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

JANET T. MILLS
GOVERNOR

PATRICK C. KELIHER
COMMISSIONER

July 17, 2021

Kathy Davis Howatt
Hydropower Coordinator, Bureau of Land Resources
Maine Department of Environmental Protection
17 State House Station
Augusta, ME 04333

RE: Comments on Brookfield White Pine Hydro, LLC's Shawmut (FERC No. 2322) Hydroelectric Project

Dear Ms. Howatt:

The Maine Department of Marine Resources (MDMR) has reviewed the Brookfield White Pine Hydro, LLC's (BWPH; Licensee) Application for Water Quality Certification (U.S. P.L. 92-500, Section 401) for the relicensing of the Shawmut Project by the Federal Energy Regulatory Commission (FERC). MDMR has also reviewed the Draft Environmental Assessment (DEA), Interim Species Protection Plan (ISPP) for Shawmut, the Final License Application (FLA), Species Protection Plan (SPP) for Lockwood, Hydro-Kennebec, and Weston, as well as other relevant documents in our administrative record. MDMR provides the attached comments and Kennebec River factual background paper focused primarily on the proposal's impacts to diadromous indigenous aquatic fish species and their habitat.

Please contact Gail Wippelhauser at gail.wippelhauser@maine.gov or at 207-904-7962 if you have any questions.

Sincerely,

Patrick C. Keliher, Commissioner

Summary

Restoration of Atlantic Salmon, American Shad, Blueback Herring, Alewife, and Sea Lamprey has lagged on the mainstem Kennebec River, primarily because of the lack of upstream fish passage. This situation is particular critical for the endangered Gulf of Maine (GOM) Distinct Population Segment (DPS) of Atlantic Salmon, one of the most iconic and imperiled species in the United States. Diadromous fish species require safe, timely, and effective access to high quality habitats at different life stages in order to successfully survive and reproduce. The Shawmut Project waters currently are used as spawning and rearing habitat and/or a migratory corridor for five indigenous fish species (Atlantic Salmon, American Shad, Blueback Herring, Alewife, and American Eel). Upstream fish passage has been provided for juvenile American Eel at the lower four mainstem dams, but adult Atlantic Salmon, American Shad, Blueback Herring, and Alewife have been captured at the Lockwood Project fish lift and transported upstream for 15 years (2006-2021). A sixth indigenous species, Sea Lamprey, also will use the Shawmut Project waters as spawning/rearing habitat and as a migration corridor when new upstream passage is implemented at the Lockwood, Hydro-Kennebec, Shawmut, and Weston projects. These aquatic habitats are extremely important for diadromous fish and have been designated as Critical Habitat for Atlantic salmon under the Endangered Species Act (ESA) and Essential Fish Habitat (EFH) under the Magnuson Stevens Act (MSA) for a number of species based on the location and characteristics of habitats required to support healthy fish populations. Almost 100% of high quality Atlantic Salmon spawning and rearing habitat, over 50% of spawning and rearing habitat for American Shad and Blueback Herring, and significant areas for the other native anadromous species in the Kennebec river watershed is upstream of the Shawmut project.

The proposal as described in the Brookfield White Pine Hydro, LLC's (BWPH; Licensee) Application for Water Quality Certification (U.S. P.L. 92-500, Section 401), if implemented, will continue to have significant adverse impacts on these indigenous fish species and their habitat. These adverse impacts include, but are not limited to, anticipated low passage efficiency rates at upstream and downstream fishways, mortality and injury to upstream and downstream migrating diadromous fish, impaired in-stream habitat, significant delays in passage, and cumulative effects of multiple proposed fish passages at other projects in the watershed. Population modeling of the cumulative impacts of upstream and downstream passage of Atlantic Salmon, American Shad, Blueback Herring, and Alewife has shown that efficient downstream and upstream fish passage with minimal delays are critical to support these fish species' life history needs. Unless fish passage facilities meet MDMR's proposed performance standards based on this modeling and also provide effective passage for eels, the project waters will likely be of insufficient quality to support self-sustaining runs of these important indigenous species. Of particular concern, MDMR's analysis strongly indicates that the Licensee's proposal would preclude the ability to recover Endangered Species Act (ESA) listed Atlantic salmon in the entire Distinct Population Segment (DPS). In addition, studies have shown that similar fishways at wide, complex sites such as Shawmut could entirely preclude fish such as American Shad from passing upstream. The Department's goal is to restore diadromous fish populations in Maine to their historic habitat. To achieve this goal, MDMR has developed "minimum goals" that are achievable if suitable habitat of sufficient quality is available to support fish and other aquatic life. In other words, building fish runs to meet these minimum demographic goals is a

