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August 2, 2021

VIA E-FILING

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, D.C. 20426

Pejepscot Hydroelectric Project (FERC No. 4784-106)
Reply Comments to Stakeholder Comments, Recommendations, and Preliminary Terms and Conditions.

Dear Secretary Bose:

On August 31, 2020, Topsham Hydro Partners Limited Partnership (Topsham Hydro), filed an Application for New License for Major Project – Existing Dam for the Pejepscot Hydroelectric Project (FERC No. 4784) (Project). On April 19, 2021, the Federal Energy Regulatory Commission (FERC or Commission) issued a Notice of Application Accepted for Filing, Soliciting Motions to Intervene and Protests, Ready for Environmental Analysis, and Soliciting Comments, Recommendations, Preliminary Terms and Conditions, and Preliminary Fishway Prescriptions (REA Notice).

Subsequently, the following parties filed comments, recommendations, and preliminary terms and conditions with FERC in response to the REA Notice: U.S. Department of Commerce, U.S. Department of Interior, and Maine Department of Marine Resources. Topsham Hydro provides reply comments to these filings in the attached.

If you have any questions regarding this filing or require additional information, please contact me by phone at (207) 755-5613 or by email at Luke.Anderson@BrookfieldRenewable.com.

Respectfully submitted,

Luke T. Anderson
Manager, Licensing
Brookfield Renewable

Attachment: Reply Comments of Topsham Hydro Partners Limited Partnership

cc: Distribution List

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Topsham Hydro Partners Limited Partnership	)))	**Docket No. P-4784-106**

REPLY COMMENTS OF TOPSHAM HYDRO PARTNERS LIMITED PARTNERSHIP

Topsham Hydro Partners Limited Partnership ("Topsham Hydro"), owner and operator of the Pejepscot Hydroelectric Project ("Pejepscot" or "Project") hereby submits its reply comments to the pleadings submitted in the above-captioned proceeding in accordance with the Federal Energy Regulatory Commission's ("FERC" or "Commission") April 19, 2021 "Notice of Application Accepted for Filing, Soliciting Motions to Intervene and Protests, Ready for Environmental Analysis, and Soliciting Comments, Recommendations, Preliminary Terms and Conditions, and Preliminary Fishway Prescriptions" ("REA Notice").

I. Introduction and Executive Summary

Topsham Hydro, owner and operator of the Project, submitted to FERC an Application for a New License for Major Project – Existing Dam ("FLA") on August 31, 2020. The existing license for the Project was issued September 16, 1982 and expires on August 31, 2022. The Project consists of a dam and appurtenant facilities located on the Androscoggin River in Maine. The Commission issued the REA Notice on April 19, 2021, which solicited motions to intervene, protests, and comments on the license application. In response to the Commission's REA Notice interested stakeholders filed comments addressing a range of issues pertaining to the licensing proceeding, including fish passage, river flow, and aquatic habitat.

The following stakeholders filed comments with FERC: U.S. Department of Commerce

("Commerce"),[1] U.S. Department of the Interior ("Interior"),[2] and the Maine Department of Marine Resources ("MDMR").[3] As explained in more detail below, the issues raised by these parties are: (1) already addressed by Topsham Hydro as part of the FLA; (2) unsupported by substantial evidence; and/or (3) outside the scope of this relicensing proceeding. Stakeholder comments are addressed by topic area below.

II. Section 10(a) Recommendations – Decommissioning and Dam Removal

Commerce submitted a 10(a) recommendation that the preferred alternative for the Pejepscot Project relicensing should be decommissioning and dam removal. Commerce states that decommissioning and removal would be reasonable alternatives for consideration under the Federal Power Act ("FPA") and is necessary for alleviation of Project impacts on fishery resources. Commerce maintains that this alternative is consistent with the management goals and restoration of public trust resources under Commission approved comprehensive plans including National Oceanic and Atmospheric Administration's ("NOAA's") Fisheries Androscoggin River Watershed Comprehensive Plan for Diadromous Fish.[4]

A. Decommissioning and Dam Removal as an Alternative

1. Summary of Comments

FERC will conduct its environmental analysis under the National Environmental Policy Act

[1] U.S. Department of Commerce, "Comments, Recommendations, Preliminary Terms and Conditions and Preliminary Fishway Prescriptions for the Pejepscot Hydroelectric Project (FERC No. 4784)," June 17, 2021 (hereinafter "Commerce comments").
[2] U.S. Department of the Interior, "Comments, Recommendations, Prescriptions, Application Ready for Environmental Analysis, Pejepscot Hydroelectric Project, FERC No. 4784-106, Androscoggin River, Androscoggin, Cumberland and Sagadahoc Counties, Maine," June 17, 2021 (hereinafter "Interior comments").
[3] Maine Department of Marine Resources, "Notice of Application Accepted for Filing, Soliciting Motions to Intervene and Protests, Ready for Environmental Analysis, and Soliciting Comments, Recommendations, Preliminary Terms and Conditions, and Preliminary Fishway Prescriptions, Pejepscot Hydroelectric Project (P-4784-106)," June 18, 2021 (hereinafter "MDMR comments").
[4] NOAA Fisheries. 2020. Androscoggin River Watershed Comprehensive Plan for Diadromous Fish. Greater Atlantic Region Policy Series 20-01. NOAA Fisheries Greater Atlantic Regional Fisheries Office - www.greateratlantic.fisheries.noaa.gov/policyseries/. 136 pp.

("NEPA"), and as part of that analysis is expected to consider reasonable alternatives to the proposed federal action. Commerce states that project decommissioning and dam removal are reasonable alternatives for analysis. Commerce contends that that project decommissioning and dam removal "would fulfill the Commission's mandate under the FPA to ensure the best comprehensive use of a waterway."[5]

2. Topsham Hydro Response

The Council on Environmental Quality defines "Reasonable Alternatives" in its regulations at 40 CFR 1508.1(a) as the "reasonable range of alternatives that are technically and economically feasible, meet the purpose and need for the proposed action, and, where applicable, meet the goals of the applicant."

As the Commission has previously held with regard to the Pejepscot proceeding, decommissioning is not a reasonable alternative to relicensing a project in most cases.[6] Prior to conducting a decommissioning analysis with or without dam removal, the Commission waits until an applicant proposes to decommission a project, or a participant in a licensing proceeding demonstrates, with supporting evidence, that there are serious resource concerns that cannot be mitigated if the project is relicensed. During the Pejepscot Project relicensing proceeding, Topsham Hydro never proposed decommissioning and dam removal as an alternative. Nor has NMFS provided any environmental rationale for retiring and/or removing the Project. Further, no entity has expressed interest in assuming regulatory control and supervision of the Project facilities. Moreover, there is no evidence of an unavoidable, serious resource concern that cannot be mitigated with appropriate protection, mitigation, and enhancement measures developed through the relicensing process. To

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[5] Commerce at 46.
[6] Scoping Document 2, Pejepscot Hydroelectric Project, Project No. 4784-095, Federal Energy Regulatory Commission, Office of Energy Projects, Division of Hydropower Licensing, Washington, DC, February 2018. Accession Number: 20180205-3004.

that point, Commerce states "In lieu of dam removal, our long-term resource goals and objectives can only be achieved via effective fishways. Therefore, we are filing the preliminary section 18 prescriptions for fish passage facilities necessary to achieve safe, timely, and effective passage."[7] This indicates that Commerce's relicensing objectives can be met without decommissioning and dam removal and support the Commission's previous conclusion that "further analysis of dam removal as a reasonable alternative is not required"[8] in this proceeding.

