

EXHIBIT E

GREEN LAKE PROJECT (P7189)

APPENDIX A – DLA RESPONSES

CONTENTS

- APPENDIX A – DLA RESPONSES
- 0.0 INTRODUCTION.....
- 1.0 SUMMARY RESPONSE TO COMMENTS ON DRAFT LICENSE APPLICATION
- 2.0 US FISH AND WILDLIFE SERVICE
- 2.1 USFWS DLA Comments.....
- 2.2 GLWP Response to USFWS DLA Comments.....
- 3.0 MAINE DEPARTMENT OF MARINE RESOURCES.....
- 3.1 MDMR DLA Comments
- 3.2 GLWP Response to MDMR DLA Comments
- 4.0 US NATIONAL MARINE FISHERIES.....
- 4.1 USNMFS DLA Comments.....
- 4.2 GLWP Response to USNMFS DLA Comments.....
- 5.0 DOWNEAST SALMON FEDERATION
- 5.1 DSF DLA Comments.....
- 5.2 GLWP Response to DSF DLA Comments
- 6.0 MAINE DEPARTMENT OF ENVIRONMENTAL PROTECTION.....
- 6.1 MDEP DLA Comments
- 6.2 GLWP Response to MDEP DLA Comments
- 7.0 MAINE DEPARTMENT OF INLAND FISH AND WILDLIFE.....
- 7.1 MDIFW DLA Comments
- 7.2 GLWP Response to MDIFW DLA Comments
- 8.0 REFERENCES FOR GLWP RESPONSES TO DLA COMMENTS

APPENDIX A – DLA RESPONSES

0.0 INTRODUCTION

This appendix contains the comments GLWP received on the Draft License Application (DLA) and GLWP's responses to those comments.

Exhibit E – Appendix A

1.0 SUMMARY RESPONSE TO COMMENTS ON DRAFT LICENSE APPLICATION

The following table contains DLA comments organized by DLA section, and a description of any related Final License Application (FLA) changes involved :

Commenting Entity	Document Section	Comment	Response
MDIFW	Exhibit A - 2.1. 1 Reservoir and Storage	The DLA states, " <i>The Project manages the lake level on Green Lake to maintain recreation values, allow a dependable water supply for the Green Lake National Fish Hatchery (GLNFH), and to protect lake trout spawning habitat.</i> " MDIFW has stocked lake trout in Green Lake since 1961, and as a result of numerous underwater surveys it has been determined that Green Lake does not contain habitat suitable for spawning lake trout nor is there evidence of spawning. We recommend " <i>...and to protect lake trout spawning habitat</i> " be removed for the Final License Application.	The FLA has been modified to replace "lake trout" with "arctic charr."
USFWS	Exhibit A - 2.1. 8 Fishway Facilities	The Applicant states "Fish passage in the upstream direction is not recommended for the Project because of the possibility of alewife being introduced into Green Lake and contaminating water withdrawn for the Green Lake National Fish Hatchery (GLNFH) with alewife-borne diseases." This recommendation, made by the Service, was included in the FERC's April 5, 1984 license order. However, the Service no longer maintains this position. The current infrastructure and biosecurity procedures at Green Lake NFH provide risk mitigation for fish pathogens regardless of the source (e.g. resident fish, stocked fish, bait fish, or migratory fish).	Additional information is in GLWP responses below.

NMFS	Exhibit A - 2.1. 8 Fishway Facilities	<p>Fish Passage Flow - In comments on a study dispute on March 20, 2020, GLWPC included an analysis regarding the amount of flow that might be available at the project for fish passage (Accession # 20200320-5152, Appendix B). We had requested this information as part of a study request that was rejected by FERC. It is our position that this is relevant information that is critical for evaluating the potential for installing and operating effective fish passage facilities at the project; and we thank GLWPC for providing it. The provided analysis indicates that the amount of available flow is extremely limited and, that except for the month of May, may not be sufficient to support facilities that could provide consistent upstream and downstream passage during the critical passage months for our trust species. We intend to evaluate the implications of limited flow on the potential for, and effectiveness of, any fish passage measures at the appropriate time. Although referenced in section 5.6.2.1, we request that the flow information be incorporated in full in the final license application so that it can be adequately considered by FERC and the state and federal agencies.</p>	This information has been added to the FLA.
MDMR	Exhibit A - 2.1. 8 Fishway Facilities	<p>GLWP states "Fish passage in the upstream direction is not recommended for the Project because of the possibility of alewife being introduced into Green Lake and contaminating water withdrawn for the Green Lake National Fish Hatchery (GLNFH) with alewife-borne diseases. To prevent fish from migrating upstream over the dam into Green Lake, the Project proposed, with concurrence from Interior and MDEP, to maintain the pre-existing fish screens at the crest of the project dam. The Project also proposed, at the request of Interior and MDEP, to install screens at the project intake with a maximum mesh size of 2 inches to prevent adult salmonids from moving out of Green Lake."</p> <p>This statement includes positions of both the Maine Department of Environmental Protection (MDEP) and the U.S. Fish and Wildlife Service (USFWS; Interior) but does not attribute those positions to any documents by those agencies on the record for the Project. In recent coordination with Interior, it was apparent that the statements included by GLWP that are attributed to Interior seem to conflict with the current position of that agency regarding upstream passage. We look forward to the comments of Interior and support their current recommendations. Similarly we will coordinate with DEP to clarify contemporary positions for the Project.</p>	Additional information is in GLWP responses below.

MDIFW	Exhibit A - 2.1. 8 Fishway Facilities	<p>As been previously stated, any planned reintroduction of river herring into Green Lake should be coordinated with MDIFW based on the outcomes of discussion and research being undertaken within the joint Federal and State partnership of the Alewife Interaction Committee to reach a balanced approach to comanaging resident lake and diadromous species in this and other waters around the State. As has been previously stated, density dependent interactions between anadromous alewives and landlocked rainbow smelt remain an ongoing concern of our Agency. Landlocked smelt are the primary forage species for landlocked salmon, which are native to Green Lake, one of only four lakes in Maine to which landlocked salmon are endemic.</p> <p>The FLA should be clear that MDIFW remains committed to working with our State and Federal partners in studying the above concerns should fish passage be considered during the term of the new license, and MDIFW should be party to any future discussions pertaining to fish passage for sea run species during the term of the new license. Therefore, our comments should not be interpreted as conflicting with the other State and federal resource agencies that are stakeholders to this relicensing.</p>	Additional information is in GLWP responses below.
MDMR	Exhibit A - 2.1.10 Proposed Facilities	GLWP does not propose any changes to existing facilities or new facilities.	The FLA has been modified.
MDMR	Exhibit A - 2.2.1 Current Project Operation	<p>GLWP states "We run an impoundment but our operation is closer to fixed point 'run of river' than it is to peaking."</p> <p>MDMR disagrees with this assessment. While GLWP is not able to align their generation with high energy rates to capitalize on peaking, the project does control storage of water in Green Lake as a reservoir. To that end GLWP draws down the impoundment by up to 3.2 feet seasonally (elevation of 157.5 to 160.7 feet USGS, yielding a maximum usable storage of about 10,000 acre-feet). In section 5.1 of Exhibit E, GLWP states "GLWP, under the current license, manages the lake to a smaller level fluctuation (4.0 – 7.2 feet) than BHE did historically (3.0 – 8.0 feet)." Statement conflicts with the description of the project operations in section 2.2.1 of Exhibit A. Descriptions should be clarified and corrected for the FLA. An accurate description of project operations is critical to determine effects on aquatic resources and should be included in the FLA.</p>	Additional information is in GLWP responses below.

USFWS	Exhibit A - 2.2.2 Proposed Project Operation	The Applicant proposes to continue to operate the Project under the existing water management regime. This water level management regime has generally served Green Lake NFH's needs. Therefore, any future changes to water level management would need to be vetted with the Service to ensure compatibility with Green Lake NFH operations as changes could reduce the established minimum water levels and therefore adversely impact hatchery operations.	Additional information is in GLWP responses below.
MDMR	Exhibit A - 7.2 Annual Operation and Maintenance Costs	GLWP states "The annual operation and maintenance costs of running the Green Lake Hydroelectric Project facility are \$46,592 with the annual administrative expenses being approximately \$34,691." These costs sum to \$81,283. GLWP also states in section 5, "The power generated by the Green Lake Hydroelectric Project produces an average of about \$72,000 per year." MDMR requests that GLWP provide addition details on the discrepancy between generation costs and operation costs at the facility. As written in the DLA, the Project losses on average \$9,283 each year, which does not include periodic maintenance costs nor does it include replacement of the penstock. These numbers indicate that the project is not economically viable. Given that the project has impacts on natural resources in the watershed, MDMR would like to understand the likelihood that the project will continue to operate through the license term, will be able to carry out proposed measures, and will be able to carry out environmental protection measures adequately.	The sentence regarding the annual operation and maintenance costs of running the Project was not clearly worded. It has been clarified in the FLA. Additional information is included in the GLWP responses below.
USFWS	Exhibit E - 3.1 Federal Power Act	Please include Section 4(e) of the Federal Power Act, 16 U.S.C. § 797(e), to this list. Section 4(e) establishes that FERC must give "equal consideration" to developmental and non-developmental values in its decisions and authorizes federal land managers to impose mandatory conditions on a FERC license for hydropower projects located on federal reservations. Section 4(e) further provides that licenses shall be issued within any federal reservation only after a finding by FERC that the license will not interfere or be inconsistent with the purpose for which such a reservation was created or acquired. Resource agencies with jurisdiction over federal reservations include the United States Forest Service, the United States Fish and Wildlife Service, the United States Army Corps of Engineers, and the United States Bureau of Land Management.	The FLA has updated information.
USFWS	Exhibit E - 3.3 Endangered Species Act (ESA)	The Applicant states "Section 7(a)(3) of the ESA specifies that a Federal agency shall consult the FWS on any prospective agency action...". The National Marine Fisheries Service (NMFS) should be added to this sentence as they also have ESA authority.	NMFS has been added to this sentence in the FLA.

NMFS	Exhibit E - 3.3 Endangered Species Act (ESA)	<p>GLWPC misinterprets the language in section 7(a)(3) of the Endangered Species Act (ESA) when they indicate that the consultation under the Endangered Species Act will occur with the US Fish and Wildlife Service (USFWS). The referenced language in the statute indicates that "...a Federal agency shall consult with the Secretary on any prospective agency action." Section 3(15) of the Act defines "Secretary" to mean either the Secretary of Interior or the Secretary of Commerce. The NMFS is within the Department of Commerce, and consistent with an agreement with USFWS, is the lead consulting agency for ESA consultations that consider effects of dams within the geographic range of the Gulf of Maine distinct population segment (GOM DPS) of Atlantic salmon.</p> <p>GLWPC cites the language in section 4(b)(2) of the ESA that discusses exemptions to critical habitat designations, and suggests that the "section may apply to this Project when cumulative effects involving the Green Lake National Fish Hatchery are considered." We would like to make clear that the Secretary of Commerce did not exempt the Green Lake watershed from critical habitat at the time of listing, and therefore this section of the ESA does not apply. However, we recognize the importance of the conservation hatchery program to Atlantic salmon survival and recovery, and will consider potential effects to its operation during the section 7 consultation.</p>	The FLA has updated information.
USFWS	Exhibit E - 3.7 Consultation	The National Fish Hatchery is a Service entity. Please add Oliver Cox, Green Lake National Fish Hatchery Manager, to the U.S. Fish and Wildlife Service list on page 3-4. Anna Harris, a Service employee listed incorrectly under Maine Department of Marine Resources, and Corbin Hilling should be omitted from all lists as they no longer work for the Green Lake NFH or the Maine Field Office.	Anna Harris has been moved. Note the Consultation list includes people in the capacity they had at the time.
MDMR	Exhibit E - 3.7 Consultation	Anna Harris was the Maine Field Office Project Leader for USFWS and is not an employee of MDMR.	The FLA has updated information.
MDIFW	Exhibit E - 3.7 Consultation	The DLA state that Susan Bard is an MDIFW Fisheries Biologist. Any future reference to Ms. Bard (who is no longer employed with MDIFW) in the FLA should be corrected to Wildlife Biologist.	Susan Bard was removed from the distribution list some time ago.
MDIFW	Exhibit E - 5.1 Background	The FLA should reference that lake trout have been stocked in Green Lake since 1961, and the stocking rate be clarified that MDIFW is currently stocking lake trout every other year, not " <i>about half of those years</i> " as stated in the DLA.	The FLA has updated information.

USFWS	Exhibit E - 5.2.1.1 Leaching Field	The Applicant states, in reference to the hydropower station leaching field, "After 40 years, it is due for repair or replacement." The original vision for a leaching field described in the Licensed Project Development Agreement, as revised on June 1, 1984 (Agreement), was to connect the hydroelectric station's sewer line to the Green Lake NFH's septic system. Ultimately, a dedicated septic system and leaching field was established. The existing Agreement will need to be amended upon license issuance.	Information is in GLWP responses below.
USFWS	Exhibit E - 5.2.1.2 Penstock	The Service appreciates the Applicant recognitions that the wood stave penstock will need to be repaired or replaced. The Service appreciates that Applicant's efforts to maintain the existing wood stave penstock and patch the leaks; however, the leaks represent a substantial loss of water, create safety issues related to ice build-up, and have caused bank erosion. Therefore, the Service requests that GLWP include in its FLA, plans to repair or replace the wooden stave section of the penstock and the leaking 8-foot square concrete transition block located between the end of the 48-inch concrete penstock and the wood stave penstock.	Information is in GLWP responses below.
USFWS	Exhibit E - 5.3.1 Species	The Applicant states, "The following migratory fish were identified during scoping: alewife, American eel, American shad, Atlantic salmon, blueback herring, and sea lamprey. With the exception of landlocked salmon, none of these are currently present in Green Lake." American eel are present in Green Lake, as identified in the Maine Department of Inland Fisheries and Wildlife fish survey data and as stated in the DLA itself in Section 5.3.3.1. The Service requests the Applicant update this section if it will be included in the FLA.	Updated information is in the FLA.

NMFS	Exhibit E - 5.3.1 Species	<p>GLWPC indicates that “The following migratory fish were identified during scoping: alewife, American eel, American shad, Atlantic salmon, blueback herring, and sea lamprey. With the exception of landlocked salmon, none of these are currently present in Green Lake. These species are all migratory fish that have potentially been present in the Union River.” GLWPC is correct that these species (except for American eel, which GLWPC reports as being occasionally entrained in the penstock in section 5.3.3.1) do not occur in Green Lake; however, this is because the dam blocks access. All of these species are expected to be present in the lower Union River, and some (i.e., Atlantic salmon, alewives, and blueback herring) are currently transported into the upper Union from the fish trap at the Ellsworth Dam. With the implementation of passage measures at the Ellsworth and Graham Lake dams (expected during the term of the new license), we anticipate that these species, particularly Atlantic salmon, will have volitional access to their historical habitat in the Union, except for those areas blocked by dams. Therefore, although the licensee may be correct that these species do not occur in Green Lake currently, we anticipate that they will have access to Reeds Brook during the term of any new license.</p>	Updated information is in the FLA and additional information is in GLWP responses below.
MDMR	Exhibit E - 5.3.1 Species	<p>GLWP states "The following migratory fish were identified during scoping: alewife, American eel, American shad, Atlantic salmon, blueback herring, and sea lamprey. With the exception of landlocked salmon, none of these are currently present in Green Lake." This statement is incorrect as American eels have been documented in Green Lake by DIFW and in the Project boundary by GLWP staff. Please see MDMR's comments on section 5.3.3.1 for supporting documentation.</p>	Updated information is in the FLA and additional information is in GLWP responses below.
MDIFW	Exhibit E - 5.3.1 Species	<p>The DLA states, "<i>Arctic charr are believed to be native to the lake.</i>" The FLA should be clarified that it has never been firmly established that Arctic charr are native to Green Lake as Arctic charr were stocked in the late 1800's, however, Green Lake does now support a wild population of Arctic charr.</p>	Updated information is in the FLA.
MDIFW	Exhibit E - 5.3.3 Environmental Analysis	<p>The DLA states, "<i>It is unlikely that any fish or wildlife species in Green Lake is unduly stressed by the current lake management method, which is similar, but less extreme than, the prior lake level management approach.</i>" As no fish or wildlife studies were conducted to verify this, we recommend that this statement be omitted from the FLA.</p>	Updated information is in the FLA.

USFWS	Exhibit E - 5.3.3.1 Eel	<p>The Applicant performed eight nighttime surveys for eel between May 11, 2020 and July 26, 2020 and did not document eels. However, eels have been documented passing the Ellsworth Dam and Graham Lake Dam and are known to be in Green Lake. Black Bear Hydro Partners LLC (BBHP) had proposed to (1) install upstream passage for eel at the Ellsworth and Graham Lake dams; and (2) consult with the resource agencies on downstream eel passage. Therefore, designated upstream eel passage at the Project will be needed after eel passage is implemented at the downstream developments as per the Service's eelway prescriptions for the Ellsworth Hydroelectric Project (FERC No. 2727).</p> <p>Additionally, the Applicant acknowledges that adult eels are found in the penstock as outlined in our ISR comment letter. Therefore, downstream protection measures for eels will be needed at the Project.</p> <p>Upstream and downstream fish passage structures should provide safe, timely, and effective passage and be designed in consultation with, and require approval by, the Service. The designs should be consistent with the Service's 2019 Fish Passage Engineering Design Criteria Manual (USFWS 2019, entire) or updated versions, as they become available.</p> <p>The Applicant should include eel passage protection, mitigation, and enhancement measures in its Final License Application.</p>	Additional information is in GLWP responses below.
MDMR	Exhibit E - 5.3.3.1 Eel	<p>GLWP performed nighttime eel surveys in 2020 and did not document eels. However, American eels have been documented above the project in Green Lake and are native to Union River watershed.</p> <p>During the ISR meeting, USFWS asked if there was any evidence of eels passing through the penstock. The first part of GLHC's response was captured in the initial study meeting summary. "We do experience things that we suspect may be eels through the penstock at times. While shut down, believe eels tried to pass where water was flowing through penstock leaks or taps". The second part of GLHC's response was not captured in the meeting summary, but was paraphrased by USFWS. "...it was necessary to remove deceased outmigrating eels from the Project at times, which required shutting down production." Mr. Kleinschmidt's comments are concerning as they describe direct impacts of the Project on American eels. If eels are entrained into the penstock, their only route of egress is through the turbines at the powerhouse.</p>	Additional information is in GLWP responses below.
MDIFW	Exhibit E - 5.3.3.4 Arctic charr	The DLA states, " <i>Arctic char spawn during the fall in water that is 1.5 to 6 feet deep...</i> "	The FLA has been updated.

The FLA should be clarified that Arctic charr likely spawn at depths deeper than 6 feet at Green Lake.

USFWS	Exhibit E - 5.3.3.6 River herring (alewife, blueback herring)	River herring are trapped in the tailrace of the Ellsworth Dam and transported and released upstream of Graham Lake Dam throughout the adult river herring migration. This means that both alewife (<i>Alosa pseudoharengus</i>) and blueback herring (<i>Alosa aestivalis</i>) have access to Reeds Brook. In May of 2021 NFH staff have observed river herring in Reeds Brook.	Additional information is in GLWP responses below.
MDMR	Exhibit E - 5.3.3.6 and 5.3.4.6 River herring (alewife, blueback herring)	<p>As described in the 2015 Union River Fisheries Management Plan (2015 Plan), alewife and other diadromous fish “were once common in the Union River (Havey 1961), but were extirpated in the late 1700’s or early 1800’s, presumably by construction of dams without fishways, water pollution, over harvest, and other factors.” The 2015 Plan goes on to state that while Green Lake is currently inaccessible to alewives due to the existence of the outlet dam and lack of a fishway, Green Lake likely contained a historic population of alewives due to the absence of a natural barrier to migration. Finally, the 2015 Plan restates a position by the Union River Fisheries Coordinating Committee related to disease risk and alewives. However, the 2015 Plan also states, “the supporting rationale has not been well described in the CFMP to date” and calls for a review of the issue. The position in the 2015 Plan dates back to a statement made by USFWS and included in FERC’s April 5, 1984 license order.</p> <p>However that position and concern of disease related to alewife restoration is no longer supported by USFWS and this statement should be removed from this section in the FLA. Restoration of alewives into Green Lake is warranted at this time and the only obstacle to restoration is the lack of adequate upstream and downstream passage at the Project.</p> <p>The statement by GLWP about blueback herring is incorrect. We echo the comments of USFWS as an accurate summary of the current stocking of river herring in the Union River watershed. "River herring are trapped in the tailrace of the Ellsworth Dam and transported and released upstream of Graham Lake Dam throughout the adult river herring migration. This means that both alewife (<i>Alosa pseudoharengus</i>) and blueback herring (<i>Alosa aestivalis</i>) have access to Reeds Brook. In May of 2021 NFH staff have observed river herring in Reeds Brook."</p>	Additional information is in GLWP responses below.

