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May 22, 2023

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

RE: NOTICE OF APPLICATION ACCEPTED FOR FILING, SOLICITING MOTIONS TO INTERVENE AND PROTESTS, READY FOR ENVIRONMENTAL ANALYSIS, AND SOLICITING COMMENTS, RECOMMENDATIONS, TERMS AND CONDITIONS, AND PRESCRIPTIONS GREEN LAKE PROJECT (FERC No. 7189-015)

Dear Secretary Bose:

The Maine Department of Marine Resources (MDMR) is writing in response to the to the Federal Energy Regulatory Commission's ("Commission") Notice of Application Accepted for Filing, Soliciting Motions to Intervene and Protests, Ready for Environmental Analysis and Soliciting Comments, Recommendations, Preliminary Terms and Conditions, and Preliminary Fishway Prescriptions, dated March 23, 2023 for the Green Lake Project (Project; FERC No. 7189-015). The Project is located on Green Lake and Reeds Brook in Hancock County, Maine. The Project occupies approximately two acres of the U.S. Fish and Wildlife Service's (USFWS) Green Lake National Fish Hatchery. The Final License Application (FLA) for the Project was filed by Green Lake Water Power Company (GLWP; Applicant) on March 31, 2022 however FERC filed Additional Information Requests (AIRs) and GLWP filed revised Exhibits to the FLA on September 12, 2022. MDMR has reviewed the FLA including the revised documents.

MDMR is concerned with the Project's continuing direct and indirect effects on diadromous fishes in and around the Project area. Below, we provide our preliminary comments, recommendations, and terms and conditions for the protection of, mitigation of damages to, and enhancement of fish resources pursuant to Section 10(j) of the Federal Power Act. These are based, in part, on MDMR's legislative authority, the results of studies performed during the licensing process and filed with the Commission by the Licensee or incorporated into the license application, and consultation with the state and federal resource agencies¹.

¹ The state and federal resource agencies are the Maine Department of Marine Resources (MDMR), Maine Department of Inland Fisheries and Wildlife (MDIFW), Maine Department of Environmental Protection (MDEP), U.S. Fish and Wildlife Service (USFWS), and National Marine Fisheries Service (NMFS).

Comments on the Final License Application

Appendix A

Section 2.1.8 Fishway Facilities: “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, because of potential effects on resident fish, and because of potential mechanical problems at the GLNFH filtration plant from large numbers of out-migrating alewives. 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.”

MDMR Comment: In their comments on the DLA, U.S. Fish and Wildlife Service (UWSFS, Interior) stated the following:

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

MDMR recommends the Licensee correct the information in the FLA to reflect the accurate position and recommendations of USFWS. Current best practices for husbandry of aquatic organisms recommend specific practices to monitor and sanitize open water sources to prevent spread and the potential for amplification of diseases that are naturally occurring (NEFHC 2015). MDMR strongly recommends the Licensee discontinue use of the outdated and incorrect information in the FLA about disease risk and alewives. Continued use of this outdated information by the Licensee is not supported by best available information and harms the public image of this indigenous species, which are a public resource for the State of Maine.

Appendix E

Section 5.4.5.1 Eel: “A series of eel surveys were performed during study season one to determine if eels were climbing the Green Lake dam. No eels were found during the surveys. For study results, see section 6.0 below.”

MDMR Comment: Section 6.0 referred to here is incorrect. Study results are in section 7.0. American eels are known to be present in Green Lake and it is therefore known that juvenile eels approach the Green Lake Project dam, though the number of eels is not known. Upstream and downstream passage measures are needed as soon as possible to address avoidable Project impacts on this species. The recommendations and terms and conditions of MDMR included in this document provide specific measures and justification to address Project impacts on American Eel.

Section 5.4.5.8 Sea lamprey: “Sea lamprey have gotten a bit of a bad reputation....”

² Accession No. 20220125-5022

MDMR Comment: This section continues to misrepresent Sea Lamprey. Please refer to our comments on the DLA.³ Sea Lamprey are an important native species.

Section 5.4.6.1 Eel: “There are currently no eel passage provisions on the Graham Lake dam nor on the Ellsworth dam. (Ellsworth FLA 2015) If eel passage is put in at the Graham Lake dam and at the Ellsworth dam, and young eel are found to be climbing or attempting to climb the Green Lake Dam, the need for upstream eel passage should be evaluated. Downstream passage should also be investigated at that time.”