benchmark for having resilient self-sustaining populations, which require safe, timely, and effective passage and supportive aquatic habitats. The minimum goals and concerns about how the proposed project will not likely achieve those goals and discussion of additional impacts to fish and aquatic habitat are outlined below. More detail on the modeling and background can be found in the Kennebec River factual background provided as a separate document.

Minimum Species Goals for the Kennebec River

The minimum goal for **Atlantic Salmon** is to provide safe, timely, and effective upstream and downstream passage in order to achieve a minimum annual return of 500 naturally-reared adults to historic spawning/rearing habitat in the Kennebec River for Endangered Species Act (ESA) down-listing and a minimum annual return of 2,000 naturally-reared adults to historic spawning/rearing habitat in the Kennebec River for reclassification based on the NOAA and USFWS Recovery Plan (2019). To reach spawning/rearing habitat in the Sandy River, Carrabassett River, and mainstem Kennebec River, all returning adults must annually pass upstream at the Lockwood, Hydro Kennebec, Shawmut, and Weston project dams.

The minimum goal for **American Shad** is to provide safe, timely, and effective upstream and downstream passage in order to achieve a minimum annual return of 1,018,000[1] wild adults to the mouth of the Kennebec River; a minimum annual return of 509,000 adults above Augusta; a minimum of 303,500 adults annually passing upstream at the Lockwood and Hydro Kennebec Project dams; a minimum of 260,500 adults annually passing upstream at the Shawmut Project dam; and a minimum of 156,600 adults annually passing upstream at the Weston Project dam.

The minimum goal for **Blueback Herring** is to provide safe, timely, and effective upstream and downstream passage in order to achieve a minimum annual return of 6,000,000[2] wild adults to the mouth of the Kennebec River; a minimum annual return of 3,000,000 adults above Augusta; a minimum of 1,788,000 adults annually passing upstream at the Lockwood and Hydro Kennebec Project dams; a minimum of 1,535,000 adults annually passing upstream at the Shawmut Project dam; and a minimum of 922,400 adults passing upstream at the Weston Project dam.

The minimum goal for **Alewife** is to provide safe, timely, and effective upstream and downstream passage in order to achieve a minimum annual return of 5,785,000[3] adults above Augusta; a minimum of 608,200 adults annually passing at the Lockwood, Hydro Kennebec, and Shawmut project dams; and a minimum of 473,500 adults annually passing upstream at the Weston Project dam.

The minimum goal for **Sea Lamprey and American Eel** is to provide safe, timely, and effective upstream and downstream passage throughout the historically accessible habitat of these two species.

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[1] Based on 5,015 hectares of spawning/rearing habitat and a minimum return of 203 adults per hectare.
[2] Based on 5,015 hectares of spawning/rearing habitat and a minimum return of 1,196 adults/hectare.
[3] Based on 9,946 hectares of spawning/rearing habitat and a minimum of 581.5 adults/hectare; the Maine State average is 988.4/hectare.

Performance standards necessary to meet minimum goals

Upstream fish passage
Based on the minimum goals, a project's facilities would be considered to be performing in a safe, timely, and effective manner if:

1. At least 99% of the adult Atlantic Salmon that pass upstream at the next downstream dam (or approach within 200 m of the project powerhouse) pass upstream at the project within 48 hours.
2. At least 70% of the adult American Shad that pass upstream at the next downstream dam (or approach within 200 m of the project powerhouse) pass upstream at the project within 72 hours.
3. At least 90% of the adult Blueback Herring that pass upstream at the next downstream dam (or approach within 200 m of the project powerhouse) pass upstream at the project within 72 hours.
4. At least 90% of the adult Alewife that that pass upstream at the next downstream dam (or approach within 200 m of the project powerhouse) pass upstream at the project within 72 hours; and
5. At least 80% of the adult Sea Lamprey that pass upstream at the next downstream dam (or approach within 200 m of the project powerhouse) pass upstream at the project within 48 hours.