NMFS	Exhibit E - 5.3.3.6 River herring (alewife, blueback herring)	<p>The GLWPC correctly indicates that blueback herring are trapped at the Ellsworth Dam and released into Leonard Lake. In an effort to capture some of the blueback herring run, Black Bear Hydro Partners releases approximately 1,600 river herring after June 10 into Leonard Lake with the assumption that many of these are blueback herring. Any blueback herring that arrive before or after the trapping of those fish are transported to Graham Lake along with the alewives. It is possible, therefore, that a small number of blueback herring do occur above the Graham Lake Dam and could approach the Green Lake Dam. It should be noted that NMFS has required that swim-through fish passage be constructed at the both the Ellsworth and Graham Lake dams 15 years after FERC issues a license for the Ellsworth Project. Therefore, it is expected that blueback herring could have access to habitat above both dams once fish passage measures have been implemented.</p>	Additional information is in GLWP responses below.
USFWS	Exhibit E - 5.3.3.7 American Shad	<p>The Applicant states, "There is no habitat suitable to American shad in the Union River upstream of Lake Leonard. American shad are not expected to have access to Reeds Brook now, or in the Future (Ellsworth FLA 2015)". The Final Environmental Assessment for the Ellsworth hydroelectric dam (P-2727) states that the Maine Department of Marine Resources and BBHP documented 4.9 miles of potential American shad (<i>Alosa sapidissima</i>) habitat in the Union River and that two miles exists upstream of the Ellsworth Dam. These two miles are between Lake Leonard and the Graham Lake dam, Further, fish passage for alosine species (alewife, blueback herring, and American shad) was included in the NMFS's Section 18 fishway prescription for the Ellsworth Project. Therefore, it is anticipated that American shad will have access to Graham Lake and Reeds Brook pending the relicensing of the Ellsworth Hydroelectric dam. If included in the FLA, this section should be updated to reflect this information.</p>	Additional information is in GLWP responses below.

NMFS	Exhibit E - 5.3.3.7 American Shad	<p>The Licensee claims that there is no American shad habitat in the Union River, and that they "...are not expected to have access to Reeds Brook now, or in the future." There is limited information of historical use of the river by shad, or any other sea-run fish. However, there is reason to believe that Ellsworth Falls (at the site of the existing Ellsworth Hydro Project) may not have been a complete barrier to the species, and that they may have accessed habitat up to Mariaville Falls on the West Branch. That said, the Licensee is correct that the species is not currently passed at the Ellsworth Dam, and the small number that are trapped at the project are released back downstream per guidance from Maine's Department of Marine Resources (DMR). However, as indicated, NMFS has required that swim through fish passage be constructed at the both the Ellsworth and Graham Lake Dams 15 years after FERC issues a license for the project. Therefore, it is expected that American shad could have access to habitat above both dams once fish passage measures have been implemented.</p>	Additional information is in GLWP responses below.
MDMR	Exhibit E - 5.3.3.7 and 5.3.4.7 American Shad	<p>GLWP incorrectly states that, "There is no habitat suitable to American shad in the Union River upstream of Lake Leonard." While shad are not currently passed upstream of the Ellsworth Dam, fish passage for alosine species (alewife, Blueback herring and American shad) was included in the NMFS Section 18 fishway prescription for the Ellsworth Project. Therefore, it is anticipated that American shad will have access to Graham Lake and Reeds Brook pending the relicensing of the Ellsworth Hydroelectric dam. If included in the FLA, this section should be updated to reflect this information.</p>	Additional information is in GLWP responses below.
MDMR	Exhibit E - 5.3.3.8 and 5.3.4.8 Sea lamprey	<p>GLWP states. "Downstream fish passage of sea lamprey is facilitated by their lack of a swim bladder. In most situations they can pass through a turbine without suffering decompression damage. (Colotelo 2012)" This statement is irrelevant to the Project and likely does not represent the best available information on this species. Decompression damage is unlikely to occur at low head dams, such as Green Lake, but direct trauma is more likely as lamprey or other fish migrate through turbines.</p>	Additional information is in GLWP responses below.

NMFS	Exhibit E - 5.3.4 Proposed environmental measures	<p>It should be noted that although this section is entitled <i>Proposed environmental measures</i> the Licensee does not propose any measures to reduce project impacts on any species. Anadromous Atlantic salmon should be incorporated into this section. Although uncommon due to a lack of stocking and inadequate passage at the dam, salmon are occasionally trapped at the Ellsworth Project and trucked to the West Branch of the Union. In 2020, for instance, three pre-spawn adult salmon were trapped and transported into the river. We anticipate that there will be an increase in the abundance and distribution of salmon throughout the Union River over time due to improved fish passage measures required at the Ellsworth Project during the relicensing process.</p>	Additional information is in GLWP responses below.
MDMR	Exhibit E - 5.3.4.1 Eel	<p>GLWP does not propose any upstream passage for American eels at the project. American eels have been documented above the Project in Green Lake and are native to Union River watershed. The presence of eels on the upstream side of the project was confirmed by Bert Kleinschmidt (GLWP) during the ISR meeting on February 24, 2021. While the density of eels migrating upstream in Reeds Brook and into Green Lake are likely low currently, there is no question that their upstream migration is impeded by the lack of a dedicated passage structure at the Project. The abundance of eels will increase in the watershed following the installation of upstream eel passage at the Ellsworth and Graham Lake dams (collectively P-2727). Upstream eel passage should be operational at Ellsworth and Graham Lake dams two years after the issuance of the new FERC license.</p>	Additional information is in GLWP responses below.

MDMR

Exhibit E -
5.3.4.1 Eel
(contd.)

GLWP does not propose any downstream passage facilities or protective measures at the Project. Downstream measures to prevent impingement and entrainment of silver eels at the project are critical to minimize Project impacts on the species and, as eels are present now, these measures are critical now. American eels are vulnerable to turbine turbine-induced mortality during their outmigration and, if downstream mortality is high, the Project could be acting as a sink to the Union River eel population. Based on the information provided by Applicant to date and other documentation, upstream and downstream passage and protection measures at the Project are warranted. Dedicated upstream eel passage is necessary to provide access to rearing habitat upstream of the project, throughout the migratory eel passage season. Similarly, eels need to be protected as they attempt to move downstream past the Project. Upstream and downstream fish passage structures at the Project should provide safe, timely, and effective passage and be designed in consultation with, and require approval by, MDMR and other resource agencies. The designs should be consistent with the USFWS's 2019 Fish Passage Engineering Design Criteria Manual or an updated version.

GLWP states, "Out-migrating eels would currently need to pass through the trash racks (1" clear spacing) to gain access to the penstock, or through the slightly closer spacing of the gate fish screens to gain access directly to Reeds Brook." USFWS states in their current fish passage guidance that 3/4-inch or less clear spacing is needed to physically exclude American eel, smolts, and adult alosines from entrainment. The current configuration at the project, 1" clear spacing, does not exclude eels from entrainment. Unfortunately the current configuration with "slightly closer spacing of the gate fish screens" likely means more eels pass via the turbines.

The Licensee indicates that “Alewife passage would risk fish in the lake and blueback herring are not expected to have access to Reeds Brook.”

As indicated in a previous comment, we anticipate that a small proportion of the river herring that are stocked into habitat above Graham Lake Dam are blueback herring. Although Black Bear moves a small number of river herring (some of which are blueback herring) into Leonard Lake annually after June 10, it is unlikely that they are capturing the entire run of the species, which means some are likely transported into Graham Lake.

Maine’s Department of Inland Fisheries and Wildlife (IFW) has filed the following comment regarding river herring accessing upstream habitat in Green Lake:

In addition to invasive fish concerns associated with fish passage, density dependent interactions between anadromous alewives and landlocked rainbow smelt remains an ongoing concern of our Agency and is a focus of an interagency interactions workgroup to coordinate research that will support restoration management goals. Smelt are an established fishery in Green Lake as well as the preferred forage species of landlocked salmon. To be clear, MDIFW continues to be supportive of the restoration of searun species to Maine waters within the historic ranges of these species; however, our Agency does have density dependent concerns regarding possible negative interactions between anadromous alewives and landlocked smelts that could decrease year-around smelt forage for managed game species in certain waterbodies, including Green Lake (FERC Accession # 20190626-5053; June 26, 2019).

Maine IFW indicates that the potential effect of alewives on landlocked smelt is an issue that is being considered by an active interagency workgroup (of which NMFS is a participant), and that they are generally “supportive of the restoration of searun species in Maine within the historic ranges of these species.” While there is much work yet to be done, it is probable that this group will reach resolution during the term of any future license issued at the Green Lake Project, and that one possible outcome is consensus that alewives do not have an impact on smelt. Therefore, the assumption that alewives are detrimental to other species in Green Lake is premature.

NMFS

Exhibit E -
5.3.4.6 River
herring

Additional information is
in GLWP responses below.

USFWS	Exhibit E - 5.3.4.6 River Herring	The Applicant states, "Alewife passage would risk fish in the lake and blueback herring are not expected to have access to Reeds Brook." Please see the comments for Exhibit A, 2.1.8 and Exhibit E, 5.3.3.6. If alewife passage does pose a risk to resident fish in Green Lake, it would be appropriate to cite the information source. The Service has not conducted any fish health assessments for the Union River alewife population; however, the Service has conducted a fish health assessment of river herring on the St. Croix River from 2014 to 2016 and no targeted pathogens were found.	Additional information is in GLWP responses below.
USFWS	Exhibit E - 5.3.4.7 American shad	The Applicant states, "American shad are not expected to have access to Reeds Brook." Please see our comment for Exhibit E, 5.3.3.7	Additional information is in GLWP responses below.
MDIFW	Exhibit E - 5.4.2.1 Loon	At a regional scale (northeastern United States), Maine has a high responsibility for loon conservation. Loons face a variety of challenges throughout their range and every subpopulation is important for species resilience. Until the late 19th century loons could be found as far south as Pennsylvania, throughout New York, and in all the New England states except Rhode Island. The declines and range retraction were primarily due to human activities such as sport hunting and shoreline development. There are now efforts underway to restore loons to parts of their historic range, specifically in Massachusetts. Efforts to reduce human impacts resulting from shoreline development, artificial water level fluctuations, increases in mercury, oil spills, lead fishing tackle, and disturbance have been undertaken over the last decade and continue to impact loons in a positive direction. State, federal, and non-governmental organization partners are currently working to restore the 531 loons killed during the 2003 B-120 tank barge oil spill in Buzzard's Bay, Massachusetts, which includes the dedication of nearly \$1.5 million for loon restoration in Maine.	

MDIFW	Exhibit E - 5.4.2.1 Loon (contd.)	<p>As proposed in the DLA, by waiting until June 1 to set the water level by which fluctuations cannot vary more than a 6-inch increase or a 1-foot decrease, loon nest initiation dates get pushed back at least two weeks, potentially leading to reduced nesting success, particularly in situations when their first nest fails. Later nesting can result in fall and winter iced-in loons becoming more frequent.</p> <p>Without knowing the number of territorial loon pairs, their exact chronology, the locations and characteristics of their established territories and nest sites, and productivity measures, MDIFW recommends:</p> <ol style="list-style-type: none"> 1. Maintaining stable water levels through the typical nesting season, with no more than 0.5 vertical foot up or 1 vertical foot down occurring within a 28-day period during the loon nesting season (May 15 - July 31); or 2. Develop a loon raft management plan. The plan would require hiring professional biological consultants with loon monitoring experience to conduct an initial 3-year study to identify territories, determine productivity, and deploy rafts where suitable. After consultation with and approval from both MDIFW and USFWS, these rafts would then be deployed, maintained, and monitored annually by professional biological consultants, with periodic reporting to both MDIFW and USFWS, for the duration of the new license. 	The FLA has updated information.
NMFS	Exhibit E - 5.6.2.1 Environmental Analysis, Atlantic salmon	<p>This <i>Environmental Analysis</i> does not contain sufficient analysis regarding the effect that the project has on critically endangered Atlantic salmon or its designated critical habitat. It consists primarily of an analysis on the presence of adequate fish passage flows, the threat of invasive species to fisheries in Green Lake, and the water needs of Green Lake National Fish Hatchery. While all of these are important considerations when analyzing the potential for fish passage at this project, this section should include a thorough analysis on the effect that the project has on critically endangered Atlantic salmon, and its designated critical habitat. With the implementation of fish passage measures at the Ellsworth Project, we anticipate that Atlantic salmon could access Reeds Brook with increasing frequency during the term of a new license at the Green Lake Project. There is also modelled rearing habitat for Atlantic salmon both in Reeds Brook, and in the tributaries to Green Lake¹. We request that GLWPC incorporate analysis to indicate how the Green Lake Project may impact this endangered species and critical habitat. We also note that consultation pursuant to section 7 of the ESA will be required for any proposed issuance of a new license by FERC.</p>	Additional information is in GLWP responses below.

MDEP	Exhibit E - Study Results	Study 1-1 - Impoundment Trophic State Study - Based on the results of sampling and information contained in the Initial Study Report and in the Draft License Application, the Department concluded that Green Lake Water Power Company has provided sufficient information to demonstrate that the project impoundment meets applicable GPA water quality standards and is free of culturally induced algal blooms that impair its use or enjoyment.	Updated information is in the FLA.
MDEP	Exhibit E - Study Results	Study 1-2 - Impoundment Habitat Study - Based on the information provided by the Applicant, operation of the project results in maintenance of at least 75% of the Littoral zone of Green Lake. The Department concludes that operation of the Project provides wetted conditions in the littoral zone sufficient to meet aquatic life and habitat standards in Green Lake.	Updated information is in the FLA.
MDEP	Exhibit E - Study Results	Study 1-3 - Benthic Macroinvertebrate Study - Based on the information included in the DLA, the Department concludes that Class B aquatic life and criteria are met in the bypass reach of Reeds Brook. Department analysis of samples collected in the Project tailrace indicate that Class B aquatic life and habitat criteria are not met, and that the structure and function of the macroinvertebrate community is influenced by the discharge from the fish hatchery outfall and from backwater effects of impounded water levels in Graham Lake. The Department finds that the condition of the macroinvertebrate community is influenced by periodic inundation of the sample location and by the fish hatchery discharge and is, therefore, not caused by the presence and operation of the Green Lake Hydroelectric Project dam.	Updated information is in the FLA.
MDEP	Exhibit E - Study Results	Study 1-4 - Dissolved Oxygen and Temperature Study - Analysis of the sampling results indicates that DO concentration met applicable Class B water quality standards in Reeds Brook both downstream of the Project dam and downstream of the powerhouse tailrace. Based on the results of DO and temperature monitoring presented in the Draft License Application, the Department concludes that the Applicant has provided sufficient information to demonstrate that the Project outlet stream meets applicable Class B dissolved oxygen standard under critical water quality conditions.	Updated information is in the FLA.

MDEP	Exhibit E - Study Results	Study 1-5 - Aquatic Habitat Cross-Section Flow Study - Review of the information provided by the Applicant in its DLA including the results of the Aquatic Habitat Cross-Section Flow Study and the Benthic Macroinvertebrate Study, the Department concludes that Project operations are not expected to negatively affect the quality of aquatic habitat downstream of the Project dam. Pending review of the remaining BMI data, the Department tentatively concludes that Green Lake Water Power Company has provided sufficient information to demonstrate that the Project meets Class B aquatic life and habitat criteria.	Updated information is in the FLA.
MDEP	Exhibit E - Study Results	The Draft License Application did not include the data collected for all the studies conducted. The Final License Application should present all raw data, including, but not limited to, tables of dissolved oxygen data to support the charts included in the Initial Study Report.	Updated information is in the FLA.
MDMR	General Comments	Green Lake includes one of only a few populations of Arctic Char in the State of Maine and important resident sportfish resources. Given the importance of this population and the landlocked salmon fishery in Green Lake, MDMR anticipates working closely with the Maine Department of Inland Fish and Wildlife (MIFW) to develop PM&E measures that support native resident and diadromous species. While the information requests and comments in this letter are focused on the resources under the authority of MDMR, we have coordinated with the other resources agencies to ensure that our comments are not in conflict with the goals of those agencies. Therefore, our comments should not be interpreted as conflicting with the other state and federal resource agencies that are stakeholders to this relicensing. As described in the 2015 Union River Fisheries Management Plan (2015 Plan), the watershed includes historic habitat for Atlantic salmon, American shad, striped bass, rainbow smelt, blueback herring, alewife, sea lamprey, American eel, and tomcod. Due to the lack of barriers below the lake, Green Lake and Reeds Brook are understood to be historic habitat for Atlantic salmon, alewife, blueback herring, American shad, American eel, and sea lamprey. In addition, Green Lake is included in the 2009 critical habitat designation for Atlantic Salmon. GLWP does not include any references, site drawings, and is missing other key pieces of information in exhibit A of the DLA. As a result, MDMR is unable to comment on the entirety of the application at this time. We look forward to a complete application in order to assess project effects and develop appropriate measures for the project.	Additional information is in GLWP responses below.

DSF (Downeast Salmon Federation)	General Comments	We also believe that more serious study and consideration should be given to the needs and impacts on Endangered Atlantic salmon and the unique population of Arctic Char that are found in Green Lake and that future project operations should protect and enhance these populations.	Additional information is in GLWP responses below.
DSF (Downeast Salmon Federation)	General Comments	We agree with many of the comments made by the USFWS and National Marine Fisheries Services in their comments on the Draft License Application. Specifically, we echo their requests for safe up and downstream passage for native species for this project.	Additional information is in GLWP responses below.

2.0 US FISH AND WILDLIFE SERVICE

2.1 USFWS DLA Comments



United States Department of the Interior



U.S. FISH AND WILDLIFE SERVICE
Maine-New Hampshire Fish and Wildlife Service Complex
Ecological Services
Maine Field Office
P.O. Box A
306 Hatchery Road
East Orland, Maine 04431
207/469-7300 Fax: 207/902-1588

January 24, 2022

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

RE: COMMENTS ON THE DRAFT LICENSE APPLICATION FOR THE GREEN LAKE HYDROELECTRIC PROJECT (FERC NO. 7189-014)

Dear Secretary Bose,

This is the United States Fish and Wildlife Service's (Service) response to the Draft License Application (DLA) submitted by Green Lake Water Power Company (GLWP; Applicant) on November 1, 2021, as part of the licensing proceeding for the Green Lake Hydroelectric Project (Project), located on Green Lake and Reeds Brook in Hancock County, Maine.¹ The Service's participation in the Project's licensing process is twofold. First, to protect and conserve fish and wildlife and their habitats and second, to protect our interest associated with the operations of the Green Lake National Fish Hatchery (NFH) which cultures federally endangered Atlantic salmon (*Salmo salar*). Green Lake NFH depends on the availability of water in sufficient quantities from Green Lake and the continuing operations and maintenance of the Green Lake Dam, both of which are included in the Project area.

The Service has reviewed the DLA and offers the following comments.

BACKGROUND

The Applicant submitted a Pre-Application Document (PAD) on November 1, 2019, and on May 31, 2019, received notice from the Federal Energy Regulatory Commission (FERC) to use the Integrated Licensing Process. The Service provided comments on the PAD by letter dated July 24, 2019² and submitted one study request: an American eel (*Anguilla rostrata*) passage facility

¹ Accession No. 20211101-5184

² Accession No. 20190724-5022

design and siting study. On February 10, 2021, GLWP filed an Initial Study Report (ISR) to FERC for review and comment. On April 08, 2021, the Service provided comments on the ISR.³

PROJECT DESCRIPTION AND PROPOSAL

The Project consists of a 7.5-foot-high, 270-foot-long, dry rock, concrete, timber, and sheet steel dam, 80-foot-long spillway sections, 1,740-foot-long penstock and a powerhouse containing one Allis Chalmers tube turbine unit with a generating capacity of 400 kilowatts and one centrifugal pump with a generating capacity of 25 kilowatts. The Project is located, in part, at Green Lake NFH on federal land managed by the Department of Interior.

The Applicant proposes no changes or new construction to the current project configuration or facilities.

The Applicant proposes no new environmental measures.

COMMENTS

Exhibit A Description of Project and Proposed Mode of Operation

2.1.8 Fishway Facilities

The Applicant states, “Fish passage in the upstream direction is not recommended for the Project because of the possibility of alewife being introduced into Green Lake and contaminating water withdrawn for the Green Lake NFH with alewife-borne diseases.” This recommendation, made by the Service, was included in the FERC’s April 5, 1984 license order.⁴ However, the Service no longer maintains this position. The current infrastructure and biosecurity procedures at Green Lake NFH provide risk mitigation for fish pathogens regardless of the source (e.g., resident fish, stocked fish, bait fish, or migratory fish).

2.2.2 Proposed Project Operation

The Applicant proposes to continue to operate the Project under the existing water management regime. This water level management regime has generally served Green Lake NFH’s needs. Therefore, any future changes to water level management would need to be vetted with the Service to ensure compatibility with Green Lake NFH operations as changes could reduce the established minimum water levels and therefore adversely impact hatchery operations.

Exhibit E Environmental Report

3.1 Federal Power Act

Please include Section 4(e) of the Federal Power Act, 16 U.S.C. § 797(e), to this list. Section 4(e) establishes that FERC must give “equal consideration” to developmental and non-

³ Accession No. 20210408-5106

⁴ See Green Lake Water Power Company, 27 FERC ¶ 62,023 (1986).

developmental values in its licensing decisions and authorizes federal land managers to impose mandatory conditions on a FERC license for hydropower projects located on federal reservations. Section 4(e) further provides that licenses shall be issued within any federal reservation only after a finding by FERC that the license will not interfere or be inconsistent with the purpose for which such reservation was created or acquired. Resource agencies with jurisdiction over federal reservations include the United States Forest Service, the United States Fish and Wildlife Service, the United States Army Corps of Engineers, and the United States Bureau of Land Management.

3.3 Endangered Species Act (ESA)

The Applicant states “Section 7(a)(3) of the ESA specifies that a Federal agency shall consult the FWS on any prospective agency action...”. The National Marine Fisheries Service (NMFS) should be added to this sentence as they also have ESA authority.

3.7 Consultation

The National Fish Hatchery is a Service entity. Please add Oliver Cox, Green Lake National Fish Hatchery Manager, to the U.S. Fish and Wildlife Service list on page 3-4. Anna Harris, a Service employee listed incorrectly under Maine Department of Marine Resources, and Corbin Hilling should be omitted from all lists as they no longer work for the Green Lake NFH or the Maine Field Office.

5.2.1.1 Leaching Field

The Applicant states, in reference to the hydropower station leaching field, “After 40 years, it is due for repair or replacement.” The original vision for a leaching field described in the Licensed Project Development Agreement, as revised on June 1, 1984⁵ (Agreement), was to connect the hydroelectric station’s sewer line to the Green Lake NFH’s septic system. Ultimately, a dedicated septic system and leach field was established. The existing Agreement will need to be amended upon license issuance.

