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GOVERNOR

STATE OF MAINE
DEPARTMENT OF MARINE RESOURCES
21 STATE HOUSE STATION
AUGUSTA, MAINE
04333-0021

CARL J. WILSON
COMMISSIONER

October 2, 2026

Michael Scarzello
Brookfield White Pine Hydro LLC
Brookfield Renewable Group
150 Main Street
Lewiston, ME 04240

Re: MDMR Comments on the Upstream and Downstream Conceptual Alternatives and CFD Modeling Studies at the Brunswick Hydroelectric Project (P-2284)

Dear Mr. Scarzello:

Brookfield White Pine Hydro LLC (Licensee) distributed drafts of the Upstream and Downstream Conceptual Alternatives (Phase 1) and CFD Modeling studies for the Brunswick Hydroelectric Project (P-2284) on September 2 and September 4 respectively. The Maine Department of Marine Resources (MDMR) has been an active participant in the relicensing process at the Project and was an original requestor of the Upstream and Downstream Passage Alternatives Study. MDMR provides the following comments on the Licensee's draft study reports for the Brunswick Project. These comments have been filed with FERC for documentation purposes.

MDMR looks forward to continued collaboration with the Licensee on diadromous fish passage at the Brunswick project. Please contact Casey Clark (casey.clark@maine.gov; 207-350-9791) or Lars Hammer (lars.hammer@maine.gov; 207-557-1564) if you have any questions.

Sincerely,

Sean Ledwin

Sean Ledwin, Director
Bureau of Sea-Run Fisheries and Habitat

Cc:

NMFS: Matt Buhyoff, Don Dow
USFWS: Patrick Dockens, Kimberly Spiller
MDIFW: John Perry, Jim Pellerin, Andrew Wood
DEP: Laura Paye, Rob Wood
MOCA: Erin Wilson
FTA: Chip Spies, Vlad Douhovnikoff

Executive Summary

The Maine Department of Marine Resources (MDMR) has closely reviewed the drafts of the Upstream and Downstream Conceptual Alternatives (Phase 1) and CFD modeling studies for the Brunswick Hydroelectric Project (P-2284) that were distributed on September 2 and September 4, respectively. Below, we clarify our recommended biological design capacity for new upstream passage facilities, request that alternatives be retained where their infeasibility has not been demonstrated, and identify concerns with the effectiveness and supporting analysis of several proposed alternatives.

MDMR does not support Alternative U4 (Fishheart) as a permanent upstream passage solution at this time or continued evaluation of Alternative D3 (floating guidance boom) in Phase 2. The Phase 2 evaluation should use consistent, species-specific criteria to assess passage effectiveness, capacity, and operational requirements and should clearly distinguish demonstrated performance from unverified assumptions.

MDMR Comments on Conceptual Alternatives Study – Upstream Passage

PDF Page 11: “Alternatives Eliminated from Phase 1 Evaluation”

MDMR Comment: MDMR does not agree that the vertical slot and fish lift (north side) alternatives, nor the traditional pool and weir, or NLF bypass channel (Topsham side of dam) should be removed from consideration at this stage. The Licensee has not provided sufficient supporting information to demonstrate that these alternatives are infeasible due to critical issues or “fatal flaws”. Concerns regarding available real estate were mentioned as reasons to exclude these alternatives, however MDMR has not been presented with data indicating that is the case beyond the brief description in Section 4.2 of the report. Please provide conceptual layouts, property constraints, and other supporting information sufficient to explain why these alternatives cannot be accommodated or modified to address the identified constraints. Without clear information demonstrating fatal flaws, MDMR requests that these alternatives be retained in Phase 2 of the evaluation.

PDF Page 22: “The fish lift hopper would be designed and sized to efficiently handle the anticipated target populations, including approximately 130,000 American shad, 600 Atlantic salmon, and 4.6 million river herring.”

MDMR Comment: MDMR provided anticipated target populations in comments to the Licensee on April 9, 2026 and revised numbers in our comments on August 6, 2026¹. For clarity, MDMR recommends that any upstream passage facility at the Project be capable of passing the following annual targets:

7,728,805 alewives,
1,218,228 blueback herring,
279,387 American shad,
600 Atlantic salmon, and
an unknown number of sea lamprey.

The combined river herring target is 8,947,033 fish annually. Please update all applicable text, tables, and capacity calculations to reflect these targets. Facility sizing should account for peak migration periods and overlapping species runs, rather than annual totals alone. For the fish lift alternative, please identify the assumed hopper

¹ Accession No. 20260806-5070

capacity, cycle time, operating schedule, and provisions for downtime, and demonstrate how these assumptions support passage of the target populations without excessive crowding or delay.