MDMR Comment: American eels are known to be present in Green Lake. Upstream and downstream passage measures are needed as soon as possible to address avoidable Project impacts on this species. The recommendations and terms and conditions of MDMR included in this document provide specific measures and justification to address Project impacts on American Eel.

Section 5.4.6.6 River herring: “No changes are proposed for river herring. Alewife passage would risk fish in the lake and blueback herring are not expected to have access to Reeds Brook.”

MDMR Comment: This statement is incorrect. Please refer to our comments on Section 2.1.8 of Appendix A of the FLA. The recommendations and terms and conditions of MDMR included in this document provide specific measures and justification to address Project impacts on River Herring.

Section 5.4.6.8 Sea lamprey: “No changes are proposed for sea lamprey. There is currently no fish passage for sea lamprey into Graham Lake. If such fish passage is established in the future, sea lamprey passage past Green Lake dam should be evaluated as to benefits, dangers and costs.”

MDMR Comment: The recommendations and terms and conditions of MDMR included in this document provide specific measures and justification to address Project impacts on Sea Lamprey.

³ Accession No. 20220128-5461

Recommendations and Terms and Conditions

1.1 MDMR statutory authority

MDMR is a cabinet level agency of the State of Maine. MDMR was established to regulate, conserve, and develop marine, estuarine, and diadromous fish resources; to conduct and sponsor scientific research; to promote and develop marine coastal industries; to advise and cooperate with state, local, and federal officials concerning activities in coastal waters; and to implement, administer, and enforce the laws and regulations necessary for these purposes. MDMR is the lead state agency in the restoration and management of diadromous (anadromous and catadromous) species of fishes.

MDMR has been an active participant throughout the licensing process. In 2021, the MDMR provided written comments on the Interim Study Plan (ISR). In 2022, the MDMR provided written comments on the Draft License Application. In addition, we have participated in meetings and conference calls with the Licensee to discuss study results.

2.0 Goals and objectives for the Union River

MDMR's policy is to restore Maine's native diadromous fish to their historical habitat. In August 2000, pursuant to Article 406 of the Ellsworth Project License (P-2727), the Licensee for the Ellsworth Project and Department of the Interior submitted to the Commission the Comprehensive Fishery Management Plan for the Union River Drainage (2000 Plan). The 2000 Plan was jointly developed by the Union River Fisheries Coordinating Committee (URFCC)⁴. The goal of the plan was to "Manage all sport and commercial fish species in the Union River in an ecologically responsible manner to optimize habitat utilization, fish abundance, and public benefit." The URFCC revised the plan on a five-year cycle and met annually to review results and develop interim modifications until 2015. The revised 2015-2017 Plan⁵ (2015 Plan) was in effect from its acceptance in March 2015 until December 31, 2017, when the current license of the Ellsworth Project expired.

Restoration of diadromous species in the Union River is guided in part by the 2015 Plan. The 2015 Plan includes agency goals and objectives for diadromous and resident fish populations in the Union River drainage. The 2015 Plan was intended to be updated in 2017 following issuance of a new License for the Ellsworth Project. Issuance of the Ellsworth License has been delayed and, at the time of writing, the date of issuance is still not certain. As a result, the goals and objectives in the 2015 Plan have not been updated and do not reflect new information or progress. Management objectives for the Union River watershed are out of date. MDMR looks forward to the conclusion of the Ellsworth relicensing and updating the 2015 Plan. In the interim, the goals and objectives contained in this letter represent the most up-to-date position on the resources under the authority of MDMR. The goals and objectives in this letter pertain only to the resources under the authority of MDMR and were coordinated with commenting state and federal resource agencies so as to not conflict.

⁴ The URFCC included the Maine Department of Marine Resources (MDMR); the former Atlantic Salmon Commission (ASC), now part of MDMR; the Maine Department of Inland Fisheries and Wildlife (IFW); the U.S. Fish and Wildlife Service (USFWS); Black Bear Hydro Partners, LLC (BBHP, licensee of the Ellsworth Project); the City of Ellsworth; Maine Council of the Atlantic Salmon Federation (MC-ASF); Union Salmon Association (USA); and interested members of the public.