5.2.1.2 Penstock

The Service appreciates the Applicant recognitions that the wood stave penstock will need to be repaired or replaced. The Service appreciates the Applicant’s efforts to maintain the existing wood stave penstock and patch the leaks; however, the leaks represent a substantial loss of water, create safety issues related to ice build-up, and have caused bank erosion. Therefore, the Service requests that GLWP include in its FLA, plans to repair or replace the wooden stave section of the penstock and the leaking 8-foot square concrete transition block located between the end of the 48-inch concrete penstock and the wood stave penstock.

⁵ See Green Lake Water Power Company, 27 FERC ¶ 62,023 (1986).

5.3.1 Species

The Applicant states “The following migratory fish were identified during scoping: alewife, American eel, American shad, Atlantic salmon, blueback herring, and sea lamprey. With the exception of landlocked salmon, none of these are currently present in Green Lake.” American eel are present in Green Lake, as identified in the Maine Department of Inland Fisheries and Wildlife fish survey data of Green Lake and as stated in the DLA itself in Section 5.3.3.1. The Service requests the Applicant update this section if it will be included in the FLA.

5.3.3.1 Eel

The Applicant performed eight nighttime surveys for eel between May 11, 2020 and July 26, 2020 and did not document eels. However, eels have been documented passing the Ellsworth Dam and Graham Lake Dam⁶ and are known to be in Green Lake. Black Bear Hydro Partners LLC (BBHP) had proposed to (1) install upstream passage for eel at the Ellsworth and Graham Lake dams; and (2) consult with the resource agencies on downstream eel passage.⁷ Therefore, designated upstream eel passage at the Project will be needed after eel passage is implemented at the downstream developments as per the Service’s eelway prescriptions for the Ellsworth Hydroelectric Project (FERC No. 2727).⁸

Additionally, the Applicant acknowledges that adult eels are found in the penstock as outlined in our ISR comment letter. Therefore, downstream protection measures for eels will be needed at the Project.

Upstream and downstream fish passage structures should provide safe, timely, and effective passage and be designed in consultation with, and require approval by, the Service. The designs should be consistent with the Service’s 2019 Fish Passage Engineering Design Criteria Manual (USFWS 2019, entire) or updated versions, as they become available.⁹

The Applicant should include eel passage protection, mitigation, and enhancement measures in its Final License Application.

5.3.3.6 River herring (*alewife, blueback herring*)

River herring are trapped in the tailrace of the Ellsworth Dam and transported and released upstream of Graham Lake Dam throughout the adult river herring migration. This means that both alewife (*Alosa pseudoharengus*) and blueblack herring (*Alosa aestivalis*) have access to Reeds Brook. In May of 2021, Green Lake NFH staff have observed river herring in Reeds Brook.

⁶ Accession No. 20140904-5142.

⁷ Accession No. 20151230-5275

⁸ Accession No. 20180410-5059

⁹ Fish Passage Engineering Design Criteria. U.S. Fish and Wildlife Service, Northeast Region 5, Hadley, MA, 2019.

5.3.3.7 American shad

The Applicant states, “There is no habitat suitable to American shad in the Union River upstream of Lake Leonard. American shad are not expected to have access to Reeds Brook now, or in the future (Ellsworth FLA 2015)”. The Final Environmental Assessment for the Ellsworth hydroelectric dam (P-2727)¹⁰ states that the Maine Department of Marine Resources and BBHP documented 4.9 miles of potential American shad (*Alosa sapidissima*) habitat in the Union River and that two miles exists upstream of Ellsworth dam. These two miles are between Lake Leonard and the Graham Lake dam. Further, fish passage for alosine species (alewife, blueback herring and American shad) was included in the NMFS’s Section 18 fishway prescription for the Ellsworth Project.¹¹ Therefore, it is anticipated that American shad will have access to Graham Lake and Reeds Brook pending the relicensing of the Ellsworth Hydroelectric dam. If included in the FLA, this section should be updated to reflect this information.

5.3.4.6 River Herring

The Applicant states, “Alewife passage would risk fish in the lake and blueback herring are not expected to have access to Reeds Brook.” Please see the comments for Exhibit A, 2.1.8 and Exhibit E, 5.3.3.6. If alewife passage does pose a risk to resident fish in Green Lake, it would be appropriate to cite the information source. The Service has not conducted any fish health assessments for the Union River alewife population; however, the Service has conducted a fish health assessment of river herring on the St. Croix River from 2014 to 2016 and no targeted pathogens were found.¹²

5.3.4.7 American shad

The Applicant states, “American shad are not expected to have access to Reeds Brook.” Please see our comment for Exhibit E, 5.3.3.7.

Thank you for this opportunity to comment. If you have any questions, please contact Oliver Cox at oliver_cox@fws.gov.

Sincerely,

AMANDA CROSS Digitally signed by AMANDA CROSS
Date: 2022.01.24 17:10:36 -05'00'

Dr. Amanda S. Cross
Project Leader
Maine Field Office
Maine-New Hampshire
Fish and Wildlife Service Complex

¹⁰ Accession No. 20190729-3018

¹¹ Accession No. 20180410-5100

¹² Personal communication, John Coll, U.S. Fish and Wildlife Service, Fish Health Center, Lamar PA. January 11, 2022.

cc:

NMFS, Dan Tierney MEDEP,
Kathy HowattMEDMR, Casey
Clark
RO/Fisheries, Brian Sojkowski
Fisheries: OCox: 1-24-22: (207)902-1557

2.2 GLWP Response to USFWS DLA Comments

In this section, text from agency comments is in this font, color, and size and GLWP replies are in this font, color and size. These choices are intended to allow the document to be read when printed in black and white.

RE: COMMENTS ON THE DRAFT LICENSE APPLICATION FOR THE GREEN LAKE HYDROELECTRIC PROJECT (FERC NO. 7189-014)

Dear Secretary Bose,

This is the United States Fish and Wildlife Service's (Service) response to the Draft License Application (DLA) submitted by Green Lake Water Power Company (GLWP; Applicant) on November 1, 2021, as part of the licensing proceeding for the Green Lake Hydroelectric Project (Project), located on Green Lake and Reeds Brook in Hancock County, Maine.¹ The Service's participation in the Project's licensing process is twofold. First, to protect and conserve fish and wildlife and their habitats and second, to protect our interest associated with the operations of the Green Lake National Fish Hatchery (NFH) which cultures federally endangered Atlantic salmon (*Salmo salar*). Green Lake NFH depends on the availability of water in sufficient quantities from Green Lake and the continuing operations and maintenance of the Green Lake Dam, both of which are included in the Project area.

GLWP: This introduction acknowledges that the Green Lake Dam and Green Lake are required to supply water to the NFH in sufficient quantities. It neglects to mention that the penstock and several aspects of project operation are beneficial, and sometimes vital, to the operation of the NFH. From late spring to early fall, surface water from the penstock is used by the hatchery because it is warmer and/or more oxygenated than water from the two NFH water inlets deeper in Green Lake. This allows the NFH to accelerate the growth of fish with minimum dependence on oil for heating water. Usually, the penstock tap provides a more beneficial alternative to the two NFH inlet pipes in Green Lake, though there was also a short period in the past, during some NFH construction work when the penstock was required for the hatchery to have an adequate supply of water, despite lake conditions that would have provided adequate water from the NFH pipes if they were fully operational.

The interrelation of turbine operation and the NFH water supply requires that we coordinate turbine startups (and ideally, shutdowns) with the hatchery so pressure changes in the upper part of the penstock do not cause high and low water conditions (and alarms) in the hatchery filter system. We perform this coordination as a matter of course, and company policy, and it has not proven to be a severe problem. This work, as well as having to monitor and clean the trash racks even when we are not running, does add to the workload on the GLWP staff.

Support of the NFH also impacts Project generation. During roughly the first 20 years of Project operation, a common method of running was to start the turbine every morning and to run it on a time switch that shut it down some number of hours later. This was done partly as a courtesy to Bangor Hydro Electric (BHE) since it maximized generation during peak periods (typical timer periods ranged from 2-12 hours.) The NFH operated under this scenario for extended periods. Within the last 10 years, there has been a shift toward the NFH requiring more and more coordination and accommodation on turbine startups and shutdowns. GLWP has accommodated this without complaint. The NFH has requested that a startup be delayed for a whole day on some occasions to align more easily with NFH staffing schedules. The NFH put in a new water filter plant flow regulation system during the time the Project has been in operation. It is possible that the new system is more sensitive to, and less tolerant of, a pressure drop in the penstock that occurs when the turbine starts up. It may also be that multiple NFH staff changes over the years have changed expectations.

Largely to accommodate the NFH, the current mode of Project operation is to start up and run non-stop

for days or weeks at a time, and then shut down for an extended period. This does not allow peaking generation from the Project. Currently there is no benefit to the Project of prioritizing peak generation, other than the benefit to society. This will likely change when a new power contract is worked out after relicensing. On the other hand, there are costs associated with project operation for peaking. Extra startups and shutdowns cause otherwise unnecessary wear on Project equipment.

The Service has reviewed the DLA and offers the following comments.

BACKGROUND

The Applicant submitted a Pre-Application Document (PAD) on November 1, 2019, and on May 31, 2019, received notice from the Federal Energy Regulatory Commission (FERC) to use the Integrated Licensing Process. The Service provided comments on the PAD by letter dated July 24, 2019 and submitted one study request: an American eel (*Anguilla rostrata*) passage facility design and siting study. On February 10, 2021, GLWP filed an Initial Study Report (ISR) to FERC for review and comment. On April 08, 2021, the Service provided comments on the ISR.

PROJECT DESCRIPTION AND PROPOSAL

The Project consists of a 7.5-foot-high, 270-foot-long, dry rock, concrete, timber, and sheet steel dam, 80-foot-long spillway sections, 1,740-foot-long penstock and a powerhouse containing one Allis Chalmer[sic] tube turbine unit with a generating capacity of 400 kilowatts and one centrifugal pump with a generating capacity of 25 kilowatts. The Project is located, in part, at Green Lake NFH on federal land managed by the Department of Interior.

The Applicant proposes no changes or new construction to the current project configuration or facilities.

GLWP: As discussed below, Exhibit E includes some non-routine maintenance and repair work that would be done if a new license for the Project is issued.

The Applicant proposes no new environmental measures.

GLWP: The DLA did not specify immediate environmental measures, but it did discuss the possible need for future eel measures. The FLA includes both immediate and possible future measures for eel passage.

COMMENTS

Exhibit A Description of Project and Proposed Mode of Operation

2.1.8 Fishway Facilities

The Applicant states, "Fish passage in the upstream direction is not recommended for the Project because of the possibility of alewife being introduced into Green Lake and contaminating water withdrawn for the Green Lake NFH with alewife-borne diseases." This recommendation, made by the Service, was included in the FERC's April 5, 1984 license order.⁴ However, the Service no longer maintains this position. The current infrastructure and biosecurity procedures at Green Lake NFH provide risk mitigation for fish pathogens regardless of the source (e.g., resident fish, stocked fish, bait fish, or migratory fish).

GLWP: The statement above about the current infrastructure of the NFH is overly simplistic and somewhat naive. GLWP has a large amount of experience with the hatchery, extending back 37 years or the Project as a whole, and more than 15 years for the current management team. During this time, we have observed regular disinfection routines for transport vehicles, step-through disinfectant pans

on hatchery doors, and alarms related to the water disinfection systems at the NFH treatment plant. We understand that such measures are in place to exercise due caution to avoid as much possibility of danger to the NFH fish.

In a recent consultation with the NFH manager, it was mentioned that bulb failure sometimes occurred. Within the last couple of weeks, GLWP experienced an alarm at the hatchery or water filter/treatment plant that started during a power failure (roughly two hours long), but then the alarm continued to sound all night. GLWP suggests that accomplishing what the NFH is doing is a difficult task, and it is unwise to blindly ignore the possibility that there could be gaps in the armor. Introducing a high-volume flow of new fish into a lake that has been in its current configuration for over 100 years and has proven to provide a reliable water supply for the NFH is bound to involve some risk. Pretending a risk does not exist is a step toward being bit by it.

2.2.2 Proposed Project Operation

The Applicant proposes to continue to operate the Project under the existing water management regime. This water level management regime has generally served Green Lake NFH's needs. Therefore, any future changes to water level management would need to be vetted with the Service to ensure compatibility with Green Lake NFH operations as changes could reduce the established minimum water levels and therefore adversely impact hatchery operations.

GLWP: The Project has a history of cooperation with the NFH and has changed its operating procedures several times in the past to accommodate the hatchery. At the same time, hatchery staff have shown they are willing to accommodate Project requests when needed. Voluntary cooperation with the hatchery is built into the project rules and procedures, and is expected to continue indefinitely into the future. At the same time, there are provisions in the signed agreement between Interior and GLWP that are sufficient to protect hatchery operations against low water levels.

[Exhibit E Environmental Report](#)

3.1 Federal Power Act

Please include Section 4(e) of the Federal Power Act, 16 U.S.C. § 797(e), to this list. Section 4(e) establishes that FERC must give "equal consideration" to developmental and non-developmental values in its licensing decisions and authorizes federal land managers to impose mandatory conditions on a FERC license for hydropower projects located on federal reservations. Section 4(e) further provides that licenses shall be issued within any federal reservation only after a finding by FERC that the license will not interfere or be inconsistent with the purpose for which such reservation was created or acquired. Resource agencies with jurisdiction over federal reservations include the United States Forest Service, the United States Fish and Wildlife Service, the United States Army Corps of Engineers, and the United States Bureau of Land Management.

3.3 Endangered Species Act (ESA)

The Applicant states "Section 7(a)(3) of the ESA specifies that a Federal agency shall consult the FWS on any prospective agency action...". The National Marine Fisheries Service (NMFS) should be added to this sentence as they also have ESA authority.

3.7 Consultation

The National Fish Hatchery is a Service entity. Please add Oliver Cox, Green Lake National Fish Hatchery Manager, to the U.S. Fish and Wildlife Service list on page 3-4. Anna Harris, a Service employee listed incorrectly under Maine Department of Marine Resources, and Corbin Hilling should be omitted from all lists as they no longer work for the Green Lake NFH or the Maine Field Office.

5.2.1.3 Leaching Field

The Applicant states, in reference to the hydropower station leaching field, "After 40 years, it is due for repair or replacement." The original vision for a leaching field described in the Licensed Project Development Agreement, as revised on June 1, 1984⁵ (Agreement), was to connect the hydroelectric station's sewer line to the Green Lake NFH's septic system. Ultimately, a dedicated septic system and leach field was established. The existing Agreement will need to be amended upon license issuance.

GLWP: Another amendment to the Agreement should be the establishment of a one-month period every summer when GLWP has priority control of the penstock. This would allow GLWP to plan and carry out dam, intake and penstock work during the late summer when weather is not likely to interfere with the work. A full month would not be needed most summers for this work, but currently GLWP is excluded from any non-emergency activity during the summer that requires shutting the penstock intake gate. The lake level is high enough during the summer to guarantee sufficient water pressure for the NFH from its in-lake water inlets without using the penstock tap.

5.2.1.4 Penstock

The Service appreciates the Applicant's recognitions that the wood stave penstock will need to be repaired or replaced. The Service appreciates the Applicant's efforts to maintain the existing wood stave penstock and patch the leaks; however, the leaks represent a substantial loss of water, create safety issues related to ice build-up, and have caused bank erosion. Therefore, the Service requests that GLWP include in its FLA, plans to repair or replace the wooden stave section of the penstock and the leaking 8-foot square concrete transition block located between the end of the 48-inch concrete penstock and the wood stave penstock.

GLWP: While GLWP appreciates the Service's efforts to appear diplomatic, the above paragraph is seriously flawed. Taking the points in order:

"substantial loss of water" is vague and alarming. How is water "lost"? At what point does it become "substantial"? Is the assertion that water that leaks out of the penstock is wasted, or it has an appreciable impact on generation, or threatens to drop the lake far enough that the hatchery has low pressure problems? GLWP has not noticed a difference in the rate that the lake drops between having the gate open or closed at the penstock intake. This is with no appreciable inflow from rain to the lake, comparable hatchery flow and the turbine shut down. GLWP notices when the turbine is running—it drops the level of the lake about 0.75 inches per day if there is little runoff into the lake. Dropping the level of the lake 0.25 inches requires removing about 22 million gallons of water from the lake. People who have no real experience with wood-stave penstocks find the penstock alarming. The truth of the matter is that they leak, and leaks do not imply imminent failure.

"create safety issues related to ice build-up" When hatchery staff pointed out several years ago that they could have trouble plowing the road cleanly if ice built up on or near the edge of the road from a small penstock leak, we started giving priority to leaks that could do this. First priority leaks are ones that threaten to cause erosion. Leaks that could influence the road are fixed next after those. Very small leaks that aim right for the road we cover with a board. When GLWP asked the Green Lake National Fish Hatchery (GLNFH) Manager recently if the hatchery had had trouble with ice from penstock leaks on the road in the last few years, he was unable to answer my question. This is likely because his office is at the Craig Brook National Fish Hatchery and he is not onsite most of time. The best I can do to communicate how absurd this claim is is to show pictures of conditions on the road during the winter.

The first pictures were taken 26-Jan-2022, the day after USFWS filed its DLA comments.

Here is a picture of the road to the dam, along the wood stave penstock:



On the road just below the dam the wind has scoured the snow, revealing the ice that is underneath the snow in these pictures. The penstock is underground at this point. Here are two pictures of the road near the dam:





Below is a picture of the parking lot just outside the Project driveway. The area that is clear of snow is where we shovel the snow by hand just outside the driveway and the part of the parking lot that we walk to get to the mailbox. We shovel these areas by hand so the sun clears the pavement.



The snow was from the day before. The ice under the snow was from a storm that occurred about one week earlier on 17-Jan-2022. It does not show clearly in the picture above, but the layer of ice in the pictures of the road near the dam is present on the parking lot as well.

Two and a half weeks later, on 13-Feb-2022, the parking lot is starting to clear off, though the ice is still present on the right. The parking lot gets more sun and attention than the upper part road.



The following picture shows the ice is still there on the road to the dam, though pavement is starting to show through in spots that get sun:



The GLWP very much appreciates the work that the GLNFH does plowing the snow on the road and the parking lot. We believe they do a very good job. The purpose of these pictures is not to complain about the winter conditions on the road. GLWP staff have experience with icy and snowy winter conditions over many years—it is part of winter in central Maine. We actually prefer that snow be plowed but not overly salted.

The winter road conditions shown in these pictures are not unusual. Every winter we use crampons as part of walking to the dam. They give excellent traction on any kind of bare ice. With our experience with snow, when there is a snow deep enough to defeat the crampons, we find there is adequate traction to walk easily from the snow itself.



Given the road conditions routinely encountered at the Project during the winter, GLWP believes that USFWS' statement that penstock leaks "create safety issues related to ice build-up" reflects either a total lack of knowledge about actual conditions on the road in winter or an attempt to twist a kernel of truth into an alarming assertion that "anybody can see" demands a particular course of action.

The statement by USFWS that penstock leaks "have caused bank erosion" furthers this theme. Yes, there have been some penstock leaks in the past that have caused bank erosion. One in particular occurred from ice in the penstock years ago. Shifting ice took out one of the penstock boards causing a reasonable large leak. This was fixed, and to the knowledge of the current GLWP management team, has not re-occurred. Leaks that threaten bank erosion are the highest priority penstock leaks to fix.

The penstock is relatively young for an "old wood stave penstock" at 38 years old. A conservative estimate of the life of the penstock is 40 years. It is not uncommon to find wood stave penstocks in the field that are 65 or even 75 years old. As they get older, their maintenance requirements increase. Because of this, it is GLWP's plan to replace the penstock if it gets a new license for the Project. Replacing the penstock involves appreciable engineering work, permitting and approval work. The design would have to be approved by the GLNFH, by FERC and by other resource agencies. The vagaries of the permitting and approval process involved in relicensing the Project and replacing the penstock make committing to a plan or schedule for penstock replacement impractical at this point. If no practical license is issued for the Project, work and expense for a new penstock are wasted. The increasing maintenance costs of the wood stave penstock mean that the life of the penstock is self-limiting. If not already there, at some not-too-distant future point in time it will be less expensive to replace the penstock than to keep maintaining it.

5.3.1 Species

The Applicant states "The following migratory fish were identified during scoping: alewife, American eel, American shad, Atlantic salmon, blueback herring, and sea lamprey. With the exception of landlocked salmon, none of these are currently present in Green Lake." American eel are present in Green Lake, as identified in the Maine Department of Inland Fisheries and Wildlife fish survey data of Green Lake and as stated in the DLA itself in Section 5.3.3.1. The Service requests the Applicant update this section if it will be included in the FLA.

GLWP has corrected this editing error in the FLA. The table of fish in Green Lake, on the same page clearly shows that American eel were found in Green Lake as recently as 1995.

5.3.3.1 Eel

The Applicant performed eight nighttime surveys for eel between May 11, 2020 and July 26, 2020 and did not document eels. However, eels have been documented passing the Ellsworth Dam and Graham Lake Dam⁶ and are known to be in Green Lake. Black Bear Hydro Partners LLC (BBHP) had proposed to (1) install upstream passage for eel at the Ellsworth and Graham Lake dams; and (2) consult with the resource agencies on downstream eel passage.⁷ Therefore, designated upstream eel passage at the Project will be needed after eel passage is implemented at the downstream developments as per the Service's eel way prescriptions for the Ellsworth Hydroelectric Project (FERC No. 2727).⁸

This section is carefully worded to avoid a factual statement of the eel study results, which would be "GLWP documented that eels were not present during their eight nighttime surveys..." It then goes on to state that "designated upstream eel passage at the Project will be needed after eel passage is implemented at the downstream developments as per the Service's eel way prescriptions for the Ellsworth Hydroelectric Project." This statement makes the assumption that the Ellsworth project will be granted a license, that the fact that the Ellsworth Project installs eel passage results in eels being

discovered at Green Lake dam, and that the Green Lake Project gets relicensed and retains ownership of the Green Lake dam.