Downstream fish passage
Based on the minimum goals, a project's facilities would be considered to be performing in a safe, timely, and effective manner if:

1. At least 99% of the Atlantic Salmon smolts and kelts that pass downstream at the next upstream hydropower dam (or approach within 200 m of the project spillway) pass the project within 24 hours.
2. At least 95% of the adult and juvenile American Shad that pass downstream at the next upstream hydropower dam (or within 200 m of the project spillway) pass the project within 24 hours.
3. At least 95% of the adult and juvenile Blueback Herring that pass downstream at the next upstream hydropower dam (or within 200 m of the project spillway) pass the project within 24 hours.
4. At least 95% of the adult and juvenile Alewife that pass downstream at the next upstream hydropower dam (or within 200 m of the project spillway) pass the project within 24 hours.

The Licensees Proposals for fish passage performance

It is unclear what the Licensee is proposing regarding salmon effectiveness standards for the Shawmut project as the proposed Interim Species Protection Plan (ISPP) does not include updated performance standards. In the SPP for the Lockwood, Hydro-Kennebec, and Weston

project, the Licensee indicates they will need to achieve a whole station survival of 88.5% for downstream passage and 84.5% for upstream passage at the four projects for Atlantic salmon. This would indicate an average of 97% for downstream passage per project, and 96% for upstream passage. A cumulative performance standard is not supported by MDMR or consistent with the precedent set by the National Marine Fisheries Service (NMFS) and the Federal Energy Regulatory Commission (FERC) for the Milford (FERC No. 2534), West Enfield (FERC No. 2600), Mattaceunk (FERC No. 2520), Orono (FERC No. 2710) and Stillwater (FERC No. 2712) projects on the Penobscot River. Cumulative performance standards can allow one or more projects to perform poorly, increasing the possibility that the cumulative effects will be even greater and reducing project by project accountability. The Licensee does not utilize DMR's recommended performance standards or provide any of their own performance standards for American Shad, Blueback Herring, Alewife, or Sea Lamprey. MDMR has completed model scenarios that represent the best available science and finds that only with a 99% upstream and downstream passage efficiency at each project (Lockwood, Hydro-Kennebec, Shawmut, and Weston) can interim minimum goals be achieved for Atlantic salmon (Factual Background, 3.1.6). Based on MDMR modeling, the 99% upstream and 99% downstream effectiveness scenario resulted in 28-29% more adult salmon returns than the 96% upstream and 97% downstream scenario suggested in the SPP. Further, based the site conditions, initial testing, and experience with similar passage approaches implemented in other river systems, we find it highly unlikely that the Licensee will meet even their own proposed standards. The Licensee had previously indicated it could achieve lower standards yet has revised those standards upward without proposing any significant commensurate measures that would likely result in those improvements. With salmon runs below replacement levels currently, MDMR concludes that the adverse impacts of the current proposal will not provide conditions where a minimum sustainable population of Atlantic salmon can be supported in the receiving water. It is also possible that species such as American Shad, which have chronic poor performance at fishways, or Sea Lamprey, which are not considered by the Licensee and migrate primarily at night, could be entirely precluded from receiving waters based on cumulative impacts from downstream projects and likely ineffective passage at the Shawmut Project. The high numbers of dams in the lower Kennebec, unknown outcomes of fish passage at those projects, and poor demonstrated performance at similar fishways (Factual Background, Table 9) significantly increases the probabilities of failure to meet basic biological requirements for some or all of the indigenous species at the Shawmut project.