⁵ Accession No. 20150227-5321

The goals and objectives represented in this letter incorporate relevant interstate fisheries management plans. Specifically, the Atlantic States Marine Fisheries Commission (ASMFC) is an Interstate Compact, ratified by the member states and approved by the U.S. Congress in 1942, to manage the states' shared migratory fishery resources and to cooperate in promoting and protecting Atlantic coastal fishery resources. Maine is an active member of ASMFC, and MDMR scientists represent the State on the Shad and River Herring Technical Committee and the American Eel Technical Committee. The Atlantic States Marine Fisheries Commission (ASMFC) has developed three documents related to the management of American eel and hydropower facilities:

1. Interstate Fishery Management Plan for American Eel. April 2000. Atlantic States Marine Fisheries Commission.
2. Addendum II to the Fishery Management Plan for American Eel. Atlantic States Marine Fisheries Commission. Approved October 23, 2008. 8 pp.
3. Addendum III to the Fishery Management Plan for American Eel. Atlantic States Marine Fisheries Commission. Approved August 2014. 19 pp.

Objectives of the management plan include: (1) protect and enhance American eel abundance in all watersheds where eel now occur; and (2) where practical, restore American eel to those waters where they had historical abundance, but may now be absent, by providing access to inland waters for glass eel, elvers, and yellow eel, and adequate escapement to the ocean for pre-spawning adult eel. Addendum II contains specific recommendations for improving upstream and downstream passage of American eel, including requesting that member states and jurisdictions seek special consideration for American eel in the Commission's relicensing process.

MDMR's management goal is to restore American eel to their historic habitat in the Union River. The waters upstream of Project represents currently occupied and historic habitat for American eel. The protection, enhancement, and restoration of all life stages of this species relies on safe, timely, and effective upstream and downstream fish passage at the Project.

The Atlantic States Marine Fisheries Commission (ASMFC) has also developed four documents related to the management of Shad and River Herring (Alewife and Blueback Herring) and hydropower facilities:

1. Interstate Fishery Management Plan for American Shad and River Herrings. October 1985. Atlantic States Marine Fisheries Commission.
2. Amendment 1 to the Interstate Fishery Management Plan for American Shad and River Herring. April 1999. Atlantic States Marine Fisheries Commission.
3. Amendment 2 to the Interstate Fishery Management Plan for American Shad and River Herring. May 2009. Atlantic States Marine Fisheries Commission.
4. Amendment 1 to the Interstate Fishery Management Plan for American Shad and River Herring. February 2010. Atlantic States Marine Fisheries Commission.

The objectives related to the management of Shad and River Herring (Alewife and Blueback Herring) and hydropower facilities include: 1) Promote improvements in degraded or historic alosine habitat throughout the species range; 2) where practical, restore Shad and River herring to those waters where they had historical abundance, but may now be absent, by providing access to inland waters for pre-spawning adults, and adequate escapement to the ocean for post-spawn adults and juveniles. State and

federal managers should consider the following methods to achieve this objective: A) Improve or install passage facilities at dams and other obstacles to provide upstream passage to historic spawning areas, or remove these obstacles entirely; B) Improve water quality in areas where water quality degradation may have affected alosine stocks; C) Evaluate current fish passage facilities for efficiency; D) Ensure that decisions on river flow allocation (e.g., irrigation, evaporative loss, out of basin water transport, hydroelectric operations) take into account flow needs for alosine migration, spawning, and nursery usage; E) Ensure that water withdrawal (e.g., cooling flow, drinking water) effects (e.g., impingement and entrainment mortalities, turbine mortalities) do not affect alosine stocks to the extent that they result in stock declines; F) Evaluate and improve downstream passage for adults and juveniles; G) Promote and coordinate alosine stocking programs for: a) reintroduction to historic spawning area, b) expansion of existing stock restoration programs, c) initiation of new strategies to enhance depressed stocks, d) promote cooperative interstate research monitoring and law enforcement.

MDMR's management goal is to restore Atlantic Salmon, American shad, American Eel, Alewife, Blueback herring, and Sea Lamprey to their historic habitat in the Union River. The waters upstream of the Project represents significant habitat for Alewife, Sea Lamprey, and potentially other diadromous species. The protection, enhancement, and restoration of these diadromous species relies on safe, timely, and effective upstream and downstream fish passage at the Project.

2.1 Diadromous species and specific management goals

All of Maine's native diadromous species are found in the Union River system, but only River Herring (Alewife and/or Blueback Herring) and American Eel are known to occur within the Green Lake Project boundaries.

Our first management objective is to maximize the production of the catadromous American Eel by providing access to and from historical growth habitat in the watershed through safe, timely, and effective upstream and downstream passage at barriers. At this time, we have no estimate for the potential abundance of American Eel.