Decommissioning the Project would require denying the relicense application and surrender or termination of the existing license. The Project provides a viable, safe, and clean renewable source of power to the region. There would be significant costs involved with decommissioning the Project and/or removing Project facilities. Based on the 17 factors that FERC considers when determining whether a more thorough analysis of decommissioning is warranted in a NEPA document, as outlined in The Interagency Task Force Report on NEPA Procedures in FERC Hydroelectric Licensing,[9] FERC should not consider decommissioning and dam removal as a reasonable alternative to relicensing the Project.

B. Consistency with Comprehensive Plans

1. Summary of Comments

Commerce maintains that decommissioning and dam removal are, per Section 10(a) of the FPA, consistent with applicable comprehensive plans and imply that this alternative would be best adapted for the waterway. Commerce writes that "a decision to decommission and remove the Pejepscot Project and thereby remove a significant barrier to recovering an endangered species, and support the restoration of several anadromous fish, would fulfill the Commission's mandate under

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[7] Commerce at 48.
[8] Scoping Document 2 at 6.
[9] Available at: https://cms.ferc.gov/sites/default/files/2020-04/NationalEnvironmentalPolicyActProceduresinHydroelectricLicensing.pdf.

the FPA to ensure the best comprehensive use of a waterway."[10] Commerce states that decommissioning and dam removal "would be consistent with the management goals and restoration of public trust resources under Commission approved comprehensive plans". Commerce cites a total of five (5) such plans including its own management plan for the Androscoggin River[11].

2. Topsham Hydro Response

Section 10(a) of the FPA establishes the comprehensive development standard which each project must meet to be licensed. The Commission must ensure that the project to be licensed is best adapted to a comprehensive plan for developing the waterway for beneficial public purposes. In making this judgment, the Commission considers comprehensive plans (including those that are resource-specific) prepared by federal and state entities, and the recommendations of federal and state resource agencies, Indian tribes, and the public.

Commerce's management plan for Androscoggin River does not discuss removal of Pejepscot as being necessary. In fact, the plan analyzes a potential upgrade and expansion scenario of the generation capacity for the Pejepscot Project, concluding that the Project could be capable of adding approximately 7.0 megawatts ("MW") of generation capacity. Within the plan, Commerce implies that this increased generation output at Pejepscot could offset generation losses at hydropower facilities located on the Lower Androscoggin River, should decommissioning and dam removal be pursued at those projects. This clearly indicates the decommissioning and dam removal of the Pejepscot Project is inconsistent with the management goals and restoration of public trust resources described under Commerce's management plan. Therefore, the Commission should not adopt decommissioning and dam removal as an alternative in its NEPA analysis.

[10] Commerce at 46.
[11] NOAA Fisheries. 2020. Androscoggin River Watershed Comprehensive Plan for Diadromous Fish. Greater Atlantic Region Policy Series 20-01. NOAA Fisheries Greater Atlantic Regional Fisheries Office - www.greateratlantic.fisheries.noaa.gov/policyseries/. 136 pp.

III. Section 18 Fish Passage Prescriptions and Section 10(j) Recommendations

Interior and Commerce both issued preliminary Section 18 fishway prescriptions for the Pejepscot Project.[12] Interior's prescription focuses on eel passage while Commerce's prescription focuses on passage for all anadromous species. MDMR included several fishway measures as 10(j) recommendations. Topsham Hydro addresses specific points related to the prescriptions and recommendations below.

A. Upstream Passage Measures

1. American Eel

Topsham Hydro proposes to install a temporary portable American eel ramp for three passage seasons (June 1 through September 15) to identify a suitable location for a permanent upstream American eel ramp. Based on the results of the temporary portable ramp evaluation, Topsham Hydro proposes to install a permanent upstream American eel ramp (June 1 through September 15) after upstream eel passage facilities are constructed at the downstream Brunswick Hydroelectric Project.

Summary of Comments

Interior's prescription would require Topsham Hydro to conduct visual monitoring surveys and deploy temporary eel ramp(s) for two passage seasons, followed by installation of permanent eel ramp(s) in the third passage season. Interior states that "based on data from nearby watersheds and a recent license issuance upstream of the Project, approved fish passage protection measures shall be operational May 1 through October 31 for the upstream migration period." MDMR's Section 10(j) recommendations essentially mirror Interior's prescription except for the seasonal operating period which is recommended to be June 1 to September 15.

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[12] Topsham Hydro requested a trial-type hearing on disputed issues of material fact with respect to the prescriptions filed by both Interior and Commerce pursuant to Section 18 of the FPA. It also filed alternative prescriptions pursuant to FPA Section 33(b). Topsham Hydro submitted a copy of these filings into the relicensing record for the Project on July 19, 2021.

Topsham Hydro Response

Interior provides no evidence that "nearby watersheds" have collected significant numbers of upstream migrating eels during the months of May, September, and October. Interior cites collections made in 2020 at the West Enfield Hydroelectric Project[13] as being supportive of the May 1 to October 31 operating period. However, those collection indicate that a total of 218,755 eels were collected at West Enfield in 2020, with most of the eels collected in the month of June (89.4%), followed by July (9%). The months of May, September, and October represented only 0.9%, 0.1%, and 0.0%, respectively, of the total collections made in 2020 at West Enfield. Moreover, the other Projects cited in the report operated more in-line with the June 1 to September 15 period proposed by Topsham Hydro and MDMR (i.e., Milford: June 3 to September 17; Orono: May 29 to September 22; and May 28 to September 21).

The most recent license issued in the Androscoggin River Basin, for the Barker's Mill Project, FERC No. 2808, approved fish passage protection measures based on a June 1 – September 15 upstream eel migration period. All of the other most recently-issued licenses for hydropower projects in watersheds throughout Maine (the Penobscot, Kennebec, and Saco River Basins) similarly approved upstream eel passage protection measures based on the same June 1 – September 15 or even shorter (June 1 – August 31) upstream eel migration period.[14] Because eelways in the Androscoggin River Basin and other watersheds in the State of Maine do not pass many eels in the months of May, September, and October, the upstream migration period is generally prescribed as June 1 – September 15, consistent with USFWS's American Eel Biological Species Report and with

[13] Milford Project (FERC No. 2534); West Enfield Project (FERC No. 2600); Stillwater Project (FERC No. 2712); Orono Project (FERC No. 2710); 2020 American Eel Upstream Passage Operation and Monitoring Report. Accession No. 20210323-5236.