Additionally, the Applicant acknowledges that adult eels are found in the penstock as outlined in our ISR comment letter. Therefore, downstream protection measures for eels will be needed at the Project.

The USFWS ISR comment letter referenced is not accurate as to what was stated by GLWP at the ISR meeting. USFWS continues to spread this falsehood, as well as MDMR. Details are in the MDMR DLA comment responses in section 3.2 below.

Upstream and downstream fish passage structures should provide safe, timely, and effective passage and be designed in consultation with, and require approval by, the Service. The designs should be consistent with the Service's 2019 Fish Passage Engineering Design Criteria Manual (USFWS 2019, entire) or updated versions, as they become available.

Constantly chasing a moving target on fish passage requirements is impractical for a small project. Earlier evaluation of fish passage was done during the study plan development based on the 2017 version of this document. GLWP was unable to locate the 2019 version of this document. It appears that the USFWS Northeast Region web site has been moved to a blog which is heavy on pictures of people paddling up streams, biographies and personal accounts and light on actual technical information. USFWS does not indicate where the document can be acquired. The 2017 version will be used here unless a link to the later document and a list of changes is presented to GLWP, or USFWS is willing to provide actual consultation and details about what is required and why.

The Applicant should include eel passage protection, mitigation, and enhancement measures in its Final License Application.

Immediate and possible future eel protection measures have been added to the FLA.

5.3.3.8 River herring (alewife, blueback herring)

River herring are trapped in the tailrace of the Ellsworth Dam and transported and released upstream of Graham Lake Dam throughout the adult river herring migration. This means that both alewife (*Alosa pseudoharengus*) and blueback herring (*Alosa aestivalis*) have access to Reeds Brook. In May of 2021, Green Lake NFH staff have observed river herring in Reeds Brook.

Asserting "This means that both alewife (*Alosa pseudoharengus*) and blueback [sic] herring (*Alosa aestivallis*) have access to Reeds Brook" is not based on known facts, and "have access" is a vague term. Conclusively detecting whether a river herring is an alewife or a blueback herring involves killing the fish. (USGS 2019) At best, the forced placement of blueback herring into Graham lake can be assumed by statistically sampling fish. Alewives and blueback herring tend to migrate upstream at different times (blueback herring in mid to late June) and to use different habitat. (MDMR 2022) (20150227-5321) Early Union River river herring are released into Graham Lake. A large percentage of the mid-run river herring are harvested (as in, killed) and some are released into Graham Lake. A portion of Late run (after 10-June) river herring, which includes a bulk of the blueback herring, are released upstream from the Ellsworth Dam. MDMR projects a spawning escapement goal of about 15% of the the total river herring run at the Ellsworth dam. Since 100% of the early run river herring (the first 150,000 fish, or about 48% of the total escapement goal) are released upstream, the escapement goal for the mid and late run river herring would be considerably below 15% unless an inadequate run of river herring occurs. (20150227-5321) Blueback herring spawn in the main stem sections of rivers and streams and do not ascend into ponds or lakes. (MDMR 2022) Most of the flow through Graham Lake is from the Union River branches that enter at the top of Graham Lake, so it is likely that more blueback herring would target those river segments after being

dumped into Graham Lake. The statement “In May of 2021, Green Lake NFH staff have observed river herring in Reeds Brook” is mentioned here and in MDMR’s DLA comments. Neither agency provides authoritative data on this such that the validity of the statement can be evaluated. The use of this statement to bolster the implication that blueback herring are in Reeds Brook is questionable.

The fish passage situations for alewives and river herring in the Union River depend on fish passage past the Ellsworth and Graham Lake dams. Several different situations can occur depending on whether the Ellsworth project gets relicensed, and whether one or both dams are removed, and the type of fish passage implemented at a dam that remains. Since blueback herring spawn in the main stem of a river or stream and do not ascend into ponds or lakes, it is unlikely the Project waters provide a significant source of habitat for blueback herring.

5.3.3.9 American shad

The Applicant states, “There is no habitat suitable to American shad in the Union River upstream of Lake Leonard. American shad are not expected to have access to Reeds Brook now, or in the future (Ellsworth FLA 2015)”. The Final Environmental Assessment for the Ellsworth hydroelectric dam (P-2727) states that the Maine Department of Marine Resources and BBHP documented 4.9 miles of potential American shad (*Alosa sapidissima*) habitat in the Union River and that two miles exists upstream of Ellsworth dam. These two miles are between Lake Leonard and the Graham Lake dam. Further, fish passage for alosine species (alewife, blueback herring and American shad) was included in the NMFS’s Section 18 fishway prescription for the Ellsworth Project. Therefore, it is anticipated that American shad will have access to Graham Lake and Reeds Brook pending the relicensing of the Ellsworth Hydroelectric dam. If included in the FLA, this section should be updated to reflect this information.

The FLA has been updated to clarify that this includes the section of the Union River between Lake Leonard and Graham Lake.

The American shad comment above clearly shows USFWS’ and MDMR’s approach of using vague terms, “have access” in this case, to state information, and then ignore the assumptions and facts behind that statement. The statement is then treated as fact and used as the basis for concrete conclusions. “Have access” is not the same as “will access.” The fact that USFWS and MDMR expect American shad to have access to the section of the Union River between the current site of the Ellsworth dam and Graham lake as a result of the Ellsworth relicensing effort does not support the implication that there is habitat suitable to American shad in Graham Lake and Reeds Brook.

5.3.4.8 River Herring

The Applicant states, “Alewife passage would risk fish in the lake and blueback herring are not expected to have access to Reeds Brook.” Please see the comments for Exhibit A, 2.1.8 and Exhibit E, 5.3.3.6. If alewife passage does pose a risk to resident fish in Green Lake, it would be appropriate to cite the information source. The Service has not conducted any fish health assessments for the Union River alewife population; however, the Service has conducted a fish health assessment of river herring on the St. Croix River from 2014 to 2016 and no targeted pathogens were found.

The FLA has been updated. See MDIFW comments and GLWP responses above. No authoritative basis has been established for the application of a personal communication about a fish health assessment of river herring on the St. Croix River from 2014 to 2016 to the Union River in the future. MDMR’s statement that river environment accounts for different effects on river herring because river herring “from all these rivers enter a common ocean environment” (while not necessarily scientifically valid reasoning) would tend to support the idea that MDMR believes that river specific differences can be significant. (20150227-5321)

5.3.4.9 American shad

The Applicant states, "American shad are not expected to have access to Reeds Brook." Please see our comment for Exhibit E, 5.3.3.7.

GLWP's responses on American shad are included above.

Thank you for this opportunity to comment. If you have any questions, please contact Oliver Cox at oliver_cox@fws.gov.

GLWP's discussion with Oliver Cox is included in the consultation section of the FLA.

Sincerely,

AMANDA CROSS Digitally signed by
AMANDA CROSS
Date: 2022.01.24
17:10:36 -05'00'

Dr. Amanda S. Cross
Project Leader Maine
Field Office
Maine-New Hampshire
Fish and Wildlife Service Complex

cc:

NMFS, Dan Tierney MEDEP,
Kathy Howatt MEDMR, Casey
Clark
RO/Fisheries, Brian Sojkowski
Fisheries: OCox: 1-24-22: (207)902-1557

GLWP appreciates that a good water supply is critical to the GLNFH. However, USFWS can't have it both ways. It is inconsistent for USFWS to demand the protections and benefits of the current agreement along with working to make the relicensing process so costly for GLWP that the company goes out of business. As shown by the hydropower plant at Craig Brook National Fish Hatchery, the USFWS does not have a very good history of evaluating, developing, or operating a hydropower site in Maine. (Person communication with NFH staff)

3.0 MAINE DEPARTMENT OF MARINE RESOURCES

3.1 MDMR DLA Comments

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



JANET T. MILLS
GOVERNOR

PATRICK C. KELIHER
COMMISSIONER

January 28, 2021

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, DC 20426

RE: Green Lake Hydroelectric Project (P-7189) Draft License Application

Dear Secretary Bose:

The Maine Department of Marine Resources (MDMR) is writing in response to Draft License Application (DLA) submitted by Green Lake Water Power Company (GLWP; Applicant) on November 1, 2021 as part of the Integrated License Process for the Green Lake Hydroelectric Project (P-7189; Project). The Project is located on Green Lake and Reeds Brook in the City of Ellsworth and the town of Dedham in Penobscot County, Maine. MDMR has reviewed the DLA and includes our comments in the attached document.

MDMR agrees with and supports the comments made by the USFWS and National Marine Fisheries Services on the Draft License Application. Specifically, substantial information has become available since the Project was last licensed and that information must inform project operations and facilities to protect and enhance the species native to Reeds Brook and Green Lake.

If you have any questions or need additional information, please contact (casey.clark@maine.gov) or (207) 350-9791.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Patrick C. Keliher'.

Patrick C. Keliher, Commissioner

cc: Sean Ledwin, Casey Clark, MDMR
Francis Brautigam, John Perry, MDIFW
Kathy Howatt, MDEP
Amanda Cross, Julianne Rosset, Oliver Cox, USFWS
Dan Tierney, NOAA

Background

The Project is located on Green Lake and Reeds Brook in the City of Ellsworth and the town of Dedham in Penobscot County, Maine. Reed Brook is a tributary to the Union River. The Project consists of: (1) a 273.2-foot-long, 7.5-foot-high dam that includes: (a) an 82-foot-long concrete-gravity section with an 80-foot-long overflow spillway with a crest elevation of 160.7 feet United States Geological Survey (USGS) datum; (b) a 12-foot-long, 15-foot-high concrete intake section with a 5-foot-wide, 5-foot-high headgate and an 8-foot-wide, 12-foot-high continuous trash rack having one-inch clear-bar spacing; (c) a 22.2 foot-long gated spillway section with two 6-foot-wide, 7-foot-high spillway gates at an elevation of 154.0 feet USGS datum; and (d) an approximately 157-foot-long dry-rock, concrete, timber, and sheet-steel section with a 35-foot-long auxiliary spillway at an elevation of 162 feet USGS datum, and a 120-foot-long auxiliary spillway that slopes from an elevation of 163 feet to 164 feet USGS datum; (2) a 2,989-acre impoundment at an elevation of 160.7 feet USGS datum; (3) a 1,740-foot-long concrete and wooden-stave penstock that includes; (4) a concrete powerhouse containing two turbine-generator units with a total installed capacity of 425 kW; (5) two 50-foot-long, 5-foot-diameter powerhouse discharge pipes; (6) step-up transformer, and underground transmission line connecting the project generators to the regional grid; and (7) appurtenant facilities.

The current license requires Green Lake Power to: (1) maintain the elevation of Green Lake between 159.7 feet and 160.7 feet USGS datum between June 1 and September 1 of each year, and no lower than 157.5 feet USGS datum for the remainder of the year; (2) complete the fall drawdown of Green Lake by October 15 of each year; and (3) reduce the elevation of Green Lake during the spring drawdown to no lower than the elevation attained on the previous October 15 of each year. In addition, the current license requires Green Lake Power to provide flows of up to 30 cfs to the FWS's Green Lake National Fish Hatchery.

The current license requires Green Lake Power to install screens at the project intake to minimize mortality due to entrainment and to prevent out-migration of adult salmonids from Green Lake. The existing screens have a two-inch mesh size and extend from the bottom of the intake to 2 feet above the crest of the spillway.

General Comments

Green Lake includes one of only a few populations of Arctic Char in the State of Maine and important resident sportfish resources. Given the importance of this population and the landlocked salmon fishery in Green Lake, MDMR anticipates working closely with the Maine Department of Inland Fish and Wildlife (MIFW) to develop PM&E measures that support native resident and diadromous species. While the information requests and comments in this letter are focused on the resources under the authority of MDMR, we have coordinated with the other resources agencies to ensure that our comments are not in conflict with the goals of those agencies. Therefore, our comments should not be interpreted as conflicting with the other state and federal resource agencies that are stakeholders to this relicensing.

As described in the 2015 Union River Fisheries Management Plan (2015 Plan), the watershed includes historic habitat for Atlantic salmon, American shad, striped bass, rainbow smelt,

blueback herring, alewife, sea lamprey, American eel, and tomcod.¹ Due to the lack of barriers below the lake, Green Lake and Reeds Brook are understood to be historic habitat for Atlantic salmon, alewife, blueback herring, American shad, American eel, and sea lamprey. In addition, Green Lake is included in the 2009 critical habitat designation for Atlantic Salmon.²

GLWP does not include any references, site drawings, and is missing other key pieces of information in exhibit A of the DLA. As a result, MDMR is unable to comment on the entirety of the application at this time. We look forward to a complete application in order to assess project effects and develop appropriate measures for the project.

Comments on Exhibit A of the DLA

2.1.8 Fishway Facilities

GLWP states, “Fish passage in the upstream direction is not recommended for the Project because of the possibility of alewife being introduced into Green Lake and contaminating water withdrawn for the Green Lake National Fish Hatchery (GLNFH) with alewife-borne diseases. To prevent fish from migrating upstream over the dam into Green Lake, the Project proposed, with concurrence from Interior and MDEP, to maintain the pre-existing fish screens at the crest of the project dam. The Project also proposed, at the request of Interior and MDEP, to install screens at the project intake with a maximum mesh size of 2 inches to prevent adult salmonids from moving out of Green Lake.”

This statement includes positions of both the Maine Department of Environmental Protection (MDEP) and the U.S. Fish and Wildlife Service (USFWS; Interior) but does not attribute those positions to any documents by those agencies on the record for the Project. In recent coordination with Interior, it was apparent that the statements included by GLWP that are attributed to Interior seem to conflict with the current position of that agency regarding upstream passage. We look forward to the comments of Interior and support their current recommendations. Similarly, we will coordinate with DEP to clarify contemporary positions for the Project.

2.1.10 Proposed Facilities

GLWP does not propose any changes to existing facilities or new facilities.

2.2.1 Current Project Operation

GLWP states, “We run an impoundment but our operation is closer to fixed point ‘run of river’ than it is to peaking.”

MDMR disagrees with this assessment. While GLWP is not able to align their generation with high energy rates to capitalize on peaking, the project does control storage of water in Green

¹ Accession No. 20150227-5321 at page 19

² 74 FR 29300. Endangered and Threatened Species; designation of critical habitat for Atlantic Salmon (*Salmo salar*) Gulf of Maine Distinct Population Segment; Final Rule. Department of Commerce National Oceanic and Atmospheric Administration. Federal Register 74(117): 29300–29341. June 19, 2009.

Lake as a reservoir. To that end, GLWP draws down the impoundment by up to 3.2 feet seasonally (elevation of 157.5 to 160.7 feet USGS, yielding a maximum usable storage of about 10,000 acre-feet). In section 5.1 of Exhibit E, GLWP states, “GLWP, under the current license, manages the lake to a smaller level fluctuation (4.0 – 7.2 feet) than BHE did historically (3.0 – 8.0 feet).” Statement conflicts with the description of the project operations in section 2.2.1 of Exhibit A. Descriptions should be clarified and corrected for the FLA. An accurate description of project operations is critical to determine effects on aquatic resources and should be included in the FLA.

7.2 Annual Operation and Maintenance Costs

GLWP states, “The annual operation and maintenance costs of running the Green Lake Hydroelectric Project facility are \$46,592 with the annual administrative expenses being approximately \$34,691.” These costs sum to \$81,283. GLWP also states in section 5, “The power generated by the Green Lake Hydroelectric Project produces an average of about \$72,000 per year.”

MDMR requests that GLWP provide addition details on the discrepancy between generation costs and operation costs at the facility. As written in the DLA, the Project losses on average \$9,283 each year, which does not include periodic maintenance costs nor does it include replacement of the penstock. These numbers indicate that the project is not economically viable. Given that the project has impacts on natural resources in the watershed, MDMR would like to understand the likelihood that the project will continue to operate through the license term, will be able to carry out proposed measures, and will be able to carry out environmental protection measures adequately.

Comments on Exhibit E of the DLA

3.7 Consultation

Anna Harris was the Maine Field Office Project Leader for USFWS and is not an employee of MDMR.

(5.3.1) Species

GLWP states “The following migratory fish were identified during scoping: alewife, American eel, American shad, Atlantic salmon, blueback herring, and sea lamprey. With the exception of landlocked salmon, none of these are currently present in Green Lake.” This statement is incorrect as American eels have been documented in Green Lake by DIFW and in the Project boundary by GLWP staff. Please see MDMR’s comments on section 5.3.3.1 for supporting documentation. MDMR requests this section be updated in the FLA to represent accurate information.

(5.3.3.1) Eel

GLWP performed nighttime eel surveys in 2020 and did not document eels. However, American eels have been documented above the Project in Green Lake and are native to Union River watershed.³

During the ISR meeting, USFWS asked if there was evidence of eels passing through the penstock. The first part of GLHC's response was captured in the initial study meeting summary. "We do experience things that we suspect may be eels through the penstock at times. While shut down, believe eels tried to pass where water was flowing through penstock leaks or taps".⁴ The second part of GLHC's response was not captured in the meeting summary, but was paraphrased by USFWS. "...it was necessary to remove deceased outmigrating eels from the Project at times, which required shutting down production."⁵ Mr. Kleinschmidt's comments are concerning as they describe direct impacts of the Project on American eels. If eels are entrained into the penstock, their only route of egress is through the turbines at the powerhouse.

(5.3.3.6) River herring (alewife, blueback herring)

As described in the 2015 Union River Fisheries Management Plan (2015 Plan), alewife and other diadromous fish "were once common in the Union River (Havey 1961), but were extirpated in the late 1700's or early 1800's, presumably by construction of dams without fishways, water pollution, over harvest, and other factors."⁶ The 2015 Plan goes on to state that while Green Lake is currently inaccessible to alewives due to the existence of the outlet dam and lack of a fishway, Green Lake likely contained a historic population of alewives due to the absence of a natural barrier to migration.⁷ Finally, the 2015 Plan restates a position by the Union River Fisheries Coordinating Committee⁸ related to disease risk and alewives. However, the 2015 Plan also states, "the supporting rationale has not been well described in the CFMP to date" and calls for a review of the issue. The position in the 2015 Plan dates back to a statement made by USFWS and included in FERC's April 5, 1984 license order.⁹ However that position and concern of disease related to alewife restoration is no longer supported by USFWS and this statement should be removed from this section in the FLA.¹⁰ Restoration of alewives into Green Lake is warranted at this time and the only obstacle to restoration is the lack of adequate upstream and downstream fish passage at the Project.

The statement by GLWP about blueback herring is incorrect. We echo the comments of USFWS as an accurate summary of the current stocking of river herring in the Union River watershed. "River herring are trapped in the tailrace of the Ellsworth Dam and transported and released upstream of Graham Lake Dam throughout the adult river herring migration. This means that

³ Id. at page 19

⁴ Accession No. 20210311-5107

⁵ Accession No. 20210408-5106

⁶ Accession No. 20150227-5321 at page 28

⁷ Id. at page 28

⁸ The Union River Stakeholder Group consisted of state and federal fishery agencies, including Maine Department of Marine Resources; Maine Department of Inland Fisheries and Wildlife; and the U.S. Fish and Wildlife Service; as well as the City of Ellsworth; Black Bear Hydro Partners, LLC; Maine Council of the Atlantic Salmon Federation; Union Salmon Association; and interested members of the public.

⁹ Green Lake Water Power Company, 27 FERC ¶ 62,023 (1986).

¹⁰ Accession No. 20220125-5022

both alewife (*Alosa pseudoharengus*) and blueback herring (*Alosa aestivalis*) have access to Reeds Brook. In May of 2021, Green Lake NFH staff have observed river herring in Reeds Brook.”¹¹

(5.3.3.7) American shad

GLWP incorrectly states that, “there is no habitat suitable to American shad in the Union River upstream of Lake Leonard.” While shad are not currently passed upstream of the Ellsworth Dam, fish passage for alosine species (alewife, blueback herring and American shad) was included in the NMFS’s Section 18 fishway prescription for the Ellsworth Project.¹² Therefore, it is anticipated that American shad will have access to Graham Lake and Reeds Brook pending the relicensing of the Ellsworth Hydroelectric dam. If included in the FLA, this section should be updated to reflect this information.

(5.3.3.8) Sea lamprey

GLWP states, “Downstream fish passage of sea lamprey is facilitated by their lack of a swim bladder. In most situations they can pass through a turbine without suffering decompression damage. (Colotelo 2012).” This statement is irrelevant to the Project and likely does not represent the best available information on this species. Decompression damage is unlikely to occur at low head dams, such as Green Lake, but direct trauma is more likely as lamprey or other fish migrate through turbines.

(5.3.4) Proposed environmental measures

(5.3.4.1) Eel

GLWP does not propose any upstream passage facilities for American eels at the Project. American eels have been documented above the Project in Green Lake and are native to Union River watershed.¹³ The presence of eels on the upstream side of the Project was confirmed by Bert Kleinschmidt (GLWP) during the ISR meeting on February 24, 2021.¹⁴ While the density of eels migrating upstream in Reeds Brook and into Green Lake are likely low currently, there is no question that their upstream migration is impeded by the lack of a dedicated passage structure at the Project. The abundance of eels will increase in the watershed following the installation of upstream eel passage at the Ellsworth and Graham Lake dams (collectively P-2727). Upstream eel passage should be operational at Ellsworth and Graham Lake dams two years after the issuance of the new FERC license.