Our second management objective is to maximize the production of anadromous Alewife, Blueback Herring, American Shad, Atlantic Salmon, and Sea Lamprey by providing access to and from historical spawning and rearing habitat in the watershed through safe, timely, and effective upstream and downstream passage at barriers. We estimate that, once accessible, habitat within the Green Lake subdrainage would annually produce 736,090 - 1,252,920 adult Alewife (Green Lake habitat only) and an unknown number of Blueback Herring, American Shad, and Sea Lamprey.

2.2 Migration periods for diadromous species

These dates are based on migration periods observed in the Saco, Androscoggin, Kennebec, and Penobscot River and may change based on new information, evaluation of new literature, and agency consultation. Diadromous species are denoted as (A) anadromous or (C) catadromous.

Species	Upstream migration period	Downstream migration period
Atlantic Salmon (A)	May 1- November 10	April 1-June 15 smolts and kelts. October 15-December 31 kelts
Alewife and Blueback Herring (A)	May 1-July 31	June 1-November 30 adults and juveniles
American Shad (A)	May 15-July 31	June 1-July 31 adults. July 15-November 15 juveniles
Sea Lamprey (A)	May 1- June 30 (night)	
American eel (C)	June 1-September 15	August 15-November 15 (night)

3.0 Project description

The Project is located on Green Lake and Reeds Brook in Hancock 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 NGVD 29 from June 1 through Labor Day weekend each year, and between 157.5 feet and 160.7 feet NGVD 29 for the remainder of the year; (2) complete the fall drawdown of Green Lake by October 15 of each year; (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; and (4) release a year-round minimum flow to Reeds Brook of one cubic foot per second (cfs), or inflow to Green Lake, whichever is less, for the protection and enhancement of fish and wildlife resources downstream of the dam. 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 also requires Green Lake Power to install screens at the project intake to protect fish from turbine entrainment and prevent out-migration of adult salmonids from Green Lake.

3.1 Project fishways

The Green Lake Project has no existing upstream or downstream fish passage facilities.

3.2 Project Impacts

Foster and Atkins (1868) wrote that the fishery in the Union River for salmon, shad, and alewives had once been excellent, but these species were nearly extinct in the river by 1868 by the construction of dams without fishways. Approximately a century later, State agencies began a restoration program. Stocking of the Union River with Atlantic salmon smolts and adult river herring (alewives and blueback herring) was initiated in 1971-72, and a fish trapping facility was built in the tailrace of the Ellsworth Dam in 1974 to allow for the capture and transport of returning adult fish. Annual runs have exceeded 1,000,000 alewives and approached 300 salmon. However, salmon runs have been much lower since the 1980's in the Union River (and elsewhere). The fish trap at the Ellsworth Dam continues to serve as an interim upstream fish passage facility and is also used for commercial harvest of river herring under a cooperative management agreement with the MDMR and the City of Ellsworth.

The Green Lake Project impacts diadromous species in several ways. Alewife, blueback herring, and other anadromous species will not be able to migrate upstream to historic spawning habitat. An unknown number of American eels will not be able to migrate upstream to historic growth habitat or the migration will be delayed. Post-spawn adult river herring that may be stocked by MDMR, their offspring, and adult American eels on their spawning migration will be delayed, injured, or be killed when attempting to migrate downstream past the Project.

4.0 Section 10(j) Recommendations

Section 10(j) of the FPA requires that each license issued for a hydropower project contain conditions to adequately and equitably protect, mitigate damages to, and enhance, fish and wildlife affected by the development, operation, and management of a project (16 U.S.C. § 803(j)). Therefore, each license issued shall include such conditions, based on recommendations of the U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), and state fish and wildlife agencies. The MDMR is submitting 10(j) fish recommendations that are based upon our enabling legislation and information developed during the licensing proceeding and consultation with other resource agencies and the Licensee.

For the Green Lake Project, we are recommending that downstream fish passage be improved for American Eel and anadromous species and upstream passage be provided for American eel and anadromous species during the license term. These recommendations are consistent with measures included in modern licenser terms for hydroelectric projects throughout the Northeast to reduce impacts to migratory species.