[14] KEI (Maine) Power Management (III) LLC, 171 FERC ¶ 62,043 (2020). Great Lakes Hydro America, LLC, 174 FERC ¶ 62,135 (2021). KEI (Maine) Power Management (III) LLC, 167 FERC ¶ 62,076 (2019). Brookfield White Pine Hydro LLC, 162 FERC ¶ 62,108 (2018).

MDMR's 10(j) recommendation.[15]

2. Anadromous Species

Topsham Hydro proposes to modify the existing fish lift cycle to increase the lift frequency during the peak alosine upstream migration season, and develop a plan and schedule, containing potential physical and/or operational modifications to be constructed/implemented to address factors (i.e., internal and external attraction flow hydraulics and acoustics) that may be impacting upstream passage of migratory fish species.

Summary of Comments

Commerce's prescription closely follows Topsham Hydro's proposal with a few exceptions. Commerce requires that the lift cycle schedule be developed through an adaptive process and determined annually through consultation with resource agencies. In addition, Commerce's prescription requires installation of a flap gate (also referred to as an overshot or reversed overshot gate) to replace the existing vertical gate at the Project fish lift. The prescription also provides that the operation of the gate should accommodate the full 160 cubic feet per second ("cfs") of attraction water or more with the top of the gate positioned a minimum of 3.0 feet below the tailrace elevation under varying river flows and maintain an entrance velocity within the 4-6 feet per second ("fps") range for alosines and up to 8 fps for Atlantic salmon and a drop at the entrance approximately 0.8 feet normally with the capability of increasing up to 1.5 to 2.0 feet. Finally, Commerce's prescription requires additional measures to be implemented if the above prescribed measures do not achieve certain passage performance standards. These adaptive requirements could include the construction of additional fishway entrances and/or fishways if monitoring demonstrates their necessity. The

[15] Shepard, S. L. 2015. American eel biological species report. Supplement to: Endangered and Threatened Wildlife and Plants; 12-Month Petition Finding for the American Eel (*Anguilla rostrata*) Docket Number FWS-HQ-ES-2015-0143. U.S. Fish and Wildlife Service, Hadley, Massachusetts. FERC Accession No. 20210629-5059.

timing of implementation of these additional measures is tied to the resolution of the upcoming Brunswick Hydroelectric Project FERC relicensing (current license expiration date of 2029). MDMR's Section 10(j) recommendations essentially mirror Commerce's prescription.

Topsham Hydro Response

The 2019 study[16] cited by Commerce's prescription indicated that submergence depths greater than 3.0 feet appeared to greatly increase alosine entrance efficiency at fish lifts. Increases in submergence depth were shown to be the most influential predictor variable of passage time, followed then by gate type (e.g., vertical, overshot, and reversed overshot) and river temperature. However, the study notes the overshot gate is "less common" in existing fishways and the reversed overshot gate is "novel" to fishways (collectively referred to a flap gate by NMFS). Due to the prototypical nature of the overshot gate design and the 2019 study finding that submergence depth was the key factor affecting passage efficiency, Topsham Hydro does not concur that the flap gate is necessary as an initial modification to the fish lift. Rather, Topsham Hydro maintains that the flap gate would be better implemented as a subsequent modification, if the initial modifications to the fish lift (i.e., increased attraction water, entrance gate setting no less than 3.0 feet, decreased lift cycle time) are not sufficiently effective. The current vertical gate at the fish lift can meet the USFWS design criteria for entrance jet velocity and hydraulic drop under the operational protocol described in Commerce's prescription; therefore, the overall operational objective and intent can be met with the current vertical gate configuration.

Topsham Hydro recommends delaying the implementation of the prototypical reverse overshot gate design at the existing fish lift, which is targeted toward increasing the external efficiency of the fish lift, until other modifications targeting the lift's internal efficiency (attraction

[16] Mulligan, K. B., Haro, A., Towler, B., Sojkowski, B., & Noreika, J. (2019). Fishway entrance gate experiments with adult American Shad. *Water Resources Research, 55*. Retrieved from https://doi.org/10.1029/2018WR024400.

flow, decreased lift cycle time) are implemented and tested. This delay is supported by Topsham Hydro's 2019 radio telemetry study that found strong nearfield attraction (approximately 93%), but low overall fish lift effectiveness (approximately 20%) for river herring, suggesting that the river herring were entering the fish lift entrance gate but not completing passage through the remaining internal portions of the fish lift.

B. Downstream Passage Measures

1. American Eel

Topsham Hydro proposes to reduce the operational setting for Unit 1 (unit turndown) to approximately 3,480 cfs (resulting in intake approach velocities of less than 1.5 fps) for eight hours during the night (8:00 pm to 4:00 am) between September 1 and October 31 annually to enhance downstream eel passage.

Summary of Comments

Interior provided preliminary Section 18 prescriptions addressing downstream passage for American eel. Interior's prescription requires as an interim measure, targeted nighttime shutdowns for downstream migrating American eel from August 15 to November 15. Construction of permanent downstream eel passage and protection are required within three year of license issuance, but Interior does not specify which permanent downstream measures would be required. Interior's Prescription only states that the design of permanent eel passage facilities and/or operational measures be developed in consultation and require approval by USFWS, as well as be consistent with the USFWS fish passage design criteria. However, Interior's prescription does suggest that downstream passage for American eels can be achieved with the installation of an inclined screen for Unit 1 with 0.75 inch clear spacing or less with bypasses capable of passing a minimum of 5% of station hydraulic capacity.

MDMR recommended the installation of a full-depth inclined rack (with a maximum clear-spaced opening of 0.75 inch) for Unit 1 with two low-level and two surface bypasses on the face of the rack; with a bypass flow of 380 cfs, as well as full depth screening of Units 21, 22, and 23 or seasonal shutdowns to prevent turbine entrainment.

Topsham Hydro Response

Both Interior and MDMR state that they are not aware of any cases of turbine turndowns implemented as a protective measure for American eel in the northeastern United States. Interior and MDMR point to the lack of supporting information as justification for dismissing this Topsham Hydro's proposal. However, Topsham Hydro's American eel route of passage studies provided an estimate of survival. In this case the studies estimated whole station survival at 91.7%. Interior and MDMR note that the "study did not consider drift of dead eels and did not use technology to reliably assess the fate of turbine-passed eels (e.g., Hi-Z balloon tags)". However, turbine survival studies[17] (Hi-Z balloon tags) conducted at the West Enfield Project support the survival estimate at Pejepscot. The West Enfield Project has Kaplan units similar to the Pejepscot Project unit,[18] and Hi-Z balloon tagging studies estimated 96-hour survival at 90.0% for American eel.