GLWP does not propose any downstream passage facilities or protective measures at the Project. Downstream measures to prevent impingement and entrainment of silver eels at the Project are critical to minimize Project impacts on the species and, as eels are present now, these measures are critical now. American eels are vulnerable to turbine-induced mortality during their

¹¹ Accession No. 20220125-5022

¹² Accession No. 20180410-5100

¹³ Id. at page 19

¹⁴ Accession No. 20210311-5107

outmigration and, if downstream mortality is high, the Project could be acting as a sink to the Union River eel population.¹⁵ Based on information provided by Applicant to date and other documentation, upstream and downstream eel passage and protection measures at the Project are warranted. Dedicated upstream eel passage is necessary to provide access to rearing habitat upstream of the Project, throughout the migratory eel passage season. Similarly, eels need to be protected as they attempt to move downstream past the Project. Upstream and downstream fish passage structures at the Project should provide safe, timely, and effective passage and be designed in consultation with, and require approval by, MDMR and other resource agencies. The designs should be consistent with the USFWS's 2019 Fish Passage Engineering Design Criteria Manual or an updated version.¹⁶

GLWP states, "Out-migrating eels would currently need to pass through the trash racks (1" clear spacing) to gain access to the penstock, or through the slightly closer spacing of the gate fish screens to gain access directly to Reeds Brook." USFWS states in their current fish passage guidance that 3/4-inch or less clear spacing is needed to physically exclude American eel, smolts, and adult alosines from entrainment. The current configuration at the project, 1" clear spacing, does not exclude eels from entrainment. Unfortunately the current configuration with "slightly closer spacing of the gate fish screens" likely means more eels pass via the turbines.

(5.3.4.6) River herring

Please refer to our comments in section 5.3.3.6.

(5.3.4.7) American shad

Please refer to our comments in section 5.3.3.7.

(5.3.4.8) Sea lamprey

Please refer to our comments in section 5.3.3.8.

We appreciate the opportunity to comment on the DLA. If you have any questions pertaining to this letter, please contact Casey Clark at (207) 350-9791 or casey.clark@maine.gov.

¹⁵ Haxton, T. (2021). Cumulative downstream turbine-induced mortality and thresholds for facilitating upstream passage of American eel. River Research and Applications.

¹⁶ USFWS (U.S. Fish and Wildlife Service). 2019. Fish Passage Engineering Design Criteria. USFWS, Northeast Region R5, Hadley, Massachusetts.

3.2 GLWP Response to MDMR DLA Comments

In this section, text from agency comments is in this font, color, and size and GLWP replies are in this font, color and size. These choices are intended to allow the document to be read when printed in black and white.

The Maine Department of Marine Resources (MDMR) is writing in response to Draft License Application (DLA) submitted by Green Lake Water Power Company (GLWP; Applicant) on November 1, 2021 as part of the Integrated License Process for the Green Lake Hydroelectric Project (P-7189; Project). The Project is located on Green Lake and Reeds Brook in the City of Ellsworth and the town of Dedham in Penobscot County, Maine. MDMR has reviewed the DLA and includes our comments in the attached document.

The above paragraph reflects a significant lack of understanding of the Project, which is located in Hancock County, Maine.

MDMR agrees with and supports the comments made by the USFWS and National Marine Fisheries Services on the Draft License Application. Specifically, substantial information has become available since the Project was last licensed and that information must inform project operations and facilities to protect and enhance the species native to Reeds Brook and Green Lake.

As “MDMR agrees with and supports the comments made by the USFWS and National Marine Fisheries Services on the Draft License Application” MDMR is a party to any invalid or misleading statements within the comments by these agencies and subject to all GLWP responses to those agencies’ comments. In addition, the following statement, which is worded to be both vague and alarming, implies that these agencies have provided important information that is not reflected in GLWP’s documents to date. No specifics on this have been provided by MDMR. The use of the word “inform,” while a bit of a stretch definition wise, implies vague and unspecific effects, despite sounding impressive.

Cutting through the vagueness, if MDMR’s paragraph above describes its comments on the DLA, then these comments should reflect species native to Reeds Brook and Green Lake. The information presented should be either new and not known during the original licensing, or the related dangers to species are new. If this is not true, either MDMR’s comments or the above paragraph or both are not true.

If you have any questions or need additional information, please contact casey.clark@maine.gov or (207) 350-9791.

GLWP sent a request for additional information to Casey Clark at MDMR on 14-Feb-2022 and has not received a reply as of 30-Mar-2022.

Background

The Project is located on Green Lake and Reeds Brook in the City of Ellsworth and the town of Dedham in Penobscot County, Maine. Reed Brook is a tributary to the Union River. The Project consists of: (1) a 273.2-foot-long, 7.5-foot-high dam that includes: (a) an 82-foot-long concrete-gravity section with an 80-foot-long overflow spillway with a crest elevation of 160.7 feet United States Geological Survey (USGS) datum; (b) a 12-foot-long, 15-foot-high concrete intake section with a 5-foot-wide, 5-foot-high headgate and an 8-foot-wide, 12-foot-high continuous trash rack having one-inch clear-bar spacing; (c) a 22.2 foot-long gated spillway section with two 6-foot-wide, 7-foot-high spillway gates at an elevation of 154.0 feet USGS datum; and (d) an approximately 157-foot-long dry-rock, concrete, timber, and sheet-steel section with a 35-foot-long auxiliary spillway at an elevation of 162 feet USGS datum, and a 120-foot-long auxiliary spillway that slopes from an elevation of 163 feet to 164 feet USGS datum; (2) a 2,989-acre impoundment at an elevation of 160.7 feet USGS datum; (3) a 1,740-foot-long concrete and wooden-stave penstock that includes; (4) a concrete powerhouse containing two turbine-generator units with a total installed capacity of 425 kW; (5) two 50-foot-long, 5-foot-diameter powerhouse discharge pipes; (6) step-up transformer, and underground transmission line connecting the project generators to the regional grid; and (7) appurtenant facilities.

The Project is still located in Hancock County, Maine.

The 22.2 foot-long gate section next to the intake structure is not a spillway. Spillways are typically located at the top of a dam to allow water to go over the dam top. (Army 2022) The top of the dam is at an elevation of 160.7 ft USGS, not at 154.0 feet USGS.

The statement that “a 1,740-foot-long concrete and wooden-stave penstock includes; (4) a concrete powerhouse containing ...” does not make sense.

The current license requires Green Lake Power to: (1) maintain the elevation of Green Lake between 159.7 feet and 160.7 feet USGS datum between June 1 and September 1 of each year, and no lower than 157.5 feet USGS datum for the remainder of the year; (2) complete the fall drawdown of Green Lake by October 15 of each year; and (3) reduce the elevation of Green Lake during the spring drawdown to no lower than the elevation attained on the previous October 15 of each year. In addition, the current license requires Green Lake Power to provide flows of up to 30 cfs to the FWS’s Green Lake National Fish Hatchery.

The statement “(1) maintain the elevation of Green Lake between 159.7 and 160.7 feet USGS datum between June 1 and September 1 of each year” is not correct. This correct summer level range period is from June 1 to Labor Day weekend.

The current license requires Green Lake Power to install screens at the project intake to minimize mortality due to entrainment and to prevent out-migration of adult salmonids from Green Lake. The existing screens have a two-inch mesh size and extend from the bottom of the intake to 2 feet above the crest of the spillway.

This section is incorrect. The Project is required to install an intake screen with a two-inch maximum grid size. The existing screens have a one-inch clear spacing between the bars. The intake screens are on the intake, not on the crest of the dam or spillway, therefore the statement that the screens “extend from the bottom of the intake to 2 feet above the crest of the spillway.” does not make sense. The intake screens are located inside the intake gatehouse at the dam and therefore do not need to extend above the gatehouse floor to perform their intended function.

General Comments

Green Lake includes one of only a few populations of Arctic Char in the State of Maine and important resident sportfish resources. Given the importance of this population and the landlocked salmon fishery in Green Lake, MDMR anticipates working closely with the Maine Department of Inland Fish and Wildlife (MIFW) to develop PM&E measures that support native resident and diadromous species. While the information requests and comments in this letter are focused on the resources under the authority of MDMR, we have coordinated with the other resources agencies to ensure that our comments are not in

conflict with the goals of those agencies. Therefore, our comments should not be interpreted as conflicting with the other state and federal resource agencies that are stakeholders to this relicensing.

This section is somewhat misleading. It is carefully crafted to insinuate several meanings. One can inspect the definition of “few” and decide whether 14 would meet that definition. However, arctic charr are listed by the International Union for Conservation of Nature as a species of Least Concern. (IUCNREDLIST) They are common in arctic regions, and Maine is one of the most southern locations in which they are found. If climate change continues, their presence in Maine may be in jeopardy from warming temperatures. The Project contributes to the reduction of the release of greenhouse gases into the atmosphere. Greenhouse gases are regarded as causing global warming. (EIA 2021)

The statement that starts “Given the importance of this population...” is problematic. The assumptions appears to be that the the statement “Green Lake includes one of only a few populations of Arctic Char in the State of Maine” establishes the importance of the arctic charr population in Green Lake. This assertion is not substantiated by MDMR, yet it is implied to be a fact that requires the adoption of “PM&E measured that support native resident and diadromous species.”

This section mentions “information requests,” yet it is unclear if their comments contain any.

“Coordination with other resources agencies to ensure that our [MDMR’S] comments are not in conflict with the goals of those agencies” indicates that meetings or other communications have occurred between MDMR and other resource agencies without these communications being part of the public record during the relicensing process. GLWP has been neither notified of these communications nor invited to participate. These communications between various interested and potentially adjudicatory parties involved in the relicensing process are ex parte communication. (12 CFR § 263.9) They violate Maine law if MDMR (or members of other agencies) are involved in or authorized to take final action or to make findings of fact and conclusions of law in the proceedings. (Maine 5§9055)

Further, MDMR states “our comments should not be interpreted as conflicting with the other state and federal resource agencies that are stakeholders to this relicensing.” Combining this statement with MDMR’s approach to communication strongly supports the idea that MDMR is not authoritative with respect to resource issues during this relicensing. MDMR’s comments should therefore be regarded as unsubstantiated opinion unless backed up by thoroughly applicable references.

As described in the 2015 Union River Fisheries Management Plan (2015 Plan), the watershed includes historic habitat for Atlantic salmon, American shad, striped bass, rainbow smelt,

blueback herring, alewife, sea lamprey, American eel, and tomcod. Due to the lack of barriers below the lake, Green Lake and Reeds Brook are understood to be historic habitat for Atlantic salmon, alewife, blueback herring, American shad, American eel, and sea lamprey. In addition, Green Lake is included in the 2009 critical habitat designation for Atlantic Salmon.

This plan (the Plan) covers a limited time period, which does not include the current date, let alone the next 15 years. It therefore is a questionable authoritative reference for statements by MDMR. However, since it may reflect the best available information, and is referenced by MDMR, it will be used as the basis for responses to MDMR’s comments. It should be noted that MDMR appears to have been intimately involved in creating the Plan. (20150227-5321)

The Plan contains the statement in its Executive Summary: “Migratory fish species include: American shad *Alosa sapidissima*, striped bass *Monroe saxatilis*, rainbow smelt *Osmerus mordax*, blueback herring *Alosa aestivalis* and alewife *Alosa pseudoharengus* (the latter two species collectively known as river herring), Atlantic sturgeon *Acipenser oxyrinchus* Atlantic tomcod *Microgadus tomcod*, American eel *Anguilla rostrata*, sea lamprey *Petromyzon marinus*, and endangered populations of sea-run Atlantic salmon. Dams constructed in the late 1700's and early 1800's contributed to the

disappearance of runs of migratory fish in the Union River, and blockages on the main stem of the river and at outlets of lakes and ponds elsewhere in the drainage continue to prevent full access for some species to historical habitat.” (20150227-5321) Further, the Plan states: “Dams constructed in the late 1700’s and early 1800’s contributed to the disappearance of runs of migratory fish in the Union River, and blockages on the main stem of the river and at outlets of lakes and ponds elsewhere in the drainage continue to prevent full access for some species to historical habitat.” (20150227-5321) No references are given in the Plan to support these statements and it is unlikely they are first person knowledge of the writers of the plan (unless they claim they have been alive since the late 1700’s, a claim GLWP would dispute). MDMR’s use of “are understood,” with passive voice and no agent, continues to cast doubt on their statements. With no references or first-hand knowledge, MDMR’s statements fall in the category of opinion or “everybody knows” supposition.

The Plan calls for river herring escapement of 315,000 river herring annually to achieve an anticipated run of 2,000,000 fish 4-5 years after the 2015 escapement increase is implemented. By 2021, less than one third of that run was achieved. (20150227-5321) This suggests that MDMR has not provided the needed understanding or management to achieve benefits that they promise in exchange for fish protection and recovery measure. Cost benefit analyses by MDMR are therefore highly suspect.

The Plan states:

“In 2009, the Atlantic States Marine Fisheries Commission (ASMFC), of which Maine is a member, passed Amendment II to the Interstate Fisheries Management Plan (IFMP) for American Shad and River Herring (ASMFC 2009). As part of this IFMP, Maine and all member states agreed to close all river herring fisheries (commercial and recreational) by 2012, except where the fishery could be documented as sustainable. Sustainable river herring fisheries are defined as those that can support a commercial and/or recreational fishery in addition to maintaining an adequate level of escapement to sustain stock reproduction and recruitment. Any state wishing to allow fishing of specific runs submitted plans to the ASMFC for approval. No run may be harvested if it has not been approved by the ASMFC.

“In late 2011, Maine submitted sustainable fishery management plans for 19 river herring runs, including the Union River run. Runs were defined as sustainable that met certain criteria, including minimum escapement targets and biological metric standards. The escapement sustainability target (established in 1984) for most commercial fisheries is 35 fish per surface acre of spawning habitat. The Ellsworth harvest was a notable exception from this target and was only allowed a lower escapement target since Amendment II was adopted after the Union River Management Plan was already in place. Other rivers have a fishery closure requirement of 3 days per week to meet their sustainable fishery management plans.” (20150227-5321)

Per the above sections, MDMR is continuing to harvest river herring despite not meeting fish per acre targets. MDMR is then lobbying for increasing the amount of river herring habitat. This suggests that the river herring run in the Union River is limited by the escapement number, and not by the amount of habitat.

The Plan also discusses information about river herring habitat and behavior that is useful for understanding some of the issues mentioned in DLA comments by MDMR and other agencies. This information is presented in other GLWP responses in this document.

It is interesting to note that the Plan contains the following statement:

"It is the goal of the Union River Stakeholders Group to achieve timely and effective restoration and/or management of populations of resident and self-sustaining diadromous fish in the Union River watershed, consistent with a comprehensive fishery management plan, and in a manner that balances the interests of the public, regulatory agencies, and the licensee of the Ellsworth Hydroelectric Project." (20150227-5321)

GLWP does not include any references, site drawings, and is missing other key pieces of information in exhibit A of the DLA. As a result, MDMR is unable to comment on the entirety of the application at this time. We look forward to a complete application in order to assess project effects and develop appropriate measures for the project.

Much of the content in Exhibit A is sourced directly GLWP's Project knowledge. References would be circular in nature and therefore, pedantic. References are included in text sections when documents external to the current relicensing documents are referenced. Also, Exhibit A does include pictures, descriptions and a map of the project boundary sufficient to understand the location and scope of the project. Final maps are included with the FLA. GLWP doubts that MDMR requires the Single Line Diagram to "assess project effects." It should be noted that MDMR does not appear to have read, understood or evaluated much of the information presented in the DLA or previous relicensing documents. Therefore, MDMR has neglected to take advantage of the opportunities to consult on resources and studies in a timely, proactive manner afforded by the Integrated Licensing Process on this project.

Comments on Exhibit A of the DLA

2.1.8 Fishway Facilities

GLWP states, "Fish passage in the upstream direction is not recommended for the Project because of the possibility of alewife being introduced into Green Lake and contaminating water withdrawn for the Green Lake National Fish Hatchery (GLNFH) with alewife-borne diseases. To prevent fish from migrating upstream over the dam into Green Lake, the Project proposed, with concurrence from Interior and MDEP, to maintain the pre-existing fish screens at the crest of the project dam. The Project also proposed, at the request of Interior and MDEP, to install screens at the project intake with a maximum mesh size of 2 inches to prevent adult salmonids from moving out of Green Lake."

This statement includes positions of both the Maine Department of Environmental Protection (MDEP) and the U.S. Fish and Wildlife Service (USFWS; Interior) but does not attribute those positions to any documents by those agencies on the record for the Project. In recent coordination with Interior, it was apparent that the statements included by GLWP that are attributed to Interior seem to conflict with the current position of that agency regarding upstream passage. We look forward to the comments of Interior and support their current recommendations. Similarly, we will coordinate with DEP to clarify contemporary positions for the Project.

This is from the PAD, and is based on the original project license. MDMR neglected to include the following paragraph, which contains the reference:

"Article 28 of the existing license requires Licensee to install screens at the project intake to minimize mortality due to entrainment and to prevent out-migration of adult salmonids from Green Lake. (FERC, 1984)" (19840406-0301)

The Union River Fisheries Management Plan (the Plan) states the following:

“The Green Lake Dam lacks a fishway and prevents anadromous fish from entering Green Lake. The URFCC recommends in this and previous plans that Green Lake be excluded from alewife stocking in order to avoid the risk of exposing the GLNFH source water supply (Green Lake) to fish that may carry harmful pathogens. Modification of that recommendation is not contemplated; however, the supporting rationale has not been well described in the CFMP to date. The specific fish health risks and their magnitude should be discussed/presented relative to water treatment capabilities at the hatchery, angler introduced baitfish, stocked game fish, and other pathogen sources (e.g. migratory eels, which ascend the face of the dam and enter the lake). That discussion may identify/highlight additional factors central to fisheries management strategies in Green Lake.

“The URFCC recommends in this and previous plans that certain waters be excluded from alewife stocking based on concerns for the potential impact on smelt populations, an important forage species for game fish in those waters. Modification of that recommendation is not contemplated; however, the supporting rationale has not been well described in the CFMP to date. A literature review and discussion of smelt - alewife interactions would benefit the planning process and support management recommendations of those species in the Union River watershed.” (20150227-5321)

The Plan states the following objectives for Green Lake:

“Continue to stock 600-800 SY landlocked salmon in most years, and 2,000 SY lake trout every other year or every third year.

“Maintain water quality and biological integrity of Great Brook and Jellison Hill Brook (these tributaries produce numerous wild salmon, which typically account for 25 - 40% of the overall salmon catch in Green Lake); (20150227-5321)

MDMR’s statement above that begins “This statement includes positions of both the Maine Department of Environmental Protection...” is a telling paragraph. The paragraph starts with an assertion that unsupported statements were made by GLWP. MDMR then asserts that they discussed fish passage with Interior outside of the public relicensing process and Interior disagrees with the statements from the original license. They then go on to state that they expect future statements from Interior, and imply that these statements will support MDMR’s argument. They further imply they are party to fish passage recommendations with Interior that have not been made public. Presumably, these implied understandings and agreements (none backed up by references to documents on the record for the Project) were worked out during MDMR’s “coordination” outside the public licensing process. MDMR then goes on to imply the same process will be pursued with MDEP. It is hard to read this paragraph in any other light than as an attempt by MDMR to intimidate GLWP into placating MDMR’s demands.

2.1.10 Proposed Facilities

GLWP does not propose any changes to existing facilities or new facilities.

2.2.1 Current Project Operation

GLWP states, “We run an impoundment but our operation is closer to fixed point ‘run of river’ than it is to peaking.”

MDMR disagrees with this assessment. While GLWP is not able to align their generation with high energy rates to capitalize on peaking, the project does control storage of water in Green

Lake as a reservoir. To that end, GLWP draws down the impoundment by up to 3.2 feet seasonally (elevation of 157.5 to 160.7 feet USGS, yielding a maximum usable storage of about 10,000 acre-feet). In

section 5.1 of Exhibit E, GLWP states, "GLWP, under the current license, manages the lake to a smaller level fluctuation (4.0 – 7.2 feet) than BHE did historically (3.0 – 8.0 feet)." Statement conflicts with the description of the project operations in section 2.2.1 of Exhibit A. Descriptions should be clarified and corrected for the FLA. An accurate description of project operations is critical to determine effects on aquatic resources and should be included in the FLA.

GLWP understands that "run-of-river" is a label that has been used at some hydropower sites to paint them as more ecologically friendly. As such, there are heated "discussions" about what is and is not a run-of-river project. If a site is recognized as run-of-river, the dispute becomes whether run-of-river sites are really beneficial environmentally. An authoritative, detailed definition of the term "run-of-river" is not easy to come by. The U.S. Energy Information Administration states: (EIA 2022)

"Run-of-river hydroelectric plant: A low-head plant using the flow of a stream as it occurs and having little or no reservoir capacity for storage.

"Low head: Vertical difference of 100 feet or less in the upstream surface water elevation (headwater) and the downstream surface water elevation (tailwater) at a dam."

"Reservoir capacity: The present total developed capacity (base and working) of the storage reservoir, excluding contemplated future development."

"Working storage capacity: The difference in volume between the maximum safe fill capacity and the quantity below which pump suction is ineffective (bottoms)."

The project clearly falls within EIA's definition of low head. It is unlikely Green Lake could be argued to have "little or no reservoir capacity for storage" despite ambiguity about the definition of "little" and "base and working" capacity, and whether the above definitions apply cleanly to the lake. However, the assertion by MDMR that GLWP stated that the project was a run-of-river project is false. GLWP states that the operation of the project is closer to a run-of-river project than it is to a peaking project.