4.1 Section 10(j) Recommendation #1

Improve Downstream Passage for American Eel and Anadromous Species at the Green Lake Project

- A. The Licensee shall improve downstream fish passage at the Project to provide safe, timely and effective passage for American Eel and anadromous fish species;

- B. As soon as possible after License issuance and no later than two years after License issuance, the Licensee shall make the following modifications to provide safe, timely, and effective passage from August 1 - October 31 for American Eel:
- a. Install full-depth trashracks with 0.75-inch clear space at the intake for the Penstock to reduce entrainment of American eels into the Project Turbine.
 - b. On the spillway channel with a crest elevation of 160.7 feet NGVD29 datum, modify the existing fish screens with review and approval from the resource agencies⁶ to allow downstream migration of American Eel, while preventing the escapement of breeding endemic landlocked salmon.
 - c. Below the spillway channel with a crest elevation of 160.7 feet NGVD29 datum, modify the bathymetry downstream to ensure an adequate plunge pool for downstream migration of American Eel.
 - d. Modify the gate(s) to provide a low-level bypass for downstream migration of American Eel;
 - e. When the surface elevation of Green Lake exceeds 160.7, modify operations at the Project to increase combined total flow over the spillway channel with a crest elevation of 160.7 NGVD29 datum and through the low-level bypass to a minimum of 5% of station hydraulic capacity.
 - f. When the surface elevation of Green Lake does not exceed 160.7, modify operations at the Project to increase combined total flow through the low-level bypass and through the gate(s) to a minimum of 5% of station hydraulic capacity.
- C. No later than June 1, 2030, the Licensee shall make the following modifications to provide safe, timely, and effective downstream passage from June 1 to August 1 for anadromous species and August 1 to November 30 for anadromous species and American Eel:
- a. From June 1 to August 1 when the surface elevation of Green Lake exceeds 160.7, modify operations at the Project to increase combined total flow over the spillway channel with a crest elevation of 160.7 NGVD29 datum and the upstream fishway (see recommendation #3) to a minimum of 5% of station hydraulic capacity and prioritize flow through the fishway.
 - b. From June 1 to August 1 when the surface elevation of Green Lake does not exceed 160.7, modify operations at the Project to increase combined total flow through the upstream fishway (see recommendation #3) and the gate(s) to a minimum of 5% of station hydraulic capacity and prioritize flow through the fishway.
 - c. From August 1 to November 30 when the surface elevation of Green Lake exceeds 160.7, modify operations at the Project to increase combined total flow over the spillway channel with a crest elevation of 160.7 NGVD29 datum, through the upstream fishway (see recommendation #3), and through the low-level bypass to a minimum of 5% of station hydraulic capacity and prioritize flow through the fishway and low-level bypass.
 - d. From June 1 to August 1 when the surface elevation of Green Lake does not exceed 160.7, modify operations at the Project to increase combined total flow through the upstream fishway (see recommendation #3), the gate(s), and through the low-level bypass to a minimum of 5% of station hydraulic capacity and prioritize flow through the fishway and low-level bypass.
- D. All modifications to the downstream facility and Project operations shall be reviewed and approved by the resource agencies, including the 30%, 60%, and 90% drawings, and all designs are to be consistent with the most current version of the Service's Fish Passage Engineering Design Criteria Manual (USFWS 2019 or subsequent version).

⁶ The resource agencies referred to are the Maine Department of Marine Resources (MDMR), Maine Department of Inland Fisheries and Wildlife (MDIFW), U.S. Fish and Wildlife Service (USFWS), and National Marine Fisheries Service (NMFS).

- E. All modifications to Project operations will be reviewed and approved by the resource agencies and all plans are to be consistent with the most current version of the Service's Fish Passage Engineering Design Criteria Manual (USFWS 2019 or subsequent version).
- F. Sections B(e) and B(f) shall be replaced by Sections C(a)-C(d) on June 1, 2030 or a revised timeline for downstream measures for anadromous species.

Downstream passage efficiency

- A. After the structural and operational changes in Section B have been made at the Green Lake Project, the Licensee shall test the effectiveness of the downstream passage facilities for passing adult American eels. The study plan for effectiveness testing shall be developed in consultation with the resource agencies. The MDMR recommends that radio telemetry methods be used at the project to determine migratory delay, route of downstream passage (i.e. via the three surface spillway, low-level bypass, or turbines), immediate survival, latent survival, and injury of downstream migrating American eels.
- B. After the structural and operational changes in Section C have been made at the Green Lake Project, the Licensee shall test the downstream passage facilities for passing River Herring. Performance standards developed in consultation with resource agencies will be implemented to determine if downstream passage is safe, timely, and effective. The study plan for effectiveness testing shall be developed in consultation with the resource agencies. If performance standards are not met, the Licensee shall implement additional measures to further reduce injury or mortality; these measures may include modifications to increase attraction or guidance to the downstream passage facilities, spill, and modifying the ledge/plunge pool and spillway surface.