Interior cites the Medway Project study where the downstream survival estimate for eels of 92% was adjusted downward by 8% to account for delayed mortality and drift of dead/injured eels. However, the study also noted that there are other sources of mortality that could have affected study results (i.e., natural and tagging-related), and the study was performed under worst-case conditions, with low flow and limited downstream passage options.[19] Results from Pflugrath et al. (2019)[20]

[17] Normandeau Associates, 2021. Downstream Adult American Eel Turbine Passage Survival and Injury, West Enfield Project, FERC No. 2600.
[18] The West Enfield units have 3 blades, a runner speed of 86 rpm, and a runner diameter of 192 inches. The Pejepscot unit has 4 blades, a runner speed of 82 rpm, and a runner diameter of 216 inches.
[19] Black Bear Hydro Partners, LLC, 2020. Evaluation of Downstream Passage Effectiveness for Adult American Eel at the Medway Hydroelectric Project, Project No. 2666-000 (filed Feb. 15, 2021).
[20] Pflugrath et al.,2019. American Eel State of Buoyancy and Barotrauma Susceptibility Associated with Hydroturbine Passage.

suggest delayed mortality may not substantially affect telemetry results, noting that eels are not likely to obtain neutral buoyancy given their swim bladder morphology and maintain a state of negative buoyancy. Therefore, dead or injured eels would sink, where they would be more likely to settle or get caught on the bottom rather than drift long distances and any drift would be slower than for live eels.

2. Anadromous Species

As part of consultation for both the FERC relicensing as well as Section 7 of the ESA, Topsham Hydro proposed a series of enhancements targeted to anadromous fish species. These enhancements include discontinuing the north (left bank) downstream fish bypass; continued operation of south (right bank) downstream fish bypass, as well as installation of a fish guidance system/debris boom to direct downstream migrants to a new bypass within bascule gate no. 1. Topsham Hydro also proposed opening bascule gate No. 1 (closest to the powerhouse) 50% to provide approximately 500 cfs of spill at night (2000 – 0700 hours) during the month of May, as an interim measure.

Summary of Comments

Commerce provided preliminary Section 18 prescriptions addressing downstream passage for anadromous species. Commerce's preliminary prescriptions for anadromous species generally correspond with Topsham Hydro's proposals with a few exceptions. Commerce requires continued operation of the north (left bank) downstream fish bypass, as well as additional adaptive management measures to be implemented if its prescribed measures do not achieve certain passage performance standards. These measures may include, but not be limited to the installation of an Alden-style (bypass) weir and/or rigid rack structure(s) with close spacing of 1-inch or less.

MDMR Section 10(j) recommendations include the installation of a full-depth inclined rack (with a maximum clear-spaced opening of 0.75 inch) for Unit 1 with two low-level and two surface bypasses on the face of the rack; with a bypass flow of 380 cfs, as well as full depth screening of Units 21, 22, and 23 or seasonal shutdowns to prevent turbine entrainment. These measures would be targeted toward all migratory fish species. MDMR did not recommend Topsham Hydro's proposed installation of the fish guidance system/debris boom.

Topsham Hydro Response

MDMR's recommended full-depth inclined trashracks would have significant cost implications, including large capital costs for installation, additional operational and maintenance costs, and reduction of energy due to head loss. Generally, Topsham Hydro does not consider tighter trashrack spacing more favorable than the proposed fish guidance system/debris boom as the boom would provide exclusion, potential sweeping flows, and guidance directly to the downstream fishways, whereas tighter rack spacing would only address the exclusion. Close-spaced trashracks while decreasing entrainment potential also have the potential to increase impingement (defined as injurious contact with a bar rack) of the target fish species. Typically, intake velocities of 2 fps or less are recommended to reduce impingement potential. At Pejepscot, replacing the existing trashracks with full depth ¾- inch trashracks within the existing intake bay at the new powerhouse would result in intake velocities at full generation of greater than 3.0 fps. To reduce intake velocities, a ¾-inch trashrack would need to be angled horizontally to increase the overall surface area. At Pejepscot, to achieve the 2 fps intake velocity criteria, the length of the trashrack would need to increase from approximately 92 feet to 140 feet. The inclined (vertically) ¾ trashrack alternative noted in MDMR's Section 10(j) recommendation would require the trashrack length to be increased from approximately 25 feet to 40 feet to achieve the 2 fps intake velocity criteria at the new powerhouse.

Given the significant engineering and operational concerns associated with ¾-inch trashracks and availability of the fish guidance system/debris boom as a viable alternative, MDMR's recommendation is not supportable, and therefore, the Commission should not adopt it.

IV. Effectiveness Testing

Topsham Hydro has proposed one season of effectiveness testing for juvenile and adult Atlantic salmon and river herring.

A. Summary of Comments

Interior has prescribed a minimum of two-seasons of effectiveness testing for American eel. Commerce's prescription and MDMR's Section 10(j) recommendations would require three years of upstream passage effectiveness testing for five species (i.e., adult American shad, alewife, blueback herring, Atlantic salmon, and sea lamprey) and three years of downstream effectiveness testing for eight species and life stages (i.e., adult and juvenile Atlantic salmon, American shad, alewife, and blueback herring). NMFS's rationale is that "monitoring over three-year terms is necessary to adequately account for the effect of environmental variability as it relates to passage efficacy at the Project." Moreover, NMFS and MDMR stipulate that an additional three years of study should be conducted after any modifications resulting from implementation of adaptive management measures.

B. Topsham Hydro Response

NMFS and MDMR provide no evidence to support the recommendations for three years of testing of multiple species and life stages. Topsham Hydro acknowledges that effectiveness testing will be a requirement to ensure that the upstream and downstream fish passage facilities are operating in a safe, timely and effective manner. However, the need for three consecutive years of testing for multiple species, life stages and directions, particularly for species and life stages for which successful study methodologies have yet to be developed, is excessive. The estimated cost is approximately $100,000 for each species and life stage, which is a significant burden that is not justified.

Furthermore, there is no need to study each species, life stage and direction as a singular effort. Juvenile alosine studies conducted using larger juvenile alewives would provide sufficient passage information for juvenile shad, blueback herring and alewives. Likewise, adult river herring (alewives and blueback herring) can be combined into a single study. Studies for American shad and sea lamprey should not be conducted at this juncture as study methodologies are not refined. Upstream American shad passage studies routinely provide inconclusive results primarily due to the "fallback" behavior typically exhibited by these fish after tagging. American shad are also very sensitive to stress, handling, holding, and transport, which can impact study results. Upstream sea lamprey studies are only just now being conducted in the state of Maine, and tagging protocols and methodologies remain in flux.