Issues with Proposed upstream fish passage facilities

The Licensee has proposed to construct permanent upstream fish passage (a single fish lift) at the Shawmut project. Successful fishways must create hydraulic signals strong enough to attract fish to one or multiple entrances in the presence of competing flows (i.e., false attraction). The Shawmut dam is extremely long and has multiple discharge locations that will provide significant false attraction flows during the passage season. MDMR has serious concerns about the design, operation, and location of the fishway and believes the current proposal will result in significant delays and likely poor upstream passage efficiency for multiple species. MDMR also has serious concerns about the cumulative adverse impacts of the Lockwood, Hydro-Kennebec, and Weston projects, which has similar issues.

MDMR is very concerned about the effectiveness of the proposed fishway in May, June, and July when the majority of anadromous species are migrating upstream (Table 1). The maximum station hydraulic capacity of the Shawmut Project is 6,690 cfs, which is exceeded approximately 65% of the time in May, 35% of the time in June, and 20% of the time in July. Water in excess of station capacity is spilled at the sluice gate in the middle of the 1,435-foot long dam, the hinged flashboards on the west side of the dam, or the rubber crest(s) on the eastern half of the dam, providing multiple false attractions. As a result, there will be false attraction at the project during the majority of the upstream migration season to multiple areas without a fishway to the headpond. A proposed cross channel egress from an identified false attraction zone would not provide passage to the headpond or directly to the lift.

Table 1. Upstream Run timing by month of Atlantic Salmon, river herring (Alewife and Blueback Herring) and American Shad captured at the Lockwood Project (2006-2020) and Sea Lamprey captured at the Milford Project (2009-2020).

Month	Atlantic Salmon	River herring	American Shad	Sea Lamprey
May	9%	72%	2%	56%
June	49%	28%	78%	44%
July	32%		19%	
August	2%			
September	3%			
October	4%			

The location of the fishway was based on very speculative assumptions using limited information. The CFD modeling that was conducted looked at a very limited range of flows that are not representative of the majority of the migration period. Furthermore, the siting study, conducted from May 19-June 14, 2016 with radio-tagged alewife, occurred during a low flow period, which is not representative of flows during the passage season. Alewives are not necessarily a good proxy for fish attraction of other species, as the Lockwood and Brunswick projects demonstrate. The existing American Eel fishway locations were selected based on flow conditions that will be changing based on the proposal.

While it is hard to predict the exact passage efficiency and delays rates at each project, the results of studies conducted on Atlantic Salmon and shad migrating upstream at the Lockwood Project are illustrative. The Lockwood and Shawmut projects are similar in that they are complex, wide sites, that have multiple sources of spill that create false attraction for migrating fish.

> Two years of telemetry studies by Brookfield were conducted at the Lockwood Project. In 2016, 16 of the 18 test fish (88.9%) which returned to the Project area were recaptured in the fish lift, and the time from return to the project area to recapture was 0.7-111.2 days (mean=17 days). In 2017, 14 of the 20 test fish (70%) were recaptured in the fish lift, and the time from return to the project area to recapture was 3.3-123 days (mean=43.5). As part of a study of energy consumption, adult Atlantic salmon were captured at the Lockwood fish lift, tagged with thermal radio tags and released downstream of the Project. In 2018, 66.7% of the tagged adults (4 of 6) were recaptured at the fish lift, and the time to recapture was 16-33 days (mean=21.8). The following year, 45.0% of tagged adults (9 of 20) were

recaptured, and the time to recapture was 9-30 days (mean=18.7). A 2015 study found that 0% of American shad captured in the fishway and returned downstream were recaptured at the fishway.

The Lockwood fishway (fish lift) was designed consistent with current standards for upstream passage of anadromous fish and yet the complicated setup at the dam has undermined the ability of the fishway to effectively pass fish. It would not be unexpected to have similar results at the Shawmut project. Results at projects such as Lockwood show significantly less than minimum goals necessary to support salmon populations and could fully preclude American shad or other species from accessing necessary habitats above the Shawmut project. MDMR believes having only one fishway at this site to the headpond that is non-volitional will likely result in large percentages of fish not finding the fishway and/or experiencing substantial delays.