Fishway Operation and Maintenance

- A. The Licensee shall, consistent with safe working practices, keep the fish passage facilities in proper working order and shall maintain fishway areas clear of trash, logs, and material that would hinder passage. Routine maintenance shall be performed sufficiently before a migratory period such that fishways can be tested and inspected, and will be operational during the migratory periods.
- B. The Licensee shall develop a Fishway Operation and Maintenance Plan (FOMP) covering all operations and maintenance of the downstream fish passage facilities for the Project. The FOMP shall be submitted to the resource agencies for review and approval. Thereafter, Licensee will keep the FOMP updated on an annual basis, to reflect any changes in fishway operation and maintenance planned for the year.

Justification

1. The Green Lake and Reeds Brook within the Green Lake Project boundaries is managed in part as a migratory pathway for three anadromous (Alewife, Blueback Herring, and Sea Lamprey) and one catadromous species (American eel) and for the sustained production of these species consistent with habitat capabilities. Currently, alewife ascend Reed Brook but are not able to pass upstream to spawn in Green Lake. Although there is no dedicated upstream passage for American eels at the Green Lake Project, some juveniles can migrate past the Project. Post-spawn and juvenile anadromous fishes and adult American eels require safe, timely, and effective downstream passage at the Green Lake Project to complete their life cycles.
2. The ASMFC River herring and American shad FMP requires State resource agencies to improve habitat accessibility and quality, including addressing fish passage needs at dams and other

obstructions. The ASMFC American eel FMP requires State resource agencies provide adequate escapement to the ocean for pre-spawning adult eel where practical.

3. The American eel was considered for listing on two occasions, but the USFWS determined on February 2, 2007 (72 FR 4967) and October 8, 2015 (80 FR 60834) that listing the species throughout all or a significant portion of its range was not warranted at the time. The 2012 ASMFC benchmark stock assessment concluded that the American eel population was *depleted* in U.S. waters and was at or near historically low levels, but the overfishing and overfished status relative to biomass and fishing mortality reference points could not be determined with confidence (ASMFC 2012). The 2017 ASMFC stock assessment update concluded that the status of the American eel population remained depleted, but no overfishing determination could be made (ASMFC 2017). In response to these findings, the ASMFC has reduced recreational and commercial harvest coastwide (ASMFC Addendum IV).
4. River herring were considered for listing under the ESA twice, but on August 12, 2013 and June 19, 2019 the NMFS determined that listing was not warranted at the time (78 FR 48944; 84 FR 28630). In 2009, the ASMFC closed all commercial and recreational fisheries for river herring except those systems with a sustainable fishery (ASMFC 2009). Maine currently has commercial municipal fisheries, one of which is the Ellsworth fishery, which have been determined by the ASMFC to be sustainable. However, this fishery is still severely limited by poor fish passage.
5. The existing downstream passage facilities at the Green Lake Project do not meet current guidelines for fish passage (USFWS 2019) and are not effective. Current guidelines require downstream protective measures to include 0.75 inch or less, clear spaced, angled racks to reduce entrainment, reduce impingement, and provide guidance to dedicated downstream passage facilities. The Licensee has documented injury and mortality American eels that bypassed the trash racks on the Project intakes. The Green Lake Project does not have any existing downstream passage facilities.
6. Efficiency testing of downstream fish passage facilities is critical to evaluating the success of the passage structures and operations, diagnosing problems, and determining when fish passage modifications are needed and what modifications are likely to be effective. It is essential to ensuring the effectiveness of fishways over the term of the license, particularly in cases where the changing size of fish populations may also change fish passage efficiency or limit effectiveness.
7. The Licensee has proposed some of these measures in the FLA. MDMR supports the Licensee's proposals with the addition of the modifications and recommendations contained herein.