V. Performance Standards

Topsham Hydro has proposed no passage performance standards as part of this proceeding. The Commission has previously stated[21] that achieving standards recommended by MDMR for alosines and sea lamprey may not be realistic and continuing to modify the fish lift and/or its operations to achieve these effectiveness standards for alosines and sea lamprey could jeopardize passage effectiveness for Atlantic salmon. Specifically, the Commission determined that upstream migrating sea lamprey and American shad can be either difficult to effectively pass or are difficult to document that they are effectively passed, for reasons that could be completely unrelated to the fishway design or its operation.

A. American Shad

1. Summary of Comments

For upstream passage MDMR recommends the following performance standards to

[21] Draft Environmental Assessment for Hydropower License. Shawmut Hydroelectric Project, P-2322-069. July 2021. Accession Number: 20210701-3011.

demonstrate safe, timely, and effective passage for American shad.

- At least 75% of the adult American shad that pass upstream at the next downstream dam (or approach within 200 m of the Pejepscot Project powerhouse) pass upstream at the Project within 72 hours.

For downstream passage, MDMR recommends the following performance standards to demonstrate safe, timely, and effective passage for American shad.

- At least 95% of the juvenile American shad and 85% of the adult American shad that pass downstream at the next upstream hydropower dam (or within 200 m of the Pejepscot Project spillway) pass the Project.

2. Topsham Hydro Response

While shad passage is provided at the downstream Brunswick Dam and MDMR has determined that shad habitat exists in the Androscoggin River, American shad are not native to the Androscoggin River. USFWS' 1951 Report "A Survey of Former Shad Streams in Maine", commissioned by the Atlantic States Marine Fisheries Commission to assess the factors contributing to the decline of American shad in Maine, indicates that the Androscoggin River was "never a shad river, because of impassable falls at Brunswick" but that "the five mile stretch between Brunswick and the bay was regularly fished".

MDMR lays out fishway performance standards for American shad based on a stochastic, life-history based, simulation model[22] developed by Dr. Daniel S. Stich (Stich 2021).[23] This model is evidently similar in concept to the model previously developed for Penobscot River shad (Stich et

[22]Although MDMR lists the model as a reference for 7 different watersheds, there is no indication that any river-specific models developed after the initial Penobscot River model (Stich et al. 2019) has been subjected to peer-review.
[23] Stich, D, E. Gilligan and J. Sperhac (2021). shadia: American shad dam passage performance standard model for R. R package version 1.8.3. (https://github.com/danStich/shadia). Retrieved January 24, 2021.

al. 2019).[24] MDMR notes that Dr. Stich ran several scenarios to explore the effects of variable upstream passage efficiencies for adult spawners (0.10-1.00) in combination with varying downstream passage efficiencies (0.50-1.00 for adults and 0.80-1.00 for juveniles). Additionally, it stated that "all models assume the same upstream passage efficiency, upstream passage time (72 hours), and downstream survival at all dams in the watershed."

Topsham Hydro acknowledges the utility and usefulness of the Stich et al. (2019) model and its consequent extensions to other river systems with regard to understanding the impacts of several passage scenarios on a simulated population of American shad. As MDMR states, the shad models developed by Dr. Stitch were utilized in the most recent benchmark stock assessment conducted by the Atlantic States Marine Fisheries Commission ("ASMFC"). That said, although the stock assessment used these individual based models ("IBMs"), the model developed by Dr. Stitch is not *the* stock assessment model. Despite the inclusion of the Stitch model, the 2020 ASMFC stock assessment for American shad states, "No trend found" and "No data" in reference to changes in mortality and abundance with respect to Young of Year ("YOY") shad and adult shad (ASMFC, 2020).[25]

It is relatively common practice for IBMs to be included in stock assessment benchmarks as they can provide a great deal of information on life history parameters which suffer from poor data availability. However, the inherent assumptions made in IBMs render them inappropriate for making predictions about species abundance. IBMs are designed to highlight data gaps, and therefore knowledge gaps, and backfill them with a hypothetical scenario that is informed by biological parameters averaged across space and time, which makes them relevant, but does not and cannot

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[24] Stich, D.S., T.F. Sheehan, and J.D. Zydlewski. 2019. A dam passage performance standard model for American shad. Canadian Journal of Fisheries and Aquatic Sciences 76: 762-779.

[25] ASMFC (Atlantic States Marine Fisheries Commission). 2020. 2020 American Shad Stock Assessment and Benchmark Peer Review Report. ASMFC, Arlington, Virginia.

guarantee their accuracy in representing a river-specific population or sub-population. MDMR has used results from this non-reviewed Androscoggin River version of the model to recommend passage criteria to reach specific outcomes of abundance above the Pejepscot Project.

The model described in Stich et al. (2019) is undoubtedly very comprehensive and well parameterized. Despite this, the Stich model has limitations in its applicability which are rooted in the inherent assumptions behind the model and the overall model type. The dam passage performance model for American shad presented in Stich et al. (2019) is an IBM with a one-dimensional movement analysis incorporated. The model focuses on the mean modeled population projections as indicators of the necessity of specific suites of passage performance criteria to achieve Plan targets. That approach is misapplied because it undermines the inherent stochasticity of the model and considers the result as deterministic. The model incorporates environmental stochasticity and inter-annual variability by drawing from parameterized distributions for many input variables. As previously stated, it is appropriate to use the model as a tool to assess the relative population trends, but not to consider the output as deterministic. This model can, and should, be used to assess how specific passage rates or passage mortalities would influence the trajectory or directionality of the population, but it cannot accurately assess or make predictions as to the precise number of individuals that will occupy the population at the end of a given simulation (such as using simulated passage efficiency/mortality required to achieve a specific target abundance).

In a simplified sense, the model utilizes several pre-defined parameters of importance such as the starting total number of age-1 individuals in the population, marine survival, and temperatures of initial and terminal spawning dates, in addition to several derived parameters based on arrival date in the estuary and several biological characteristics such as growth and fecundity parameters which are interpolated from data obtained in the several river systems, not explicitly the Androscoggin River.

The greatest limitation of an IBM-type model for projecting fish populations, and the reason they are not used as a standalone stock assessment model, is the inability to assess the fitness of the model to observed data such as count data. This is a critical step in the review of a model prior to its use to make management decisions because it will reveal whether the model is capable of accurately representing the species in question. Assessing a model's fit to an observed data set gives the model developer and managers an opportunity to evaluate their model performance in comparison with what is being observed in the river system in question. Some model types lend themselves to an analysis of retrospective 'peels,' which will indicate whether a model tends to over-predict, under-predict, or if the model can be considered accurate within an acceptable margin of error. This stepwise process allows for step-specific assessments of model fit and for adjustments to be made post-hoc to improve model performance, explanatory capability, and increase the accuracy or reliability of model outputs. Unfortunately, this is not possible for an individual based model because it must run out the amount of time specified in the simulation and because it is based only on a few initial pieces of data, rather than continuously collected data. As a result, there is no quantifiable metric by which to decide whether the simulated data from the Stich model is representative of the observed data collected by MDMR and Topsham Hydro biologists each year.