Operational period

The Licensee proposed to operate the upstream fishway (fish lift) May 1 to October 31 during daylight hours. This proposed upstream operational period is inadequate to effectively pass all species upstream. Atlantic salmon have been documented in the Kennebec River migrating upstream for a longer season and sea lamprey predominately migrate during the night. Fish passage should be provided from May 1 through November 10 with operations occurring 24 hours per day from May 1 through June 30 to accommodate diurnal and nocturnal migrants. In addition, the proposed fish lift is not a volitional facility and its operation is vulnerable to regular mechanical failures and power outages. Fish lifts generally also have a minimum cycle time of about 15 minutes, during which time the fishway is closed. The Licensee considered at a conceptual level both a nature-like fishway (which is volitional) and a fish lift during a feasibility study, but only pursued the fish lift design. MDMR has further explored concepts developed in the Licensees feasibility study and has conceptual designs for a nature like fishway at this site, which can be made available to DEP upon request. There is potential with a nature like volitional and the similarly designed fish lift working together in separate locations, improved upstream fish passage efficiency and timeliness could be achieved.

Issues with Proposed downstream fish passage facilities

The Licensee proposes to utilize three gates in the forebay area (Sluice Gate, Tainter Gate, and Deep Gate) and up to four sections of hinged flashboards to pass fish downstream. The licensee also proposes a guidance boom (discussed below) and no screening protection of fish through the Francis Turbines. Unlike the Licensee proposal in the SPP for the Lockwood, Hydro-Kennebec, and Weston projects, the Licensee does not propose any specific low flow thresholds that would require curtailment of generation to provide for additional spill for protection of downstream passage of Atlantic salmon smolts. The proposal also fails to provide adequate protection for other species during their period of downstream passage. The proposed downstream operational facilities are inadequate to safely and effectively pass Atlantic salmon and all species downstream.

Radio telemetry studies conducted at the Weston, Shawmut, Hydro-Kennebec, and Lockwood projects resulted in baseline survival of downstream migrating Atlantic salmon smolts ranging from 89.5–100%, but only 66-94.5% of smolts successfully passed the projects within 24 hours. The Shawmut project averaged 93% survival. This analysis only measured survival from just

above to just below the projects and fails to take into account the impact of the latent mortality and other mortality associated with the cumulative effects of passing multiple projects. For example, smolts that were released at Weston and detected at Lockwood had much lower survival, with a four-year average of 56%, and that does not include the impacts of the Weston impoundment as fish were released just upstream of the dam.

To assess the true impacts of the projects, it is important to account for survival with dam dependency. The NOAA Science Center modeled smolt survival with dam dependency (Stevens et al. 2019) using 40 years of data on the Penobscot River, with estimates of estuarine mortality for fish that passed 4 dams at 1.15% per kilometer versus 0.34% with no downstream dams (natural mortality baseline). MDMR developed a deterministic salmon model utilizing this data and other data in the watershed and modeled smolt survival with four dams under a number of scenarios. Using the passage scenario of 96% upstream and downstream passage per project, these projects would result in a 45% reduction in smolt survival to sea compared to smolt survival without the projects. Using the updated 97% survival per project proposed in the SPP (12% direct mortality across four projects) and NOAAs estimate from a dam impact model (Neiland and Sheehan 2020) of 6% mortality per dam baseline (24% indirect mortality across four projects), would result in 36% mortality of smolts from project effects alone. In NOAAs August 28, 2020 preliminary Section 18 prescription, their analysis estimated about 40% loss of smolts due to project impacts. The loss of between 36-45% of smolts from dam impacts in addition to baseline mortality on a salmon run that is currently below replacement is not supportive of recovery, even under the most favorable marine survival and freshwater production scenarios. It is unlikely that the Licensee could even achieve the 97% downstream standard based on their proposal as many fish would still be entrained in turbines without shutdowns or full screening. Thus, representations of "Whole Station Survival" vastly understate the current take of these projects as they measure only a small window of impacts that do not account for large impacts of impoundments and latent impacts to fish that pass dams (e.g. delayed mortality in estuary rather than directly after passing project). In addition, in their Augusta 28, 2020 preliminary prescription for the Shawmut project, NOAA predicted that the overall survival of kelts through the four projects cumulatively would be 42% to 51%, an incredibly low number of fish that would preclude the important life history trait of repeat spawning.