PDF Page 22: “This alternative is considered to have high passage effectiveness for upstream fish passage, although it would not provide volitional passage.”

MDMR Comment: Given passage effectiveness information from other sites, MDMR requests that the passage effectiveness of this alternative be ranked as “moderate to high” not “high”, which would be comparable to the new vertical slot alternative. While the Vertical Slot alternative is hindered by overall length and number of switchbacks, fish lifts also pose potential passage issues. Issues specific to lifts can occur at crowding infrastructure (e.g., V-gates), which can confuse or startle fish and cause failed passage attempts or delay. Furthermore, fish lifts do not provide volitional passage. The available information does not support an effectiveness rating of “high” for the fish lift alternative. While passage of alewife at the Milford fish lift may be relatively high², the facility does not meet MDMR-developed performance standards necessary to achieve management goals for alewives in the Penobscot River³. The Milford facility is also not effective for American shad⁴, and does not meet delay standards for Atlantic salmon⁵. Other fish lifts in Maine including at the Cataract and Skelton Projects⁶ have not demonstrated high effectiveness. Thus, the available data suggest that “moderate to high” is a more appropriate ranking for this alternative. Please update the text to reflect a ranking of “moderate to high” for this alternative. The evaluation should identify the species-specific evidence supporting each rating and explain the limitations of applying results from other facilities to Brunswick.

PDF Page 23: “However, in Phase 2 of this study consideration may be given to the use of the existing turbine discharge to augment attraction flow, potentially reducing the need for a new attraction water pipeline and intake.”

MDMR Comment: Please include additional detail related to the intent of this statement. U.S. Fish and Wildlife Service guidelines recommend a minimum of 5% of station capacity be used as attraction flow⁷. Typically, turbine discharge does not count toward the 5% minimum.

PDF Page 24: “**Alternative U4 Fishheart System**”

MDMR Comment: As stated in previous comments, MDMR is not supportive of this alternative at this time unless considered as an auxiliary or secondary fishway. We are not aware of information to suggest that a Fishheart system would be effective for the target species and number of fish (i.e., millions) that could be present annually downstream of the project. In addition, as the Fishheart system is still considered experimental technology, it puts a high level of risk on the Licensee as a permanent solution for upstream passage, particularly at this head-of-tide dam. Any further consideration should identify demonstrated species-specific passage performance, capacity during peak migration, fish handling effects, and operational reliability.

MDMR may be supportive of an approach that utilizes Fishheart as a temporary solution during construction of a permanent upstream fishway or as a measure to supplement other upstream passage measures.

PDF Page 33: “The proposed NLF flow of 5 percent of the station's generating capacity is approximately 375 cfs.”

² Accession No. 20220118-5295

³ Accession No. 20260807-5193

⁴ Accession No. 20230117-5064

⁵ Accession No. 20260213-5107

⁶ Accession No. 20260331-5065

⁷ USFWS (U.S. Fish and Wildlife Service). 2019. Fish Passage Engineering Design Criteria. USFWS, Northeast Region R5, Hadley, Massachusetts.

MDMR Comment: Five percent of station capacity is the minimum recommendation for attraction flows at technical fishways. Nature-like fishways (NLFs) do not have minimum attraction flow recommendations and have the ability to pass more flow than technical fishways. The proposed NLF entrance is located away from the turbine outflow and providing additional flow through the NLF will likely reduce the impact of spatial separation between the NLF and the turbine outflow. MDMR recommends investigating NLF flow scenarios and designs capable of routinely passing at least 5 percent of station capacity and up to 20 percent of station capacity. This range should accommodate a significant portion of flows that exceed station capacity during the spring upstream passage season. Using the report's stated relationship of 375 cfs = 5%, this corresponds to approximately 375–1,500 cfs (5-20%). Please evaluate the frequency and duration for which these flows would be available and assess attraction, water depths, velocities, and passage conditions throughout the NLF across the proposed operating range.

MDMR Comments on Conceptual Alternatives Study – Downstream Passage

PDF Page 16: “The Unit 1 intake would be approximately 80 feet wide by 35 feet deep, while the combined intake for Units 2 and 3 would be approximately 68 feet wide by 20 feet deep; both configurations would be designed to maintain an average approach velocity of about 1.8 fps.”