Looking at and understanding the lake levels maintained by the Project shows how this could be the case. During the summer, the lake is managed to 160.2 ft USGS plus or minus 0.5 ft. Managing the water level at the turbine intake to a one foot range is not unusual for a run-of-river project. (Ellsworth 2015) In practice, the lake is run by targeting a fixed level (typically 160.0 to 160.2 ft USGS, depending on whether it is a dry or wet summer) and the project operates full time if the lake level is above that level and shuts down if the lake level is below that level. Large rain events modify this somewhat, but in practice, NOAA forecasts are neither early enough nor accurate enough to do this reliably. Some summers, the lake level drops below the 159.7 lower limit late in the summer despite the turbine being shut down all summer. Some summers, one or more large rain events push the lake above the 160.7 upper limit despite the turbine running and both dam gates being wide open ahead of the arrival of the rain runoff. It is the assessment of GLWP that this is exactly how the Project would operate during the summer if it were run-of-river. This has nothing to do with whether the Project is able to align its generation with high energy rates or not.

During the winter, the lake level is managed over a wider range. This is largely driven by the need to absorb heavy spring runoff without the lake level rising above the allowed maximum of 160.7 ft USGS. While the Project has been in operation the lake level has risen into the summer level range every spring despite gates being open, with the exception of 2001 and 2021. In 2001 and 2001 the lake rose into the summer range in the spring, but gates did not need to be opened to keep the lake level from rising above

the maximum level. So, again, given the unique details of the Project, within the restrictions of physics and biology, the Project is run in a manner that is indistinguishable from run-of-river operation.

The Impoundment Habitat Study (ISR 2021) demonstrated that the littoral zone drawdowns from Project operation are 14.41% by area and 13.26% by volume. GLWP suspects these values are less than the head-pond drawdown values of some run-of-river projects.

Perhaps MDMR is asserting that the lake should be managed to the summer level year round despite ice and spring runoff. Or perhaps MDMR has not understood the physics implications of the lake given the details laid out in the PAD, ISR and DLA. GLWP leaves it to the reader to decide whether the assessment that Project "operation is closer to fixed point 'run of river' than it is to peaking" is reasonable or not.

GLWP's suggestion that Project operation can be viewed and understood as close to run-of-river in no way changes the detailed descriptions of the Project and its operations contained in Exhibits A and E of the FLA and prior documents. If MDMR is using the quoted paragraph from Exhibit A as their "accurate description of project operations" sufficient to "determine effects on aquatic resources" they are not demonstrating an understanding of the various documents filed for this Project relicensing sufficient to deal with the Project and its resource issues in a realistic, balance manner. GLWP suspects that the thought that the label "run-of-river" could reasonably be used to describe actual Project operation is too much of a blow to MDMR's cause for them to accept.

Near the end of the section above, MDMR states: "In section 5.1 of Exhibit E, GLWP states, 'GLWP, under the current license, manages the lake to a smaller level fluctuation (4.0 – 7.2 feet) than BHE did historically (3.0 – 8.0 feet).' Statement [sic] conflicts with the description of the project operations in section 2.2.1 of Exhibit A. Descriptions should be clarified and corrected for the FLA. An accurate description of project operations is critical to determine effects on aquatic resources and should be included in the FLA."

Section 2.2.1 of Exhibit A states: "The lake is drawn down during the fall and winter from the spillway elevation of 160.7 ft USGS to a minimum of 157.5 ft (7.2 to 4.0 feet on the staff gauge)" and "The lake is restored to between elevations 159.7 ft and 160.7 ft (6.2' and 7.2' on the staff gauge) by June 1. The lake is maintained between elevation 159.7 ft and 160.7 ft for the period of June 1 through Labor Day of each year."

DLA Exhibit E section 5.1 states: "BHE managed the lake level over a range of 3.0 to 8.0 feet on the staff gauge (156.5 – 161.5 USGS), with unusual levels as low as 2.4 feet and as high as 9.5 feet. They appear to have used a management approach based on moderately stable, mostly full levels during the summer, with a drawdown in the fall or winter for spring runoff. GLWP, under the current license, manages the lake to a smaller level fluctuation (4.0 – 7.2 feet) than BHE did historically (3.0 – 8.0 feet)."

GLWP finds the statements in Exhibits E and A consistent on the current lake levels, though the two sections do cover slightly different material. They both explain the relationship between staff gauge level readings and USGS levels to avoid confusion. GLWP believes that MDMR's confusion on these sections reflects their lack of real understanding of the project. They then take their confusion and use it as the basis for grandiose and arrogant assertions about what a correct FLA should be. This does not inspire confidence in MDMR'S ability to rationally handle complicated technical issues.

7.2 Annual Operation and Maintenance Costs

GLWP states, "The annual operation and maintenance costs of running the Green Lake Hydroelectric Project facility are \$46,592 with the annual administrative expenses being approximately \$34,691." These costs sum to \$81,283. GLWP also states in section 5, "The power generated by the Green Lake Hydroelectric Project produces an average of about \$72,000 per year."

MDMR requests that GLWP provide additional details on the discrepancy between generation costs and operation costs at the facility. As written in the DLA, the Project loses on average \$9,283 each year, which does not include periodic maintenance costs nor does it include replacement of the penstock. These numbers indicate that the project is not economically viable. Given that the project has impacts on natural resources in the watershed, MDMR would like to understand the likelihood that the project will continue to operate through the license term, will be able to carry out proposed measures, and will be able to carry out environmental protection measures adequately.

That information is provided on the page that follows the one quoted. The section with the additional information from the DLA is as follows:

"8.0 Estimated Annual Cost of the Project

"The total annual cost to operate the project, including administrative costs, insurance, operations and maintenance, general and other expenses is as follows:

- "Administrative costs \$35,000
 - "- includes insurance, pay, property taxes, administrative and general costs.
- "Operations and maintenance \$12,000

"Much of the payroll and general costs (included in Administrative costs) are for operations and maintenance activities."

The statements by MDMR on section 7.2 of the DLA are concerning. MDMR states that they "would like to understand the likelihood that the project will continue to operate through the license term, will be able to carry out proposed measure, and will be able to carry out environmental measures adequately." MDMR states the basis of this concern is that "the project has impacts on natural resources in the watershed." What exactly is MDMR suggesting with this vague statement beyond that they can prescribe any environmental measures they want and GLWP better be ready to pay for them. They appear to be asserting that GLWP must not try to escape MDMR's prescribed environmental measure even if these measures force the Project to be highly impractical economically. Or is MDMR attempting to bait GLWP into responding with a reply that they expect to make **LOTS** of money so they can exclaim "gotcha" and prescribe a long wish list of environmental measures?

Another aspect of MDMR's comments on Section 7.2 of the DLA is concerning. The data needed to understand Section 7.2 was contained on the next page in Section 8.0. MDMR appears to have started reading Section 7.2 with some prior conclusions, added more conclusions based on assumptions about Section 7.2, and then maintained those conclusions through Section 8.0. Using prior, fixed conclusions, some based on assumptions, and not revisiting them when new data is provided, can lead to an unscientific approach to issues. An "everybody knows" approach to dealing with technical problems is neither good for the environment nor good for the public.

One thing does not change from MDMR's assertions about that project: The Project does not fit the expected image that MDMR and potentially other agencies, have that money is being raked in hand over

fist at the expense of the environment. Despite the view of some resource agencies, there can be motivations involved in hydro-power projects that go beyond, and may be more important, than the acquisition of profits. This project involves benefits to the lake, lake residents, the Green Lake National Fish Hatchery, fish and other wildlife, local economies, Maine and the USA, in addition to GLWP and its personnel. The officers of GLWP certainly don't get paid as much as GLWP would have to pay to hire competent replacements. We are prepared to run the project for little profit unless the result will be us living under a bridge somewhere. People who only view life from the viewpoint of what's in it for them, who can't see the reward for figuring out what is the right thing in complex situations and doing it, who don't feel accomplishment at tackling difficult problems well, who don't stay true to making things better for everyone as much as possible, and who don't strive to help people they could be excused for not being responsible for, do not live very full lives. Profit is just one thing that makes GLWP work.

[Comments on Exhibit E of the DLA](#)

3.7 Consultation

[Anna Harris was the Maine Field Office Project Leader for USFWS and is not an employee of MDMR.](#)

The list of consultations distribution list have been updated. Note that the consultation list reflects names and titles at the time the consultation occurred. It is not the distribution list.

[\(5.3.1\) Species](#)

[GLWP states "The following migratory fish were identified during scoping: alewife, Americaneel, American shad, Atlantic salmon, blueback herring, and sea lamprey. With the exception of landlocked salmon, none of these are currently present in Green Lake." This statement is incorrect as American eels have been documented in Green Lake by DIFW and in the Project boundary by GLWP staff. Please see MDMR's comments on section 5.3.3.1 for supporting documentation. MDMR requests this section be updated in the FLA to represent accurate information.](#)

The table at the top of the same page in that section clearly listed American eel as present in Green Lake. The editing error that caused the inconsistency lower on the page has been corrected in the FLA.

[\(5.3.3.1\) Eel](#)

[GLWP performed nighttime eel surveys in 2020 and did not document eels. However, Americaneels have been documented above the Project in Green Lake and are native to Union River watershed.³](#)

Reference #3 is: "3 Id. at page 19"

This would refer to page 19 of the previous reference: "74 FR 29300. Endangered and Threatened Species; designation of critical habitat for Atlantic Salmon (*Salmo salar*) Gulf of Maine Distinct Population Segment; ..."

Page 19 of this reference does not mention eels. The use of abbreviated references of this type, or references that only contain accession numbers must be done carefully since the accession numbers don't contain any real information on what is being referred to. In this case, the statement supposedly based on the reference is an unsubstantiated opinion of MDMR.

[During the ISR meeting, USFWS asked if there was evidence of eels passing through the penstock. The first part of GLHC's response was captured in the initial study meeting summary. "We do experience things that we suspect may be eels through the penstock at times. While shutdown, believe eels tried to pass where water was flowing through penstock leaks or taps".⁴ The second part of GLHC's response was not captured in the meeting summary, but was paraphrased by USFWS. "...it was necessary to remove deceased](#)

outmigrating eels from the Project at times, which required shutting down production.”⁵ Mr. Kleinschmidt’s comments are concerning as they describe direct impacts of the Project on American eels. If eels are entrained into the penstock, their only route of egress is through the turbines at the powerhouse.

The comments attributed to Mr. Kleinschmidt are concerning, mainly because MDMR’s statement about them is not true. Here is a complete, detailed transcript of the meeting section that is being discussed:

At the beginning of the Architectural Survey questions section:

Julianne Rosett: “Hey Bert this is Julianne Rosett again from Fish and Wildlife Service. I’m sorry to go back and I’m just becoming familiar with the project so my questions aren’t coming from a place of um folks doing anything wrong, it’s really me trying to understand what’s going on.”

Bert: “Ok.”

Julianne: “I just started at the Maine field office in November, so pretty new to the state and projects in Maine. Um. I know that... er, I think that there was no downstream uh eel passage study. Is that correct?”

Bert: “That’s correct.”

Julianne: “Ok. Ah... Do you have any information, uh, you know, from your observations or other folks, um, that are at the project, whether eels pass through the penstock? That’s pretty specific, but I just want to ask.”

Bert: “We have a trash racks, um, that have a one inch spacing, upstream of the trash racks [penstock intake]. I think that stops some, if there are large eels trying to get down there. But, we do experience things that we believe are eels. Um, We’ve had a couple instances in the past where we had the penstock shut down, and we... a valve didn’t close so we had water flowing off a tap, like a two inch tap that comes off for cooling and lubrication water on the turbine bearings. And, I believe we’ve gotten eels that tried to enter that passage. Because, that’s the only place that water was really flowing. Um. And I have seen one eel that made its way half-way through a hole in the penstock. It was a pretty big hole, um, that I had to get the eel out, it was dead, I had to get the eel out to patch that hole. So, ah, we occasionally, I believe, have seen eels at the fish screens also on the gates when they are open.”

Julianne: “Ok, that’s helpful for me to understand. Thanks very much, I appreciate it.”

Bert: “Ok.”

GLWP believes the ISR meeting summary captured the important ideas expressed in the meeting.

MDMR went beyond the ISR meeting summary to state:

“The second part of GLHC’s response was not captured in the meeting summary, but was paraphrased by USFWS. ‘...it was necessary to remove deceased outmigrating eels from the Project at times, which required shutting down production.’”

As can be seen in the meeting transcript above, the USFWS paraphrase is incorrect and misleading. GLWP did not state that it was necessary to shut down production to remove deceased eels from the project at times. It is true that GLWP once discovered a deceased eel in a penstock hole while the penstock was shut

down for patching, and decided to remove the eel as part of patching the hole, and that a second eel was discovered to have entered a water tap on the penstock while the penstock was shut down (the valve causing the improper water flow has since been replaced). MDMR has taken an incorrect paraphrase of statements from a meeting (one they actually attended) and used it as the basis to imply that GLWP did not include an important statement in the meeting summary. However, as shown above, the statement is not true.

MDMR continues to state: "If eels are entrained into the penstock, their only route of egress is through the turbines at the powerhouse." This also does not happen to be true. Both eels being discussed here entered the penstock when the turbine was not running. Without the turbine running, the flow in the penstock is negligible--any eel that wanders through the gap at the side of the trash racks can wander out again if desired.

Per Random House Unabridged Dictionary, 2022, the definition of "entrainment" that applies here would be "2. The act or fact of being drawn into a current or flow." This appears to align with the various uses and definitions of fish entrainment encountered during this relicensing process. One of the key concepts here is moving water. Technically, the eel situations being described here would not be eel entrainment since the two eels encountered would not be able to access the locations in which they were found if the turbine were running. GLWP does not dispute the assertion that these eels were impacted by the Project. However, stating that "there only route of egress is through the turbines at the powerhouse" is not true. Again, these statements by MDMR appear to be alarming statement intended to elicit an "everybody knows reaction." This a somewhat surprising reaction from a fish agency that deals with the harsh reality of participating in "harvest" of millions of eels from Maine waters each year, and which is intimately involved with the killing of hundreds of thousands of river herring each year, in Ellsworth alone.

(5.3.3.6) River herring (alewife, blueback herring)

As described in the 2015 Union River Fisheries Management Plan (2015 Plan), alewife and other diadromous fish "were once common in the Union River (Havey 1961), but were extirpated in the late 1700's or early 1800's, presumably by construction of dams without fishways, water pollution, over harvest, and other factors." The 2015 Plan goes on to state that while Green Lake is currently inaccessible to alewives due to the existence of the outlet dam and lack of a fishway, Green Lake likely contained a historic population of alewives due to the absence of a natural barrier to migration. Finally, the 2015 Plan restates a position by the Union River Fisheries Coordinating Committee⁸ related to disease risk and alewives. However, the 2015 Plan also states, "the supporting rationale has not been well described in the CFMP to date" and calls for a review of the issue. The position in the 2015 Plan dates back to a statement made by USFWS and included in FERC's April 5, 1984 license order. However that position and concern of disease related to alewife restoration is no longer supported by USFWS and this statement should be removed from this section in the FLA.¹⁰ Restoration of alewives into Green Lake is warranted at this time and the only obstacle to restoration is the lack of adequate upstream and downstream fish passage at the Project.

See comments above on the Union River Fisheries Management Plan. The plan does not call for fish passage into Green Lake. The statement "The position in the 2015 Plan dates back to a statement made by USFWS and included in FERC's April 5, 1984 license order" is not backed up by authoritative references, and is a supposition on MDMR's part that does not bear up under close scrutiny. Replies to USFWS' DLA comments are included in another section of this document.

MDMR states: "Restoration of alewives into Green Lake is warranted at this time and the only obstacle to restoration is the lack of adequate upstream and downstream fish passage at the Project."
MDMR is ignoring effects on other fish in Green Lake. At the same time only vague and general information is provided throughout MDMR's comments on how such restoration is "warranted."

The statement by GLWP about blueback herring is incorrect. We echo the comments of USFWS as an accurate summary of the current stocking of river herring in the Union River watershed. "River herring are trapped in the tailrace of the Ellsworth Dam and transported and released upstream of Graham Lake Dam throughout the adult river herring migration. This means that both alewife (*Alosa pseudoharengus*) and blueback herring (*Alosa aestivalis*) have access to Reeds Brook. In May of 2021, Green Lake NFH staff have observed river herring in Reeds Brook."

This is covered in the GLWP responses to USFWS comments above.

(5.3.3.7) American shad

GLWP incorrectly states that, "there is no habitat suitable to American shad in the Union River upstream of Lake Leonard." While shad are not currently passed upstream of the Ellsworth Dam, fish passage for alosine species (alewife, blueback herring and American shad) was included in the NMFS's Section 18 fishway prescription for the Ellsworth Project.¹² Therefore, it is anticipated that American shad will have access to Graham Lake and Reeds Brook pending the relicensing of the Ellsworth Hydroelectric dam. If included in the FLA, this section should be updated to reflect this information.

This is covered in the GLWP responses to USFWS comments above.

(5.3.3.8) Sea lamprey

GLWP states, "Downstream fish passage of sea lamprey is facilitated by their lack of a swim bladder. In most situations they can pass through a turbine without suffering decompression damage. (Colotelo 2012)." This statement is irrelevant to the Project and likely does not represent the best available information on this species. Decompression damage is unlikely to occur at low head dams, such as Green Lake, but direct trauma is more likely as lamprey or other fish migrate through turbines.

(5.3.4) Proposed environmental measures

(5.3.4.1) Eel

GLWP does not propose any upstream passage facilities for American eels at the Project. American eels have been documented above the Project in Green Lake and are native to Union River watershed. The presence of eels on the upstream side of the Project was confirmed by Bert Kleinschmidt (GLWP) during the ISR meeting on February 24, 2021. While the density of eels migrating upstream in Reeds Brook and into Green Lake are likely low currently, there is no question that their upstream migration is impeded by the lack of a dedicated passage structure at the Project. The abundance of eels will increase in the watershed following the installation of upstream eel passage at the Ellsworth and Graham Lake dams (collectively P-2727). Upstream eel passage should be operational at Ellsworth and Graham Lake dams two years after the issuance of the new FERC license.

The impact of MDMR's "I gotcha!" moment in the section above is lessened by the fact that eels have been mentioned in Project documentation since the PAD. GLWP's confirmation of eels in Green Lake during the ISR was no revelation. MDMR's statement "While the density of eels migrating upstream in Reeds Brook and into Green Lake are [sic] likely low currently, there is no question that their upstream migration is impeded by the lack of a dedicated passage structure at the Project" is "witch hunt" language at its finest. It starts with an unsubstantiated assertion of an assumption as fact and proceeds to form conclusions with consequences from there. Then the unsubstantiated assumptions continue about whether the Ellsworth project will be relicensed, and what will happen at the dams.

Downstream eel passage measures are discussed in the FLA.

GLWP does not propose any downstream passage facilities or protective measures at the Project. Downstream

measures to prevent impingement and entrainment of silver eels at the Project are critical to minimize Project impacts on the species and, as eels are present now, these measures are critical now. American eels are vulnerable to turbine-induced mortality during their outmigration and, if downstream mortality is high, the Project could be acting as a sink to the Union River eel population. Based on information provided by Applicant to date and other documentation, upstream and downstream eel passage and protection measures at the Project are warranted. Dedicated upstream eel passage is necessary to provide access to rearing habitat upstream of the Project, throughout the migratory eel passage season. Similarly, eels need to be protected as they attempt to move downstream past the Project. Upstream and downstream fish passage structures at the Project should provide safe, timely, and effective passage and be designed in consultation with, and require approval by, MDMR and other resource agencies. The designs should be consistent with the USFWS's 2019 Fish Passage Engineering Design Criteria Manual or an updated version.¹⁶

Again, the above section uses assumptions to form conclusions. Or, is MDMR's assertion really that 3 known eels affected by the project in 16 years is enough data to issue alarming reports of potentially high mortality rates that could be acting as a sink to the Union River eel population? If removing 3 adult eels from the river warrants this concern, allowing millions of glass eels to be "harvested" from the Union River annually would be expected to be a concern as well. However, understanding MDMR and its motivation and relationship with eels requires looking at more than dams and their effects. The above paragraph sounds altruistic, until one looks at the power that flows to MDMR from its regulation of glass eel harvesting and sale.

GLWP states, "Out-migrating eels would currently need to pass through the trash racks (1" clear spacing) to gain access to the penstock, or through the slightly closer spacing of the gate fish screens to gain access directly to Reeds Brook." USFWS states in their current fish passage guidance that 3/4-inch or less clear spacing is needed to physically exclude American eel, smolts, and adult alosines from entrainment. The current configuration at the project, 1" clear spacing, does not exclude eels from entrainment. Unfortunately the current configuration with "slightly closer spacing of the gate fish screens" likely means more eels pass via the turbines.

More information on eel measures has been included in the FLA.

(5.3.4.6) River herring

Please refer to our comments in section 5.3.3.6.

(5.3.4.7) American shad

Please refer to our comments in section 5.3.3.7.

(5.3.4.8) Sea lamprey

Please refer to our comments in section 5.3.3.8.

We appreciate the opportunity to comment on the DLA. If you have any questions pertaining to this letter, please contact Casey Clark at (207) 350-9791 or casey.clark@maine.gov.

4.0 US NATIONAL MARINE FISHERIES

4.1 USNMFS DLA Comments



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
GREATER ATLANTIC REGIONAL FISHERIES OFFICE
55 Great Republic Drive
Gloucester, MA 01930

January 27, 2022

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

RE: NMFS comments on the Draft License Application for the Green Lake Hydroelectric Project (FERC No. 7189-014)

Dear Ms. Bose:

On November 1, 2021, Green Lake Water Power Company (GLWPC or licensee) submitted its Draft License Application (DLA) for the Green Lake Hydroelectric Project (FERC No. 7189-014 or Project) to the Federal Energy Regulatory Commission (FERC or Commission). The Project is located on Reeds Brook, a tributary to the Union River in the town of Ellsworth, Maine. We are submitting comments on the DLA in accordance with the Commission's Integrated Licensing Process (ILP).