Within the selection of model type and parameter assignments, there are several assumptions, including:

- Inputs to the IBM are representative and reflective of that which is occurring in the natural system (i.e., Androscoggin River).
- Outputs of the IBM are representative and reflective of that which is occurring in the natural system (i.e., Androscoggin River).
- There are no significant differences in population structure, individual behavior, or biological parameters between shad in the river systems used to obtain averaged

biological parameters to inform the model.

- Fish make only one attempt at passage per day.
- Fish move upstream regardless of saturation of the downstream spawning habitat and the energetics of continued migration.

Any model is only as good as its key assumptions, and even a cursory review of the Androscoggin River American shad model developed and used by MDMR raises considerable doubts about many of the assumptions used by MDMR.

Additionally, following the assumption that the model input parameters and output results are representative of shad in the Androscoggin River, it is explicitly stated by Stich et al. (2019) that the shad passage model outputs are highly sensitive to changes in the parameter estimate for marine survival, which is based on an age-invariant rate of 0.62 (62%) for each annual period from young of year up until age-13 (maximum age in model) (ASMFC 2020). Although a range of values were considered, Stich explicitly states *"*our ability to make more precise predictions would be improved by better information." This raises the question of the appropriateness of assuming not only a constant mortality across age classes, but also the validity of assuming that this rate of survival has remained unchanged over the past 14 years. Lacking information, the Stich model incorporates a fixed rate of at-sea mortality within a given model run. Most fish species exhibit a type III survivorship pattern where mortality losses are generally associated with the earlier portion of life. Whereas assumption of a constant marine survival rate for older shad may be appropriate, the assumption of a single representative rate for first year fish with repeat spawners may not be appropriate. Although the Stitch model accounts for simulated variability in this parameter, it is still informed by a single value which may be outdated, and misrepresentative of the various age classes present in the population.

Stich (2019) also states explicitly that "model outputs were sensitive to changes in growth of

American shad in this study. This indicates that system-specific data would be preferable to using growth information from the Connecticut River population." This statement inherently casts doubt on the usefulness of the current Androscoggin River model, as the incorporation of Connecticut River shad data, or data from any other river system, may be likely to exhibit significant differences in key biological parameters that would have a large influence on model outputs. MDMR has provided no evidence that these differences were explored or considered, furthering the question of whether this model is appropriate to forecast Androscoggin River shad populations.

Furthermore, a critical assumption that is not explored in the Stitch et. al. (2019) publication is that fish make only one attempt at passage per day. This is evidenced in the upstream passage model description when Stitch et. al. (2019) states that "each fish was allowed one attempt per day to pass a dam." Despite the various parameters that were highlighted in the model's sensitivity analysis as having a large influence over the output, this critical assumption is not tested and it does not appear that any variability in passage attempts has been, or can be, incorporated into the models constructed by MDMR. This assumption is a potential flaw: diadromous species approaching a dam, as has been well documented, can make several attempts at passage per day. MDMR has not discussed or supported the upholding of this assumption with any literature or observational evidence to indicate how this assumption may impact model results or impact the various *time-to-pass* parameters explored by MDMR.

The shad passage model used to inform the passage comes from the *'Shadia'* package in the statistical program R published by Dr. Stich. On the provided website and in the subsequent links it is stated: "*These models are in various stages of completion but are provided for transparency in their development and application*." Specific to the Androscoggin River shad model, "This model is currently undergoing review with fishery and habitat scientists and managers at the Maine Department of Marine Resources." It is unclear from either the website or content provided by

MDMR as to what the review has consisted of or whether the issues described above have been considered.

While Stich et al. 2019 remains a useful tool to evaluate potential population impacts, MDMR relies on this non-reviewed and largely undocumented Androscoggin River American shad model to develop recommendations for passage requirements they believe will lead to a specific goal of shad abundance. A review of the model results raises significant questions regarding the applicability of the model, fundamental assumptions loaded into the model, and as such any conclusions MDMR has drawn from limited use of the model.

B. Blueback Herring

1. Summary of Comments

For upstream passage MDMR recommends the following performance standards to demonstrate safe, timely, and effective passage for blueback herring.

- At least 88% 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.

For downstream passage, MDMR recommends the following performance standards to demonstrate safe, timely, and effective passage for blueback herring.

- At least 95% of the juvenile blueback herring and 75% of the adults that pass downstream at the next upstream hydropower dam (or within 200 m of the project spillway) pass the project.

2. Topsham Hydro Response

As with the American shad standards, MDMR based the proposed standard on an unpublished stochastic, life-history based, simulation model developed by Dr. Daniel S. Stich (Stich unpublished)[26]. This model is similar in concept to a model previously developed for Penobscot River shad (Stich et al. 2019)[27] and which has been presumably modified to be representative for Androscoggin River blueback herring.

Topsham Hydro acknowledges the utility and usefulness of the original Stich et al. (2019) model with regard to understanding the impacts of several passage scenarios on a simulated population of American shad. That said, MDMR has used results from this unpublished and non-reviewed model to recommend specific passage criteria that they believe will result in reaching a specific target abundance of blueback herring. Given previous experience with MDMR utilizing these models in this very context, Topsham Hydro questions the applicability of using this model to develop blueback herring passage standards without adequate peer and public review and comment.

According to the description provided by the author (Stich, unpublished) the current Androscoggin River blueback herring model incorporates some species-specific data from other rivers and assumes the majority of movement data for the species are the same as that for American shad. While Topsham Hydro understands the adoption of surrogate data for this less studied species, it does raise questions with regards to the predictive abilities of the model and the legitimacy and accuracy of the associated performance standards that are being put forth by MDMR for blueback herring specific to the Androscoggin River. Although the model described in Stich et al. (2019) is comprehensive and well parameterized, it was originally built and described exclusively for shad passage. Stich et al. (2019) states "Differences between species in addition to site-specific considerations further complicate this problem and preclude a one-size-fits-all solution of fish passage."

Further Stich et al. (2019) notes that the model can be readily extended to other species given

[26] Stich, D.S. Unpublished. Kennebec Blueback Herring model.
[27] Stich, D.S., T.F. Sheehan, and J.D. Zydlewski. 2019. A dam passage performance standard model for American shad. Canadian Journal of Fisheries and Aquatic Sciences 76: 762-779.

alterations to input data, such as biological parameters, path information, etc. However, MDMR has failed to present these parameters, how they are different from the shad model, and what evidence supports the use of said parameters. In addition, MDMR's estimate of minimum design populations for blueback herring seems to be based solely on the population in the Sebasticook River, which is in the lower portion of the Kennebec watershed. While Topsham Hydro recognizes that the data necessary to estimate minimum design populations can be scarce, the use of a single population from a river that is highly productive is questionable and likely overestimates what would be seen in other watersheds. The Sebasticook River is relatively eutrophic due to a combination of slow-moving water and high nutrient inputs from surrounding farmlands and wetlands. These conditions seem to be favorable for river herring population growth, and both blueback and alewives have seen large recoveries in the Sebasticook river after the removal of the Edwards Dam on the mainstem of the Kennebec River (Wippelhauser 2021) [28]. However, it is not appropriate to use the Sebasticook River to represent other watersheds like the Androscoggin because of underlying differences in the characteristics of these rivers. The design populations estimated by MDMR for both shad and alewife are calculated using multiple systems instead of a single river. In addition, the Connecticut River American Shad Management Plan (CRASC 2017)[29] uses different productivity estimates for mainstem reaches and tributaries, stating that it is not appropriate to assume that one location represents the other. Taken together, the approach used by MDMR for blueback herring does not seem suitable for deriving performance standards for the Androscoggin River.