MDMR Comment: In addition to limiting the approach velocity to below 2 fps, the design should ensure that sweeping velocities across the rack are greater than normal velocities through the angled rack. An average approach velocity of 1.8 fps alone does not demonstrate that this criterion would be met throughout the rack area. Please provide the spatial distribution of velocity components normal and parallel to the rack under representative operating conditions, identify areas of elevated velocity or weak sweeping flow, and demonstrate that fish would be guided toward the bypass entrance.

PDF Page 20: “Alternative D3 - Floating Guidance Boom with a New Downstream Surface Bypass and Nighttime Shutdowns”

MDMR Comment: Although this alternative may be technically feasible, MDMR does not support continued evaluation of this alternative in Phase 2. MDMR agrees with the Licensee that passage effectiveness of this alternative is likely to be low. Available information on fish migration depths and turbine entrainment raises substantial concerns about the ability of a floating guidance boom to protect the target species and life stages. A 1990 paper reported that adult American Shad were captured in the lower half of the water column 83% of the time when migrating upstream and downstream, and a 1987 paper reported that adult Blueback Herring migrated at mid-water depth⁸. In addition, a 1982 paper that compared surface and bottom trawls for juvenile alosines found that the majority of alewife (98.5%) and American shad (76.8%) and a large proportion of blueback herring (33%) were captured in bottom trawls⁹. Further, downstream passage studies performed at West Enfield with Atlantic salmon smolts, adult river herring, adult American shad, and juvenile river herring demonstrate that these fish either approach the project at depth or descend more than 15 feet to reach the submerged intake entrance. The results of these studies are as follows:

- 2016: 49.4% of smolts were entrained
- 2017: 57% of smolts were entrained
- 2018: 26% of smolts, 16% of adult river herring, and 13% of adult American shad were entrained¹⁰
- 2019: 99% of juvenile river herring were entrained

⁸ Witherall, D. B. and B. Kynard. 1990. Vertical distribution of adult American shad in the Connecticut River. Transactions of the American Fisheries Society. 119: 151-155.

Witherall, D. B. 1987. Vertical distributions of adult American shad and blueback herring during riverine movement. Master's thesis. University of Massachusetts, Amherst.

⁹ Loesch, J. G., W. H. Kriete, Jr., and E. J. Foell. 1982. Effects of light intensity on the catchability of juvenile anadromous Alosa species. Transactions of the American Fisheries Society 111:41-77.

¹⁰ These entrainment values would have likely been higher but flashboard damage during the study period caused spill conditions that don't normally occur.

These studies document migration behavior and entrainment risk relevant to the proposed alternative, although they do not directly measure the performance of a floating guidance boom at Brunswick. The Licensee has not demonstrated that the proposed boom would effectively guide fish traveling below its depth or prevent fish from passing beneath it.

Given this information and the Licensee's own "low" effectiveness rating, MDMR does not support continued evaluation of this alternative. MDMR considers the anticipated low passage effectiveness a fundamental deficiency that warrants removing this alternative from further consideration.

PDF Page 20: "During the shutdown periods, project inflows would be routed through the downstream bypass facility, spill gates, and/or over the spillway, depending on river flows, providing downstream migrants with non-turbine passage routes. Because the majority of downstream eel passage occurs at night, the shutdown periods are expected to protect most migrating eels passing the Project. The total bypass flow would be approximately 375 cfs, representing about 5 percent of station discharge."

MDMR Comment: Project inflows are expected to exceed 375 cfs during most times of year. Without changing MDMR's recommendation to eliminate Alternative D3, if this alternative is considered in future studies, please describe the flow-routing priorities and hydraulic capacity of each proposed passage route during turbine shutdowns. Please also confirm that flows past the project will remain consistent between the two operational conditions (i.e., turbines running and turbines shut down). Describe any changes in impoundment level, downstream flow, and ramping during transitions between these conditions. The evaluation should also address passage safety through each non-turbine route and identify the seasonal timing, nightly duration, and operational triggers for shutdowns that would support the stated expectation of protecting most migrating eels.

PDF Page 23: "BWPH has contracted with Natel to conduct a preliminary feasibility study to support evaluation of alternatives in Phase 2 of the downstream studies."

MDMR Comment: As has been done at other hydroelectric projects (i.e., West Enfield), MDMR requests that any feasibility study of "FishSafe" runner replacement evaluate the entire route of passage including trashracks, wicket gates, and other project structures. The study should distinguish runner-specific performance from survival and injury outcomes for the complete passage route, address relevant species and life stages across the anticipated operating range, and identify uncertainties and additional testing needed to assess performance at Brunswick. Please provide the feasibility study and supporting information to MDMR for review as part of the Phase 2 evaluation.