If you have any questions regarding these comments, please contact Dan Tierney (Dan.Tierney@noaa.gov).

Sincerely,

A handwritten signature in black ink that reads "Julia E. Crocker".

Julia Crocker
Endangered Fish Branch Chief

Enclosure

cc: Service List



NMFS Comments on the Exhibit E of the DLA

Section 3.3, *Endangered Species Act*

GLWPC misinterprets the language in section 7(a)(3) of the Endangered Species Act (ESA) when they indicate that the consultation under the Endangered Species Act will occur with the US Fish and Wildlife Service (USFWS). The referenced language in the statute indicates that "...a Federal agency shall consult with the Secretary on any prospective agency action." Section 3(15) of the Act defines "Secretary" to mean either the Secretary of Interior or the Secretary of Commerce. The NMFS is within the Department of Commerce, and consistent with an agreement with USFWS, is the lead consulting agency for ESA consultations that consider effects of dams within the geographic range of the Gulf of Maine distinct population segment (GOM DPS) of Atlantic salmon.

GLWPC cites the language in section 4(b)(2) of the ESA that discusses exemptions to critical habitat designations, and suggests that the "section may apply to this Project when cumulative effects involving the Green Lake National Fish Hatchery are considered." We would like to make clear that the Secretary of Commerce did not exempt the Green Lake watershed from critical habitat at the time of listing, and therefore this section of the ESA does not apply. However, we recognize the importance of the conservation hatchery program to Atlantic salmon survival and recovery, and will consider potential effects to its operation during the section 7 consultation.

Section 5.3.1, *Species*

GLWPC indicates that "The following migratory fish were identified during scoping: alewife, American eel, American shad, Atlantic salmon, blueback herring, and sea lamprey. With the exception of landlocked salmon, none of these are currently present in Green Lake. These species are all migratory fish that have potentially been present in the Union River." GLWPC is correct that these species (except for American eel, which GLWPC reports as being occasionally entrained in the penstock in section 5.3.3.1) do not occur in Green Lake; however, this is because the dam blocks access. All of these species are expected to be present in the lower Union River, and some (i.e., Atlantic salmon, alewives, and blueback herring) are currently transported into the upper Union from the fish trap at the Ellsworth Dam. With the implementation of passage measures at the Ellsworth and Graham Lake dams (expected during the term of the new license), we anticipate that these species, particularly Atlantic salmon, will have volitional access to their historical habitat in the Union, except for those areas blocked by dams. Therefore, although the licensee may be correct that these species do not occur in Green Lake currently, we anticipate that they will have access to Reeds Brook during the term of any new license.

Section 5.3.3.6, *River herring (alewife, blueback herring)*

The GLWPC correctly indicates that blueback herring are trapped at the Ellsworth Dam and released into Leonard Lake. In an effort to capture some of the blueback herring run, Black Bear Hydro Partners releases approximately 1,600 river herring after June 10 into Leonard Lake with

the assumption that many of these are blueback herring. Any blueback herring that arrive before or after the trapping of those fish are transported to Graham Lake along with the alewives. It is possible, therefore, that a small number of blueback herring do occur above the Graham Lake Dam and could approach the Green Lake Dam. It should be noted that NMFS has required that swim-through fish passage be constructed at the both the Ellsworth and Graham Lake dams 15 years after FERC issues a license for the Ellsworth Project. Therefore, it is expected that blueback herring could have access to habitat above both dams once fish passage measures have been implemented.

Section 5.3.3.7, *American shad*

The Licensee claims that there is no American shad habitat in the Union River, and that they "...are not expected to have access to Reeds Brook now, or in the future." There is limited information of historical use of the river by shad, or any other sea-run fish. However, there is reason to believe that Ellsworth Falls (at the site of the existing Ellsworth Hydro Project) may not have been a complete barrier to the species, and that they may have accessed habitat up to Mariaville Falls on the West Branch. That said, the Licensee is correct that the species is not currently passed at the Ellsworth Dam, and the small number that are trapped at the project are released back downstream per guidance from Maine's Department of Marine Resources (DMR). However, as indicated, NMFS has required that swim through fish passage be constructed at the both the Ellsworth and Graham Lake Dams 15 years after FERC issues a license for the project. Therefore, it is expected that American shad could have access to habitat above both dams once fish passage measures have been implemented.

Section 5.3.4, *Proposed environmental measures*

It should be noted that although this section is entitled *Proposed environmental measures* the Licensee does not propose any measures to reduce project impacts on any species. Anadromous Atlantic salmon should be incorporated into this section. Although uncommon due to a lack of stocking and inadequate passage at the dam, salmon are occasionally trapped at the Ellsworth Project and trucked to the West Branch of the Union. In 2020, for instance, three pre-spawn adult salmon were trapped and transported into the river. We anticipate that there will be an increase in the abundance and distribution of salmon throughout the Union River over time due to improved fish passage measures required at the Ellsworth Project during the relicensing process.

Section 5.3.4.6, *River herring*

The Licensee indicates that "Alewife passage would risk fish in the lake and blueback herring are not expected to have access to Reeds Brook."

As indicated in a previous comment, we anticipate that a small proportion of the river herring that are stocked into habitat above Graham Lake Dam are blueback herring. Although Black Bear moves a small number of river herring (some of which are blueback herring) into Leonard Lake annually after June 10, it is unlikely that they are capturing the entire run of the species, which means some are likely transported into Graham Lake.

Maine's Department of Inland Fisheries and Wildlife (IFW) has filed the following comment regarding river herring accessing upstream habitat in Green Lake:

In addition to invasive fish concerns associated with fish passage, density dependent interactions between anadromous alewives and landlocked rainbow smelt remains an ongoing concern of our Agency and is a focus of an interagency interactions workgroup to coordinate research that will support restoration management goals. Smelt are an established fishery in Green Lake as well as the preferred forage species of landlocked salmon. To be clear, MDIFW continues to be supportive of the restoration of searun species to Maine waters within the historic ranges of these species; however, our Agency does have density dependent concerns regarding possible negative interactions between anadromous alewives and landlocked smelts that could decrease year-around smelt forage for managed game species in certain waterbodies, including Green Lake (FERC Accession # 20190626-5053; June 26, 2019).

Maine IFW indicates that the potential effect of alewives on landlocked smelt is an issue that is being considered by an active interagency workgroup (of which NMFS is a participant), and that they are generally "supportive of the restoration of searun species in Maine within the historic ranges of these species." While there is much work yet to be done, it is probable that this group will reach resolution during the term of any future license issued at the Green Lake Project, and that one possible outcome is consensus that alewives do *not* have an impact on smelt. Therefore, the assumption that alewives are detrimental to other species in Green Lake is premature.

Section 5.6.2.1, *Environmental Analysis, Atlantic salmon*

This *Environmental Analysis* does not contain sufficient analysis regarding the effect that the project has on critically endangered Atlantic salmon or its designated critical habitat. It consists primarily of an analysis on the presence of adequate fish passage flows, the threat of invasive species to fisheries in Green Lake, and the water needs of Green Lake National Fish Hatchery. While all of these are important considerations when analyzing the potential for fish passage at this project, this section should include a thorough analysis on the effect that the project has on critically endangered Atlantic salmon, and its designated critical habitat. With the implementation of fish passage measures at the Ellsworth Project, we anticipate that Atlantic salmon could access Reeds Brook with increasing frequency during the term of a new license at the Green Lake Project. There is also modelled rearing habitat for Atlantic salmon both in Reeds Brook, and in the tributaries to Green Lake¹. We request that GLWPC incorporate analysis to indicate how the Green Lake Project may impact this endangered species and critical habitat. We also note that consultation pursuant to section 7 of the ESA will be required for any proposed issuance of a new license by FERC.

Fish Passage Flow

¹ Maine Stream Habitat Viewer. <https://webapps2.cgis-solutions.com/MaineStreamViewer/>

In comments on a study dispute on March 20, 2020, GLWPC included an analysis regarding the amount of flow that might be available at the project for fish passage (Accession # 20200320-5152, Appendix B). We had requested this information as part of a study request that was rejected by FERC. It is our position that this is relevant information that is critical for evaluating the potential for installing and operating effective fish passage facilities at the project; and we thank GLWPC for providing it. The provided analysis indicates that the amount of available flow is extremely limited and, that except for the month of May, may not be sufficient to support facilities that could provide consistent upstream and downstream passage during the critical passage months for our trust species. We intend to evaluate the implications of limited flow on the potential for, and effectiveness of, any fish passage measures at the appropriate time. Although referenced in section 5.6.2.1, we request that the flow information be incorporated in full in the final license application so that it can be adequately considered by FERC and the state and federal agencies.

4.2 GLWP Response to USNMFS DLA Comments

In this section, text from agency comments is in this font, color, and size and GLWP replies are in this font, color and size. These choices are intended to allow the document to be read when printed in black and white.

Section 5.3.1, Species

GLWPC indicates that "The following migratory fish were identified during scoping: alewife, American eel, American shad, Atlantic salmon, blueback herring, and sea lamprey. With the exception of landlocked salmon, none of these are currently present in Green Lake. These species are all migratory fish that have potentially been present in the Union River." GLWPC is correct that these species (except for American eel, which GLWPC reports as being occasionally entrained in the penstock in section 5.3.3.1) do not occur in Green Lake; however, this is because the dam blocks access. All of these species are expected to be present in the lower Union River, and some (i.e., Atlantic salmon, alewives, and blueback herring) are currently transported into the upper Union from the fish trap at the Ellsworth Dam. With the implementation of passage measures at the Ellsworth and Graham Lake dams (expected during the term of the new license), we anticipate that these species, particularly Atlantic salmon, will have volitional access to their historical habitat in the Union, except for those areas blocked by dams. Therefore, although the licensee may be correct that these species do not occur in Green Lake currently, we anticipate that they will have access to Reeds Brook during the term of any new license.

The FLA has corrected wording to include American eel in the list of migratory fish in Green Lake. Its omission was an unintentional error.

NMFS appears to make assumptions about whether the Ellsworth station will be relicensed or not, which could affect the presence of dams on the main stem of the Union River.

Section 5.3.3.6, River herring (alewife, blueback herring)

The GLWPC correctly indicates that blueback herring are trapped at the Ellsworth Dam and released into Leonard Lake. In an effort to capture some of the blueback herring run, Black Bear Hydro Partners releases approximately 1,600 river herring after June 10 into Leonard Lake with the assumption that many of these are blueback herring. Any blueback herring that arrive before or after the trapping of those fish are transported to Graham Lake along with the alewives. It is possible, therefore, that a small number of blueback herring do occur above the Graham Lake Dam and could approach the Green Lake Dam. It should be noted that NMFS has required that swim-through fish passage be constructed at both the Ellsworth and Graham Lake dams 15 years after FERC issues a license for the Ellsworth Project. Therefore, it is expected that blueback herring could have access to habitat above both dams once fish passage measures have been implemented.

Again, basing conclusions on types of fish passage present on the main stem of the Union River is a bit premature with the Ellsworth relicensing yet to be resolved. Because of the spawning habitat differences between alewives and blueback herring, GLWP believes the type of fish passage present on the main stem of the Union River could very well change the mix of river herring in Graham Lake

and Reeds Brook.

Section 5.3.3.7, American shad

The Licensee claims that there is no American shad habitat in the Union River, and that they "...are not expected to have access to Reeds Brook now, or in the future." There is limited information of historical use of the river by shad, or any other sea-run fish. However, there is reason to believe that Ellsworth Falls (at the site of the existing Ellsworth Hydro Project) may not have been a complete barrier to the species, and that they may have accessed habitat up to Mariaville Falls on the West Branch. That said, the Licensee is correct that the species is not currently passed at the Ellsworth Dam, and the small number that are trapped at the project are released back downstream per guidance from Maine's Department of Marine Resources (DMR). However, as indicated, NMFS has required that swim through fish passage be constructed at the both the Ellsworth and Graham Lake Dams 15 years after FERC issues a license for the project. Therefore, it is expected that American shad could have access to habitat above both dams once fish passage measures have been implemented.

Section 5.3.4, Proposed environmental measures

It should be noted that although this section is entitled *Proposed environmental measures* the Licensee does not propose any measures to reduce project impacts on any species. Anadromous Atlantic salmon should be incorporated into this section. Although uncommon due to a lack of stocking and inadequate passage at the dam, salmon are occasionally trapped at the Ellsworth Project and trucked to the West Branch of the Union. In 2020, for instance, three pre-spawn adult salmon were trapped and transported into the river. We anticipate that there will be an increase in the abundance and distribution of salmon throughout the Union River over time due to improved fish passage measures required at the Ellsworth Project during the relicensing process.

GLWP believes that the Project does a large amount already to support the restoration of Atlantic Salmon through its support of the Green Lake National Fish Hatchery. Even if fish passage flow issues are handled, it is likely that some types of fish passage that could be required would make the Project impractical from a financial point of view. The project would then cease to exist, and some or most of the benefits the hatchery enjoys from the Project would go away, along with the potential for fish passage, at least from GLWP. The purchase agreement for the Green Lake dam requires that the dam be sold in the event the project ceases to be licensed for power generation.

Section 5.3.4.6, River herring

The Licensee indicates that "Alewife passage would risk fish in the lake and blueback herring are not expected to have access to Reeds Brook."

As indicated in a previous comment, we anticipate that a small proportion of the river herring that are stocked into habitat above Graham Lake Dam are blueback herring. Although Black Bear moves a small number of river herring (some of which are blueback herring) into Leonard Lake annually after June 10, it is unlikely that they are capturing the entire run of the species, which means some are likely transported into Graham Lake.

Maine's Department of Inland Fisheries and Wildlife (IFW) has filed the following comment regarding river herring accessing upstream habitat in Green Lake:

In addition to invasive fish concerns associated with fish passage, density

dependent interactions between anadromous alewives and landlocked rainbow smelt remains an ongoing concern of our Agency and is a focus of an interagency interactions workgroup to coordinate research that will support restoration management goals. Smelt are an established fishery in Green Lake as well as the preferred forage species of landlocked salmon. To be clear, MDIFW continues to be supportive of the restoration of sea run species to Maine waters within the historic ranges of these species; however, our Agency does have density dependent concerns regarding possible negative interactions between anadromous alewives and landlocked smelts that could decrease year-around smelt forage for managed game species in certain waterbodies, including Green Lake (FERC Accession # 20190626-5053; June 26, 2019).

Maine IFW indicates that the potential effect of alewives on landlocked smelt is an issue that is being considered by an active interagency workgroup (of which NMFS is a participant), and that they are generally "supportive of the restoration of sea run species in Maine within the historic ranges of these species." While there is much work yet to be done, it is probable that this group will reach resolution during the term of any future license issued at the Green Lake Project, and that one possible outcome is consensus that alewives do *not* have an impact on smelt. Therefore, the assumption that alewives are detrimental to other species in Green Lake is premature.

As would be the assumption that they are not—hence the ongoing concern.

Section 5.6.2.1, *Environmental Analysis, Atlantic salmon*

This *Environmental Analysis* does not contain sufficient analysis regarding the effect that the project has on critically endangered Atlantic salmon or its designated critical habitat. It consists primarily of an analysis on the presence of adequate fish passage flows, the threat of invasive species to fisheries in Green Lake, and the water needs of Green Lake National Fish Hatchery. While all of these are important considerations when analyzing the potential for fish passage at this project, this section should include a thorough analysis on the effect that the project has on critically endangered Atlantic salmon, and its designated critical habitat. With the implementation of fish passage measures at the Ellsworth Project, we anticipate that Atlantic salmon could access Reeds Brook with increasing frequency during the term of a new license at the Green Lake Project. There is also modelled rearing habitat for Atlantic salmon both in Reeds Brook, and in the tributaries to Green Lake¹. We request that GLWPC incorporate analysis to indicate how the Green Lake Project may impact this endangered species and critical habitat.

We also note that consultation pursuant to section 7 of the ESA will be required for any proposed issuance of a new license by FERC.

It is known that if Atlantic salmon move up Reeds Brook, they are stopped by the Green Lake dam. It is known that the Atlantic salmon at the Green Lake National Fish Hatchery are included in the protected population and that the Project benefits and helps protect this population. It is known that the return rate of Atlantic salmon is extremely low. Information on habitat in Reeds Brook is included in the study results.

Fish passage flow information was included because that was the information needed to answer a study request from NMFS. All of the approved fish and habitat related studies were completed, with results published. It is the belief that adequate information has been presented by the GLWP for FERC and the resource agencies to do their analysis and evaluation regarding aquatic resources. NMFS has been consulted during GLWP's relicensing work as required by the FERC Integrated Licensing Process.

Fish Passage Flow

In comments on a study dispute on March 20, 2020, GLWPC included an analysis regarding the amount of flow that might be available at the project for fish passage (Accession # 20200320- 5152, Appendix B). We had requested this information as part of a study request that was rejected by FERC. It is our position that this is relevant information that is critical for evaluating the potential for installing and operating effective fish passage facilities at the project; and we thank GLWPC for providing it. The provided analysis indicates that the amount of available flow is extremely limited and, that except for the month of May, may not be sufficient to support facilities that could provide consistent upstream and downstream passage during the critical passage months for our trust species. We intend to evaluate the implications of limited flow on the potential for, and effectiveness of, any fish passage measures at the appropriate time.

Although referenced in section 5.6.2.1, we request that the flow information be incorporated in full in the final license application so that it can be adequately considered by FERC and the state and federal agencies.

This data is included in Appendix C of the FLA. This data is also included with the full study dispute in Appendix D of the FLA.

5.0 DOWNEAST SALMON FEDERATION

5.1 DSF DLA Comments



January 28, 2022

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

Comments on the Draft License Application for the Green Lake Hydroelectric Project (FERC No. 7189-014)

Secretary Bose,

The Downeast Salmon Federation is a community-based fisheries conservation organization that has for 40 years worked to restore Atlantic salmon and their home rivers in Eastern Maine. Green Lake and the Union River are critical habitats for that recovery. We run a conservation Atlantic salmon hatchery in cooperation with the US Fish and Wildlife Service (USFWS) and the Green Lake National Fish Hatchery is essential to that program.

We agree with many of the comments made by the USFWS and National Marine Fisheries Services in their comments on the Draft License Application. Specifically, we echo their requests for safe up and downstream passage for native species for this project. American eel, alewife, blueback herring, sea lamprey, Atlantic salmon, and American shad are native to the Union River drainage and must have access into Green Lake. American shad are currently encountered at the fish trap at the downstream Ellsworth Dam (see 2021 Maine Department of Marine Resources Fish Trap report <https://www.maine.-gov/dmr/science-research/searun/programs/trapcounts.html>). With passage upgrades on the downstream FERC project (Docket #P-2727) pending, as well as public indications from that dam owner that they are considering decommissioning that project, the suite of native species listed above may have access to the watershed in less than the 15 years required by the Draft License for that project.

We also believe that more serious study and consideration should be given to the needs and impacts on Endangered Atlantic salmon and the unique population of Arctic Char that are found in Green Lake and that future project operations should protect and enhance those populations.

Thank you,

A handwritten signature in black ink, appearing to read 'Dwayne Shaw', is written in a cursive style.

Dwayne Shaw
Executive Director
Downeast Salmon Federation

5.2 GLWP Response to DSF DLA Comments

Comments on the issues expressed by DSF are included in the GLWP agency responses above.

6.0 MAINE DEPARTMENT OF ENVIRONMENTAL PROTECTION

6.1 MDEP DLA Comments

STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION



MELANIE LOYZIM
COMMISSIONER



JANET T. MILLS
GOVERNOR

January 28, 2022

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

Subject: FERC No. 7189 – Green Lake Hydroelectric Project
Draft License Application Comments

Dear Ms. Bose:

The Maine Department of Environmental Protection (Department) received and reviewed a Draft License Application (DLA) for the Green Lake Hydroelectric Project, located on Green Lake and Reeds Brook in the towns of Ellsworth and Dedham in Hancock County, Maine.

The existing Green Lake Project consists of a dam on Green Lake, an intake structure, a penstock, a powerhouse, two generating units and their associated transmission and control facilities. The dam is a dry stone and timber structure to which sheet steel was added on the upstream face and deck to replace deteriorating hemlock planks. A concrete gate structure was added in the 1960s and a 12' by 15' intake structure was added in 1984. The dam measures 7.5 feet high and 270 feet long, with a maximum top width of 7 feet; 82 feet of the dam is a concrete gravity section with an 80-foot spillway channel having a crest elevation of 160.7 feet¹. The dam impounds Green Lake which has an area of approximate area of 2,989 acres and a maximum storage of approximately 3,000 acre-feet. Lake water levels are maintained between 157.5 feet and 160.7 feet over the course of the year and maintained between 159.7 and 160.7 feet between June 1 and Labor Day, annually. A 1,740-foot-long wood and concrete penstock delivers water to the Project powerhouse containing two turbine units (400 kW and 25 kW, respectively) with a total hydraulic capacity of 97 cfs; the total installed capacity of the facility is 425 kW. Power generated at the project is fed to Emera Maine through a 12.476 kV, 3-phase distribution line. leakage flow from the Project dam provides an instantaneous minimum flow of 1 cfs to Reeds Brook.

The Green Lake watershed has an area of 45 square miles and comprises a portion of the Union River watershed, with an area of 547 square miles. Reeds Brook flows for approximately 2000 feet from the outlet of Green Lake to Graham Lake, dropping approximately 45 feet.

The Department understands that Green Lake Water Power Company (Applicant) proposes to continue operation of the facility to generate power, to supply water for downstream power

¹ All elevations are referenced to a US Geological Survey datum.

