat and Aquatic Life Studies

For rivers and streams, determination of attainment of the designated use 'habitat for fish and other aquatic life' will be determined as follows. A Cross-Section Flow Study is required that measures width and depth at various flows to determine the flow at which at least 75% of the bank full cross-sectional area of the river or stream is continuously watered. At least three crosssections representative of the

river or stream must be measured. Alternately, a combination of ambient measurements in one cross-section, flow data from existing flow gages, and/or modelling may be approved by DEP.

In addition, to determine if the project 'attains the aquatic life criteria, i.e. 'maintains the structure and function of the resident biological community', biological monitoring of the benthic macroinvertebrate community must be conducted following DEP's standard protocol in Methods for Biological Sampling and Analysis of Maine's Rivers and Streams, DEP LW0387- B2002.

A copy can be found at www.maine.gov/dep/water/monitoring/biomonitoring/material.html