Assuming MDMR relied solely on this model output and given the lack of species and watershed specific input data, Topsham Hydro feels the development of the blueback herring passage

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[28] Wippelhauser, G. 2021. Recovery of Diadromous Fishes: A Kennebec River Case Study. Transactions of the American Fisheries Society. 150: 277-290.
[29] CRASC (Connecticut River Atlantic Salmon Commission). 2017. Connecticut River American Shad Management Plan. Sunderland, Massachusetts. https://www.fws.gov/r5crc/pdf/CRASC_Shad_Plan_6_13_17_FINAL.pdf.

standard is premature. Like that previously described for American shad, the Stich model has limitations in its applicability which are rooted in the inherent assumptions behind the model and the overall model type. These potential impacts are previously described for the American shad model in and are consistent with the concerns associated with the blueback herring model.

C. Alewife

1. Summary of Comments

For upstream passage MDMR recommends the following performance standards to demonstrate safe, timely, and effective passage for alewife.

- At least 95% of the adult alewife that that pass upstream at the next downstream dam (or approach within 200 m of the project powerhouse) must pass upstream at the project within 72 hours; and

For downstream passage, MDMR recommends the following performance standards to demonstrate safe, timely, and effective passage for alewife.

- 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.

2. Topsham Hydro Response

MDMR explains that these passage standards were developed through alewife habitat and production estimate modeling. Topsham Hydro agrees that effective passage in both directions is vital to restore and maintain self-sustaining populations of migratory fish. However, a review of MDMR's explanation of how its new effectiveness standards were derived raises questions about MDMR's methodologies, documentation, and conclusions. MDMR appears to have inappropriately used a deterministic model.

A deterministic population model produces results that are entirely driven by the parameters that are programed into its calculations. Changing key assumptions in the inputs directly changes the output. While useful for many purposes, deterministic population models have several well-known and well-documented limitations.

MDMR inappropriately adapted an existing, deterministic alewife population model to develop and propose the passage standards for the Pejepscot Project. MDMR claims these standards are critical for restoring an annual alewife run of 817,100-1,390,800 upstream of Worumbo Dam. The basic structure and inputs of the original model have been described in Barber et al. (2018);[30] the same information and the R code is annotated at the model web site.[31] MDMR failed to heed the warnings and instructions explicitly stated by the model developers: that users of this model should *"not make detailed predictions about the exact number of alewife that will return in a given time frame."* (Barber et al. 2018). Barber et al. (2018), explains that deterministic models such as this one address general trends in a population and can help inform management decisions by testing sensitivities within life histories, but because variation in the spawning run is averaged, these models are not predictive.

As a result, this model is intended for the sole purpose of comparing different management strategies and understanding their general impacts, but is unable to forecast accurate, well-informed projections of alewife abundance or population size. Barber et al. stresses that key assumptions of the model which can greatly impact model output must be kept in mind when interpreting the results of the model. Among these key assumptions are the following:

- Environmental parameters are constant within and between years;
- Inputs values (life history, behavioral, and biological characteristics) are representative of that which is occurring in the natural system (i.e., the Androscoggin

[30] Barber, B. L., A. J. Gibson, A. J. O'Malley, and J. Zydlewski. 2018. Does what goes up also come down? Using a recruitment model to balance alewife nutrient import and export. Marine and Coastal Fisheries: Dynamics, Management, and Ecosystem Science 10: 236-154.

[31]The model is available at https://umainezlab.shinyapps.io/alewifepopmodel/

River); and

- Quality of spawning habitat in the Androscoggin River does not vary spatially.

It is well known and documented in the fisheries literature that annual runs of river herring species are influenced by highly variable environmental parameters such as water temperature and flow conditions. These parameters exhibit substantial temporal variance within years and inter-annually such as high/low snowfall years causing high/low spring flow conditions in addition to acute changes in flow or temperature caused by storm events or abrupt climactic changes. This type of environmental variability can delay, hasten, or temporarily impede river herring runs. Understanding that the timing of river herring runs can be late or early and subject to multiple peaks is a key driver of why models that make the assumption of environmental constants are unable to produce accurate and reliable projections of abundance or population size. Failure to account for environmental variance both within and between years introduces a tremendous amount of uncertainty into model outputs.

As discussed above and as explicitly identified by model developers, the use of population-averaged input values is strongly discouraged in population modeling due to the uncertainty introduced by the failure to account for population variance, outlying values, etc. Uncertainty has been introduced to these model outputs through the use of fixed environmental constants, population averaged input values, and through assumptions disregarding spatial variability (i.e., that St Croix alewife populations are biologically and behaviorally similar to Androscoggin River populations in addition to assuming all habitat is of equal production quality). MDMR has not provided any written or circumstantial evidence to justify the upholding of these assumptions when suggesting performance standards regarding alewife in the Androscoggin River system. These are all assumptions which form the cornerstone of the model developers' warnings as to why this model is not intended and, more importantly, unable to make accurate, well-informed projections of abundance or population size. Topsham Hydro acknowledges the importance of this model as a tool for comparing management scenarios to understand general impacts and resulting trends but questions its appropriation as a population projection and management decision tool by MDMR.

Ignoring the inappropriateness of this model to project alewife population estimates and the violated assumptions discussed, MDMR proceeded to use the model to develop upstream and downstream passage standards without providing the information necessary to support those specific requirements. The alewife population results from MDMR's model also lacks measurements of uncertainty around the estimate lines. It displays no confidence limits, no error bars, etc. on the forecasts generated from the population model to allow readers to see where the estimated populations sit relative to fixed unit production values. Lines presented provide only the mean estimates of alewife spawner abundances for a series of upstream and downstream passage effectiveness rates relative to fixed values of mean and minimum escapement goals for the species. Failure to provide a measurement of error around those abundance estimates prevents the reader from understanding the magnitude of variation around those values. Without referencing any form of uncertainty around the estimates, it is not possible to understand the margin of error behind these outputs, consequently bringing to question the reliability of the estimate. Presenting a single line with no variance is misleading and makes it look as though targets are either always achieved or never achieved, which is not realistic.