AUGUSTA
17 STATE HOUSE STATION
AUGUSTA, MAINE 04333-0017
(207) 287-7688 FAX: (207) 287-7826

BANGOR
106 HOGAN ROAD, SUITE 6
BANGOR, MAINE 04401
(207) 941-4570 FAX: (207) 941-4584

PORTLAND
312 CANCO ROAD
PORTLAND, MAINE 04103
(207) 822-6300 FAX: (207) 822-6303

PRESQUE ISLE
1235 CENTRAL DRIVE, SKYWAY PARK
PRESQUE ISLE, MAINE 04769
(207) 764-0477 FAX: (207) 760-3143

generation², to allow water supply for the Green Lake National Fish Hatchery, and for recreational and habitat considerations in Green Lake and in Reeds Brook. Green Lake Power Company no additional environmental measures. With its comments on the Project Pre-Application Document (PAD), the Department requested and the Applicant undertook, a number of studies to assess the impact of Project operations on environmental resources and to demonstrate whether the Project meets water quality standards, including:

1. Impoundment Trophic State Study;
2. Impoundment Aquatic Habitat Study;
3. Downstream Benthic Macroinvertebrate Study;
4. Downstream Temperature and Dissolved Oxygen Study; and
5. Aquatic Habitat Cross-Section Flow Study.

The water quality studies provide data sufficient to assess attainment of Maine's water quality standards in Green Lake and in Reeds Brook. The data collected provides an understanding of the current water quality conditions, document dissolved oxygen concentrations and water temperatures upstream and downstream of the Project dam, document benthic macroinvertebrate community structure and function downstream of the Green Lake dam, and determine the effect of Project operations on the habitat for fish and other aquatic life.

Impoundment Trophic State Study

Green Lake Water Power Company completed trophic state studies in Green Lake in accordance with the Department's Sampling Protocol for Hydropower Studies (2018) and a study plan approved by the Department. Data were collected from June 17 through October 19, 2020 at two stations, representing the north and south ends of Green Lake to evaluate baseline water quality and to assess the trophic state of Green Lake. Samples were collected for phosphorus, Chlorophyll-a, color, dissolved oxygen temperature, pH, total alkalinity, iron, calcium, silica, and sulfate; Secchi disk transparency measurements were also collected. Additional late season samples were collected on August 26 and 27, 2020.

The Applicant submitted a detailed description of the sampling effort and submitted some graphs and charts representing the data. A review of the samples indicate that Green Lake stratified at both sample locations, a condition that persisted throughout the summer at sample station 1 and developed but did not persist for the entire summer at sample station 2. The waters of Green Lake fall at the mesotrophic/oligotrophic transition point (total phosphorus average of 7.1 ug/L at station 1 and 4.4 ug/L at station 2; chlorophyll-a average 2 ug/L at station 1 and station 2) and the Secchi disk transparency measurements averaged 8.68 meters at station 1 and 8.11 meters at station 2. Water quality parameters measured in Green Lake were within acceptable ambient water quality ranges for GPA water bodies in Maine. Dissolved oxygen and temperature measured in the impoundment is sufficient to support a cold water fishery.

² Electric power generation occurs both at the Green Lake facility and downstream at the Ellsworth Hydroelectric Project.

Based on the results of sampling and information contained in the Initial Study Report and in the Draft License Application, the Department concludes that Green Lake Water Power Company has provided sufficient information to demonstrate that the project impoundment meets applicable GPA water quality standards and is free of culturally induced algal blooms that impair its use or enjoyment.

Impoundment Habitat Study

An Impoundment Habitat Study was conducted by the Applicant during the 2020 summer field season in accordance with a FERC approved study plan using bathymetric data and a Raymarine Axion 9RV chartplotter/depth-sounder. Average Secchi disk transparency measured in the impoundment³ was determined to be 27.5 feet; the littoral depth, calculated as twice the Secchi disk transparency measurement, therefore, is 55 feet. Maximum drawdown of the impoundment is 3.2 feet. The Applicant calculated that the littoral zone area dewatered by the maximum drawdown is 14.4% and the volume drawdown is a maximum of 13.3%.

Based on the information provided by the Applicant, operation of the project results in maintenance of at least 75% of the littoral zone of Green Lake. The Department concludes that operation of the Project provides wetted conditions in the littoral zone sufficient to meet aquatic life and habitat standards in Green Lake.

Dissolved Oxygen and Temperature Study

The Applicant conducted a Dissolved Oxygen (DO) and Temperature Study in Reeds Brook downstream of the Project dam in accordance with the Department's Sampling Protocol for Hydropower Studies during the summer of 2020, between July and October. Data were gathered downstream of the dam but upstream of the Green Lake Fish Hatchery filter backwash discharge, in the tailrace downstream of the powerhouse, in the confluence of the tailrace and the Reeds Brook bypass reach, and in Reeds Brook bypass directly upstream of the confluence of the bypass and the tailrace. DO concentrations recorded during the study ranged from 7.59 mg/L to 9.14 mg/L and between 85.2% and 112% saturation.

Analysis of the sampling results indicates that DO concentration met applicable Class B water quality standards in Reeds Brook both downstream of the Project dam and downstream of the powerhouse tailrace. Based on the results of DO and temperature monitoring presented in the Draft License Application, the Department concludes that the Applicant has provided sufficient information to demonstrate that the Project outlet stream meets applicable Class B dissolved oxygen standard under critical water quality conditions.

Benthic Macroinvertebrate Study

Green Lake Water Power Company completed a Benthic Macroinvertebrate Study between August 27 and September 24, 2020 to demonstrate whether current in-stream flow releases affect

³ Secchi disk transparency measurements are collected as part of the Trophic State Study.

attainment of aquatic life and habitat criteria in Reeds Brook downstream of the Project dam. Data were collected in accordance with a FERC approved study plan, however, data were submitted and analyzed for only one of the three sample locations⁴. Benthic macroinvertebrate samplers were deployed for 28 days (+/- 4 days), in accordance with the Department's sampling protocol. Habitat and water quality data were collected at the time of deployment and at retrieval. Habitat parameters included substrate composition, canopy cover, land use and terrain characteristics; water quality measurements included water velocity, temperature, specific conductance, and dissolved oxygen. The DLA indicates and Department analysis using its linear discriminant model determined that results from sample location 1 in Reeds Brook downstream of the Project dam⁵ demonstrates that Class B aquatic life and habitat criteria are met in the bypass reach. The Applicant indicated that the Department had not yet processed the data from the two sample locations downstream of the Project tailrace.

Based on the information included in the DLA, the Department concludes that Class B aquatic life and habitat criteria are met in the bypass reach of Reeds Brook. Department analysis of samples collected in the Project tailrace indicate that Class B aquatic life and habitat criteria are not met, and that the structure and function of the macroinvertebrate community is influenced by the discharge from the fish hatchery outfall and from backwater effects of impounded water levels in Graham Lake. The Department finds that the condition of the macroinvertebrate community is influenced by periodic inundation of the sample location and by the fish hatchery discharge and is, therefore, not caused or contributed by the presence and operation of the Green Lake Hydroelectric Project dam.

Aquatic Habitat Cross-Section Flow Study

The Applicant conducted a Cross-Section Flow Study in December 2020 and January 2021 within the Reeds Brook bypass reach downstream of the Project dam to evaluate the sufficiency of in-stream flow releases from the Project dam. Wetted area and habitat characteristics were recorded for four different flows (2 cfs, 5.5 cfs, 11 cfs, and 22 cfs⁶) at four transects in Reeds Brook to determine the flow at which at least 75% of the bankfull area is wetted at all times. The Applicant reports that even at the lowest flow of 2 cfs at least 81.42% of the bankfull width is wetted at all times.

Review of the information provided by the Applicant in its DLA including the results of the Aquatic Habitat Cross-Section Flow Study and the Benthic Macroinvertebrate Study, the Department concludes that Project operations are not expected to negatively affect the quality of aquatic habitat downstream of the Project dam. Pending review of the remaining BMI data, the

⁴ The Study Plan called for analysis of rock bags deployed at three locations in Reeds Brook, however the Applicant submitted data from only one set of rock bags. DEP requested a study modification to analyze and submit data collected for the additional sample locations or to repeat the BMI study in 2021 however FERC determined that hatchery discharges and backwatering effects could influence the data and that the data submitted was sufficient; FERC did not recommend that Green Lake Power Company repeat the study, as requested by DEP.

⁵ Sample location 1 is downstream of the Project dam but upstream of the Fish Hatchery outfall, to ensure that the study is evaluating impacts to Reeds Brook from Project operations.

⁶ Flows were approximated from gate opening calculations.

Department tentatively concludes that Green Lake Water Power Company has provided sufficient information to demonstrate that the Project meets Class B aquatic life and habitat criteria.

Other Comments

The Draft License Application did not include final reports and did not include the data collected for all the studies conducted. The Final License Application should present all raw data, including, but not limited to, tables of dissolved oxygen data to support the charts included in the Initial Study Report.

Thank you for the opportunity to comment on the Draft License Application. Please contact me by phone at (207) 446-2642 or by email at Kathy.Howatt@maine.gov if you have questions.

Sincerely,

Kathy Davis
Howatt
Hydropower
Coordinator
Maine Department of Environmental
Protection Bureau of Land Resources

6.2 GLWP Response to MDEP DLA Comments

The complete data for the water quality studies are included in Appendix C of the FLA.

GLWP would like to thank MDEP for their guidance and help during our relicensing work. The impoundment trophic state study and dissolved oxygen and temperature study were some of the most enjoyable activities we have done during the relicensing.

7.0 MAINE DEPARTMENT OF INLAND FISH AND WILDLIFE

7.1 MDIFW DLA Comments



JANET T. MILLS
GOVERNOR

STATE OF MAINE
DEPARTMENT OF
INLAND FISHERIES & WILDLIFE
353 STATE STREET
41 STATE HOUSE STATION
AUGUSTA ME 04333-0041



JUDITH CAMUSO
COMMISSIONER

VIA ELECTRONIC FILING

January 29, 2022

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

Subject: **Green Lake Dam Project (FERC No. 7189)
MDIFW COMMENTS ON DRAFT LICENSE APPLICATION**

Dear Secretary Bose:

The Maine Department of Inland Fisheries and Wildlife has reviewed Green Lake Water Power Company’s Green Lake Hydroelectric Project FERC No. 7189-014 Draft License Application (DLA). The Project is located on Green Lake and Reeds Brook in the City of Ellsworth, Hancock County, Maine.

The Maine Department of Inland Fisheries and Wildlife (MDIFW) was originally established in 1880 to protect big game populations; since then, MDIFW’s mission has evolved in scope to include protection and management of fish, non-game wildlife, and associated habitats. Per 12 MRSA, §10051:

The Department of Inland Fisheries and Wildlife is established to preserve, protect and enhance the inland fisheries and wildlife resources of the State; to encourage the wise use of these resources; to ensure coordinated planning for the future use and preservation of these resources; to provide for effective management of these resources; and to use regulated hunting, fishing and trapping as the basis for the management of these resources whenever feasible.

Nowhere in our Department’s legislative mandate is MDIFW required to differentiate fisheries and wildlife management strategies between naturally occurring lakes and artificial, or artificially modified, lakes. The waters and aquatic resources utilizing these waterbodies belong to the People of the State of Maine and MDIFW has the stewardship responsibilities for the management of inland fisheries and wildlife resources and respective habitats in all public waters of the State for their preservation, protection, enhancement, and use.

It is our understanding of the FERC process that “*assessing project effects is directed primarily at describing the existing (baseline) project-related environment and assessing the beneficial and adverse effects that the proposed project and its operation would have on these resources*”. To that end, we offer the following comments and corrections on the DLA, noting that other resource agencies have commented and addressed inaccuracies under their respective purview:

PHONE: (207) 287-5254

FISH AND WILDLIFE ON THE WEB:
www.maine.gov/ifw

EMAIL ADDRESS:
IFWEnvironmentalreview@maine.gov

Section 2.1.1 Reservoir and Storage

The DLA states, “*The Project manages the lake level on Green Lake to maintain recreation values, allow a dependable water supply for the Green Lake National Fish Hatchery (GLNFH), and to protect lake trout spawning habitat.*”

MDIFW has stocked lake trout in Green Lake since 1961, and as a result of numerous underwater surveys it has been determined that Green Lake does not contain habitat suitable for spawning lake trout nor is there evidence of spawning. We recommend “...*and to protect lake trout spawning habitat*” be removed for the Final License Application (FLA).

Section 2.1.8 Fishway Facilities

As been previously stated, any planned reintroduction of river herring into Green Lake should be coordinated with MDIFW based on the outcomes of discussions and research being undertaken within the joint Federal and State partnership of the Alewife Interaction Committee to reach a balanced approach to comanaging resident lake and diadromous species in this and other waters around the State. As has been previously stated, density dependent interactions between anadromous alewives and landlocked rainbow smelt remain an ongoing concern of our Agency. Landlocked smelt are the primary forage species for landlocked salmon, which are native to Green Lake, one of only four lakes in Maine to which landlocked salmon are endemic. Additional concerns relate to preventing invasive species from being introduced above said licensed dam in the advancement of diadromous fish restoration. Green Lake’s tributaries also have very limited spawning and rearing habitat for its native landlocked salmon, and MDIFW desires to protect this limited habitat from future threats of other species displacing and utilizing this native fishes’ reproductive area. We believe there are options that would support both restoration and controlling the spread of invasives at Green Lake.

The FLA should be clear that MDIFW remains committed to working with our State and Federal partners in studying the above concerns should fish passage be considered during the term of the new license, and MDIFW should be party to any future discussions pertaining to fish passage for sea run species during the term of the new license. Therefore, our comments should not be interpreted as conflicting with the other State and federal resource agencies that are stakeholders to this relicensing.

Section 3.7 Consultation

The DLA states that Susan Bard is an MDIFW Fisheries Biologist. Any future reference to Ms. Bard (who is no longer employed with MDIFW) in the FLA should be corrected to Wildlife Biologist.

Section 5.1 Background

The references to the fish screens should clarify that the screens were installed to prevent landlocked salmon from leaving the lake.

Section 5.3.1 Species

The FLA should reference that lake trout have been stocked in Green Lake since 1961, and the stocking rate be clarified that MDIFW is currently stocking lake trout every other year, not “*about half of those years*” as stated in the DLA.

The DLA states, “*Arctic charr are believed to be native to the lake.*”

The FLA should be clarified that it has never been firmly established that Arctic charr are native to Green Lake as Arctic charr were stocked in the late 1800’s; however, Green Lake does now support a wild population of Arctic charr.

Section 5.3.3 Environmental Analysis

The DLA states, “*It is unlikely that any fish or wildlife species in Green Lake is unduly stressed by the current lake management method, which is similar, but less extreme than, the prior lake level management approach.*”

As no fish or wildlife studies were conducted to verify this, we recommend that this statement be omitted from the FLA.

Section 5.3.3.4 Arctic Charr

The DLA states, “*Arctic char spawn during the fall in water that is 1.5 to 6 feet deep...*”

The FLA should be clarified that Arctic charr likely spawn at depths deeper than 6 feet at Green Lake.

Section 5.4.2.1 Loon

At a regional scale (northeastern United States), Maine has a high responsibility for loon conservation. Loons face a variety of challenges throughout their range and every subpopulation is important for species resilience. Until the late 19th century loons could be found as far south as Pennsylvania, throughout New York, and in all the New England states except Rhode Island. The declines and range retraction were primarily due to human activities such as sport hunting and shoreline development. There are now efforts underway to restore loons to parts of their historic range, specifically in Massachusetts. Efforts to reduce human impacts resulting from shoreline development, artificial water level fluctuations, increases in mercury, oil spills, lead fishing tackle, and disturbance have been undertaken over the last decade and continue to impact loons in a positive direction. State, federal, and non-governmental organization partners are currently working to restore the 531 loons killed during the 2003 B-120 tank barge oil spill in Buzzard’s Bay, Massachusetts, which includes the dedication of nearly \$1.5 million for loon restoration in Maine.

As proposed in the DLA, by waiting until June 1 to set the water level by which fluctuations cannot vary more than a 6-inch increase or 1-foot decrease, loon nest initiation dates get pushed back at least two weeks, potentially leading to reduced nesting success, particularly in situations

when their first nest fails. Later nesting can result in fall and winter iced-in loons becoming more frequent.

Without knowing the number of territorial loon pairs, their exact chronology, the locations and characteristics of their established territories and nest sites, and productivity measures, MDIFW recommends:

1. Maintaining stable water levels through the typical nesting season, with no more than 0.5 vertical foot up or 1 vertical foot down occurring within a 28-day period during the loon nesting season (May 15 – July 31); or
2. Development of a loon raft management plan. The plan would require hiring professional biological consultants with loon monitoring experience to conduct an initial 3-year study to identify territories, determine productivity, and deploy rafts where suitable. After consultation with and approval from both MDIFW and USFWS, these rafts would then be deployed, maintained, and monitored annually by professional biological consultants, with periodic reporting to both MDIFW and USFWS, for the duration of the new license.

Please feel free to contact my office if you have any questions regarding this information, or if I can be of any further assistance.

Best regards,

A handwritten signature in blue ink, appearing to read 'John Perry', with a stylized flourish at the end.

John Perry
Environmental Review Coordinator

Cc: Greg Burr, Steve Dunham—MDIFW Region C
Francis Brautigam, Joe Overlock, Nathan Webb, Ryan Robicheau—MDIFW Augusta Headquarters
Danielle D'Auria—MDIFW Bangor Headquarters
Casey Clark, MDMR
Kathy Howatt, MDEP
Julianne Rosset, Amanda Cross—USFWS
Dan Tierney, NMFS

7.2 GLWP Response to MDIFW DLA Comments

Most of the MDIFW comments are addressed by them above. Comments requesting changes are addressed through changes in the FLA. Comments on the loons are addressed in the FLA and below.

MDIFW states:

“As proposed in the DLA, by waiting until June 1 to set the water level by which fluctuations cannot vary more than a 6-inch increase or 1-foot decrease, loon nest initiation dates get pushed back at least two weeks, potentially leading to reduced nesting success, particularly in situations when their first nest fails. Later nesting can result in fall and winter iced-in loons becoming more frequent.

“Without knowing the number of territorial loon pairs, their exact chronology, the locations and characteristics of their established territories and nest sites, and productivity measures, MDIFW recommends:

1. “Maintaining stable water levels through the typical nesting season, with no more than 0.5 vertical foot up or 1 vertical foot down occurring within a 28-day period during the loon nesting season (May 15 – July 31); or
2. “Development of a loon raft management plan. The plan would require hiring professional biological consultants with loon monitoring experience to conduct an initial 3-year study to identify territories, determine productivity, and deploy rafts where suitable. After consultation with and approval from both MDIFW and USFWS, these rafts would then be deployed, maintained, and monitored annually by professional biological consultants, with periodic reporting to both MDIFW and USFWS, for the duration of the new license.”

GLWP believes the second approach is only proposed to make the first approach look good, and then to capitalize on the situation if GLWP is determined to go with approach 2. A serious read of #2, combined with the knowledge that Maine Lakes and Maine Audubon have recently started a loon raft program that is aimed

at having volunteers create, deploy and monitor the rafts, leads to the conclusion that #2 is arbitrarily involved. GLWP also believes that lake rafts are only really called for on lakes which have wide level variations. They can also be problematic on busy lakes, since they tend to attract attention from people out on the lake.

#1 is also overly complicated and impractical. While it sounds simple, regulating the water level as described is not straightforward. This approach can actually make the situation worse for the loons. If a hurricane pushes the lake one foot over the allowed range, loons that are waiting for the lake to return to the normal level range to nest are out of luck. And, what gets priority in that situation? The normally allowed lake range or the loon restrictions?

GLWP proposes that the following current summer lake levels be used. GLWP performed an analysis of the lake levels during the 37 years the Project has been in operation and found that all but 10 of those years the +0.5 -1.0 test over any 28 day period from 15-May through 31-July was met. Of those 10, all but 2 involved the lake going out of range from one or more unusual weather events. The two remaining encountered 28 day rises of 0.65 ft and 0.71 ft.

It has been the experience of GLWP that during the summer, because lake level increases are caused by rain, and decreases are caused by elongated dry periods, the lake can rise much faster than it can drop. Heavy rain is often encountered in May. The study referenced by MDIFW suggested maintaining restricted lake levels from the first week of June. This is in Minnesota, which would be expected to have a northern climate, as does Maine.

8.0 REFERENCES FOR GLWP RESPONSES TO DLA COMMENTS

12 CFR § 263.9 - Ex parte communications. | CFR | US Law | LII / Legal Information Institute (cornell.edu)
<https://www.law.cornell.edu/cfr/text/12/263.9>

20150227-5321 – Accession No. 20150227-5321

Army 2022 - Spillways (army.mil)
<https://www.hec.usace.army.mil/confluence/hmsdocs/hmstrm/modeling-reservoirs/spillways>

EIA 2021 - Greenhouse gases' effect on climate - U.S. Energy Information Administration (EIA)
<https://www.eia.gov/energyexplained/energy-and-the-environment/greenhouse-gases-and-the-climate.php>

EIA 2022 - Glossary - U.S. Energy Information Administration (EIA)
<https://www.eia.gov/tools/glossary/index.php?id=R>

Ellsworth 2015 – Accession No. 20151230-5275

IUCNREDLIST - Salvelinus alpinus (Arctic Char) (iucnredlist.org)
<https://www.iucnredlist.org/species/19877/9102572#geographic-range>

Maine 5§9055 - Title 5, §9055: Ex parte communications; separation of functions (maine.gov)
<https://legislature.maine.gov/statutes/5/title5sec9055.html>

MDMR 2022 - River Herring (Alewife and Blueback Herring) Fact Sheet: Maine Department of Marine Resources, Sea-Run Fisheries <https://www.maine.gov/dmr/science-research/searun/alewife.html>

USGS 2019 - Blueback Herring (Alosa aestivalis) - Species Profile (usgs.gov)
<https://nas.er.usgs.gov/queries/FactSheet.aspx?SpeciesID=488>