The proposed guidance structures (discussed below) at the project are unlikely to prevent or reduce entrainment of smaller alosines. In addition, smaller alosines are more likely to migrate past the Lower Kennebec Projects during the summer months (July-September) when water levels are not likely to result in spill at the project. Due to the reduced swimming ability of smaller alosines and the timing of their migrations, MDMR believes that smaller alosines are likely passing through the turbines of the projects at a high rate. Juvenile alosines migrate downstream from freshwater nursery habitat in Maine between July and November each year. While some juveniles stay in nursery habitat and reach lengths of 100-150mm before their downstream migration, a significant portion of the downstream migrants are much smaller (total length 40-100mm) and typically migrate earlier in the year. Smaller alosines do not have the same swimming ability as larger fish and are more likely to utilize routes of passage in a manner proportionate to the ratio of flow to a given a route. For this reason, smaller juvenile alosines are likely to be entrained as they migrate past the project and turbine passage has been documented as the route of highest mortality (acute and latent) when compared to other passage routes. This

will result in adverse impacts to these species and not be conducive to meeting demographic or other goals to maintain self sustaining runs above these projects.

Surface Guidance Boom

The Licensee proposed to construct a fish guidance boom system that is intended to preclude downstream migrating fish from entrainment in Units 7 and 8. MDMR does not support the Licensee's proposal to use surface guidance booms at the Shawmut Project and finds them to be inadequate to protect the GOM DPS population of Atlantic Salmon and the other diadromous species in the Kennebec River. Data provided by the Licensee in the (SPP, Table 5-1) demonstrates that the guidance booms used at the Lockwood, Hydro-Kennebec, and Weston Projects do not guide 14.3-30.6% of the migrating smolts away from the turbines. Data provided by the Licensee (FLA, Table 4-22) shows that 32.7% of the downstream migrating smolts were entrained into the turbines at the Shawmut Project. The instantaneous survival was 7% lower when fish went through the turbines compared to spill routes at Shawmut and that grossly underestimates the sublethal effects, including injury and disorientation, that would result in higher mortality in the estuary. Studies at the Ellsworth dam on the Union river assessing injury to salmon showed that 22-30% of fish that went through the turbines had injuries compared to 3.8% that went through spill routes, demonstrating that impact quantitatively. The 2015 *Evaluation of Downstream Passage for Adult and Juvenile River Herring* demonstrated that 53 percent of the study fish went through the Lockwood turbines, rather than being guided by the boom to the downstream bypass, and survival was lowest for those fish passing Lockwood via the units (i.e., 77-4-81.7% survival).[4] This would indicate that performance standards would not likely be met for these species with the proposed plan.

In addition, MDMR has consulted with the USFWS regarding floating guidance booms and concurs with their comments that are provided below.

> "The Service does not know of any studies that have assessed how effective floating guidance booms are at protecting eels as they attempt to migrate downstream past a hydroelectric project. However, we do know that eels are a bottom-oriented species (Brown et al. 2009) and therefore a floating guidance boom with partial depth panels would not be fully protective. As stated in our 2019 Fish Passage Engineering Design Criteria manual, "A floating guidance system for downstream fish passage is constructed as a series of partial depth panels or screens anchored across a river channel, reservoir, or power canal. These structures are designed for pelagic fish which commonly approach the guidance system near the upper levels of the water column. While full-depth guidance systems are strongly preferred, partial-depth guidance systems may be acceptable at some sites (e.g., for protection of salmonids, but not eels)." Booms have not been implemented as a protective measure for eels or alosines anywhere else in our region, which spans fourteen states, unless they are installed with other protective measures that are suitable to ensure the safe, timely, and effective downstream passage of our trust species (e.g., inclined bar screens, angled bar racks, etc.). Therefore, the Service recommends that any protective measure implemented at the mainstem Kennebec River hydroelectric projects, as part of the current SPP process, are

[4] Accession No. 20160331-5144

protective of all migratory species and that the proposed mitigation measures comport with the Service's fish passage guidelines."