Because deterministic models do not account for annual/environmental variation, they should be limited to assessing general trends in each population, and to informing management decisions by testing sensitivities within life histories. But because variation in the life histories is averaged, deterministic models are not predictive (Barber 2018). MDMR has utilized this alewife population model in a manner which disregards the limitations of the model as stated by its developer and should not set performance standards based on a model which is designed to aid in visualizing the trends and impacts of certain management decisions.

In addition, performance standards for alewife do not seem necessary at this time. Sabattus Pond is the primary waterbody near the mainstem currently stocked by MDMR as part of their trap and transport program for the Androscoggin River. Other tributaries providing access to spawning habitat currently have little in the way of upstream fish passage facilities installed at dams. Therefore, instituting passage performance standards at fish passage facilities at the mainstem dams is premature until passage facilities are constructed at the dams along the tributaries that currently block direct access to alewife spawning habitat.

D. Sea Lamprey

1. Summary of Comments

For upstream passage MDMR recommends the following performance standards to demonstrate safe, timely, and effective passage for sea lamprey.

- 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.

2. Topsham Hydro Response

Topsham Hydro understands that in recent years, the ecological benefits of sea lamprey have become better understood and appreciated, however MDMR provides no description, justification, or supporting evidence for its passage performance standards recommended for the species. As summarized in the MDMR 10(j) recommendation, annual returns of sea lamprey at Brunswick have ranged from 0 to a high of 240 individuals during the period of record since 1999. The spatial distribution of historical sea lamprey spawning habitat within the Androscoggin River and relative to Pejepscot is not well defined. NMFS[32] suggests parts of the Little Androscoggin River as well as the mainstem Androscoggin River downstream from Rumford Falls as potential sea lamprey habitat. However, due to their semelparous lifestyle and fixed energy reserves for upstream migration, it is unlikely that any significant immigration upstream of Lewiston Falls historically occurred. In the Penobscot River, many tributaries located in the lower portion of the watershed have growing populations of sea lamprey (ex: Souadabscook Stream and Sedgeunkedunk Stream), suggesting that it is not necessary for this species to migrate far upstream to find suitable spawning habitat. In the Androscoggin, there is likely spawning habitat in the furthest downstream reaches of the river that is yet to be fully utilized. As noted, earlier sea lamprey studies are only just now being conducted in the state of Maine. As a result, Topsham Hydro recommends delaying the establishment of an upstream performance standard for sea lamprey until a time when annual returns improve at the downstream Brunswick Project and the spatial distribution of quality habitat within the basin is better understood.

VI. Other Section 10(j) Recommendations

A. Large Woody Material

1. Summary of Comments

Commerce recommends as a 10(j) measure a Large Woody Material ("LWM") Plan for the Pejepscot Project, to include provisions for storage of beneficial LWM and disposal of unused debris, and guidelines and measures for the sorting, disbursement, and transport of stored LWM with priority given to habitat enhancement projects in the Androscoggin River or its tributaries.

2. Topsham Hydro Response

Currently, most debris in the Project headpond congregates near the powerhouse intakes,

[32] NOAA Fisheries. 2020. Androscoggin River Watershed Comprehensive Plan for Diadromous Fish. Greater Atlantic Region Policy Series 20-01. NOAA Fisheries Greater Atlantic Regional Fisheries Office - www.greateratlantic.fisheries.noaa.gov/policyseries/. 136 pp.

settling on the trashracks. Topsham Hydro generally inspects and cleans the trashracks at the Project on a weekly basis. Frequency of cleaning may increase to daily during the higher debris month loads of April, May, June, October, and November.

Debris removed is temporarily located to a laydown area until transported by a contractor to a licensed solid waste disposal facility. LWM that is not currently removed by Topsham Hydro either remains in the Project impoundment or is passed over the spillway during high flow events.

Topsham Hydro's proposed trash boom, to be installed as part of the proposed downstream fish guidance system, will facilitate the sluicing of the majority of this debris downstream past the Project over the new license term. Very little debris is expected to accumulate on the trashracks and therefore, removal and disposal of debris is expected to be minimal as it will be passed downstream.

Commerce's recommended plan includes a provision for stockpiling LWM on site for later transport to other locations throughout the basin, presumably at the expense of Topsham Hydro. While generally there could be some benefits to aquatic resources elsewhere in the basin from transporting the Project's LWM to habitat enhancement sites throughout the basin, Commerce provides no specific information on the location of such sites and their relationship to the Project. Therefore, there is no Project-related basis for requiring Topham Hydro to stockpile and transport LWM outside of the Project. The Commission has made similar findings regarding LWM Plans in other recent FERC proceedings [33]

B. Run-of-River Operations

Topsham Hydro currently operates the Project in run-of-river mode and does not utilize the impoundment for energy generation; variations to the headpond level are significantly limited in both frequency and magnitude and generally associated with either changes to inflow into the headpond

[33] Draft Environmental Assessment for Hydropower License. Shawmut Hydroelectric Project, P-2322-069. July 2021. Accession Number: 20210701-3011.

or transitory operational changes.

Topsham Hydro proposes to maintain a year-round minimum flow of 1,710 cfs or inflow, whichever is less, and continue to operate in a run-of-river mode maintaining a normal pond elevation of 67.2 ft or 0.3 ft below the top of the spill gates. Topsham Hydro proposes that the requirement in the new license for minimum flow and pond level elevation be based on the hourly average.

1. Summary of Comments

Interior and NMFS state that they are not supportive of the proposal that compliance requirements for both minimum flow and pond level be changed to reflect an hourly average, instead of as a continuous measurement.

2. Topsham Hydro Response

In recent licensing proceedings, FERC has acknowledged the inherent lag times associated with the passive release of flow from an elevation-stabilized impoundment (FERC 2019).[34] FERC determined that precise instantaneous matching of outflows to inflows is not practicable. Therefore, run-of-river operation should be defined as when outflows from a given project are released to approximate inflow. FERC also recognized as project operation changes, some flexibility regarding flow fluctuations downstream is needed to allow for brief delays between change in operation and attenuation of the flow. Topsham Hydro's proposal—that the requirement in the new license for minimum flow and pond level elevation be based on the hourly average—avoids unnecessary reporting of very short-term excursions due to unplanned events such as extreme weather and equipment failure, while also being consistent with previous FERC proceedings[35].

VII. Conclusion

[34] FERC 2019. Final Environmental Assessment for Hydropower Licenses, Piedmont, Upper Pelzer, and Lower Pelzer Hydroelectric Projects. FERC Accession No. 20191031-3038.
[35] A similar change was adopted in 2011 for the Gulf Island-Deer Rips Hydropower Project (FERC No. 2283).

Based upon the foregoing reasons, Topsham Hydro respectfully requests that the Commission (1) reject parties' 10(a) recommendations for decommissioning and dam removal, (2) consider Topsham Hydro's suggested modifications to preliminary terms and conditions and prescriptions, and (3) issue a new license consistent with Topsham Hydro's FLA proposal.