Operational period

The Licensee proposed to operate the downstream fishway as follows:

- Continue to operate the existing forebay surface sluice gate at maximum capacity to pass up to 35 cfs from April 1 to December 31 to provide a continuous surface bypass route for downstream migrating fish.
- Continue to spill 600 cfs through the existing forebay Tainter gate from April 1 to June 15 to provide a passage route for Atlantic salmon smolts.
- Continue to provide a total of 6% of Station Unit Flow (about 400 cfs at maximum generation) through the combined discharge of the forebay Tainter and surface sluice gates from November 1 to December 31 to provide a safe passage route for Atlantic salmon kelts.
- During the interim period between license issuance and the installation of the new fish guidance boom, continue to lower four sections of hinged flashboards to pass 560 cfs via spill from April 1 to June 15 to provide a safe passage route for Atlantic salmon smolts.
- Continue to pass approximately 425 cfs through the forebay deep gate and shut down Units 7 and 8 for 8 hours during the night for 6 weeks between September 15 and November 15 for downstream adult eel passage.

This proposed downstream operational period is inadequate to safely and effectively pass all species downstream. Alewives and blueback herring leave the spawning grounds immediately after spawning and begin their downstream migration. American shad exhibit similar behavior. This downstream migration typically occurs between May and September each year. In addition, juvenile lifestages of these three species of alosines begin migrating downstream as early as July when they are only approximately 40mm long. Larger juveniles will migrate downstream as late as November depending on environmental variables freshwater nursery habitats. The Licensee has proposed to cease operation of the forebay Tainter gate after June 15th, which would leave only the forebay sluice gate in operation. The maximum capacity of the sluice gate is approximately 35cfs, which is 0.52% of station capacity and is 0.43-0.81% of average flow at the Shawmut dam between June and September.

The Licensee also mentions that they will prioritize units for protection of Atlantic salmon. Based on the average daily inflow reported in table 2 of the EA, station capacity will be exceeding in all months except July, August, and September. Therefore, station capacity will be exceeded at the project for the majority of the downstream migration of Atlantic salmon smolts and adult alosines in the spring and the majority of the juvenile alosines and adult eels in the summer and fall. While unit prioritization is proposed for these times as a protective measure, the prioritization will not be in effect as all units will be "on".

Turbine screening

The licensee did not propose any additional screening, however FERC has suggested screening may be required as this was suggested in NMFS Section 18 preliminary prescription. The preliminary screening suggestion is to equip each powerhouse with full-depth trash rack bars clear spaced at 1.5-inches and 3.5-inches for Units 1-6 and 7-8 respectively. This screening approach is inadequate for Atlantic salmon and does not take into account juvenile river herring, shad, sea-lamprey, or eels so will not result in safe downstream passage of indigenous species. In order to protect downstream migrating Atlantic Salmon smolts and kelts, adult and juvenile Alewife, adult and juvenile American Shad, adult and juvenile Blueback Herring, and adult American Eel, and adult and juvenile sea-lamprey, the Licensee would need to install full-depth inclined or angled screening with much smaller spacing and sized so that the normal velocities should not exceed 2 feet per second measured at an upstream location where velocities are not influenced by the local acceleration around the guidance structures.

Non-Attainment

MDMR notes that aquatic life monitoring in the Shawmut impoundment indicates a finding of non-attainment ME0103000306_339R_01.
https://www.maine.gov/dep/water/monitoring/305b/2016/28-Feb-2018_2016-ME-IntegratedRptLIST.pdf.

Conclusion

The proposal by the Licensee will have significant adverse impacts to fisheries habitat and aquatic life and does not provide sufficient protections for indigenous species. Many additional items, such as full depth appropriate screening, a second volitional fishway near a major area of attraction flow on river right, and reliance on other best protective practices and available science should be considered further.