4.3 Section 10(j) Recommendation #2

Provide Upstream Passage for American eel at Green Lake Project

- A. Within two years of license issuance, the Licensee shall construct, operate and maintain upstream eel passage facilities at the Green Lake Project. The exact location of the upstream eel passage facilities shall be determined in consultation with the resource agencies. The upstream eel facilities shall be operated from June 1 through October 31.
- B. The upstream facilities shall be designed in consultation with the resource agencies, and the resource agencies shall review and approve the 30%, 60%, and 90% drawings. The facilities shall be consistent with the most current version of the Service's Fish Passage Engineering Design Criteria Manual (USFWS 2019 or subsequent version).
- C. The Licensee shall test the effectiveness of the upstream passage facilities for attracting and passing juvenile American eels. The study plan for effectiveness testing shall be developed in consultation with the resource agencies. The study plan shall include the standard methods required by the resource agencies for eel ramp fishways at Maine hydroelectric projects on the Kennebec,

Presumpscot, and Penobscot Rivers (FERC No's. 2555, 2556, 2364, 2365, 2611, 2574, 2322, 2325, 5073, 2942, 2984, 2931, 2941, 2932, 2712, 2710, and 2458), and other projects. These standard study methods consist of (1) evaluating attraction efficiency to the facility, and (2) evaluating effectiveness of passing eels that have entered the upstream eel passage structure. Attraction efficiency shall be assessed with nighttime observations of migrating eels at the Project in comparison to the number of eels passed. Attraction shall be assessed on a minimum of one night per week during the eel passage season in the first year of operation and subsequent years as needed. Passage effectiveness shall be assessed with captive eels placed in a holding tank at the fishway entrance. A minimum of 100 eels shall be used in the study and 90 percent must pass the fishway within 24 hours, a criterion developed by MDMR and used to assess all the eel ramps installed at dams on the Kennebec and Presumpscot Rivers, and at other projects. If the minimum of 100 eels for effectiveness testing are not able to be captured at the Green Lake Project in the first year of operation, the Licensee shall consult with and obtain approval from MDMR, USFWS, and other resource agencies, as appropriate, to determine an updated timeline for completing effectiveness testing for the upstream passage ramp(s).

- D. The Licensee shall develop a Fishway Operation and Maintenance Plan (FOMP) covering all operations and maintenance of the upstream eel passage facilities for the Project. The FOMP shall be submitted to the resource agencies for review and approval. Thereafter, Licensee will keep the FOMP updated on an annual basis, to reflect any changes in fishway operation and maintenance planned for the year.

Justification

- A. The total number of American eels reaching the Green Lake Project dam is unknown. Some of the juveniles may be able to ascend the Project dam, but dedicated upstream passage would increase the number of eel able to reach growth habitat in Green Lake and other waterbodies upstream of the Project Dam. There is a commercial glass eel fishery in tidal waters of the Union River and the Ellsworth Dam lacks an eel fishway currently. However, juvenile eels are able to gain access to habitats upstream of Ellsworth Dam by ascending the wetted surface of the dam and eels have been documented in the Green Lake Project boundary.
- B. Goals and objectives of the American Eel Fishery Management Plan (ASMFC 2000) are to protect and enhance the abundance of American eel in inland and territorial waters of the Atlantic states, and where practical, restore American eel to those waters where they had historical abundance but may now be absent by providing access to inland waters for glass eel, elvers, and yellow eel.
- C. Efficiency testing of upstream fish passage facilities is critical to evaluating the success of the passage structures and operations, diagnosing problems, and determining when fish passage modifications are needed and what modifications are likely to be effective. It is essential to ensuring the effectiveness of fishways over the term of the license, particularly in cases where the changing size of fish populations may also change fish passage efficiency or limit effectiveness.

4.3 Section 10(j) Recommendation #3

Provide Upstream Passage for Anadromous Fish

- A. The Licensee shall construct, operate and maintain upstream fish passage facilities that pass anadromous species of fish in a safe, timely, and effective manner at the Green Lake Dam. The exact location and type of upstream fish passage facilities shall be determined in consultation with the resource agencies. The upstream fish passage facilities shall be operated from May 1 through October 31 or ice-in, whichever is later.

- B. The upstream facility shall be designed and approved in consultation with the resource agencies and the resource agencies shall review and approve the 30%, 60%, and 90% drawings. The facility shall be consistent with the Service's most current Fish Passage Engineering Design Criteria Manual (USFWS 2019 or subsequent version). Upstream passage will be designed with consideration of preventing the upstream spread of Aquatic Invasive Species, as reviewed and approved by the resource agencies.
- C. The upstream facility will be installed and operational no later than May 1, 2030 unless a revised timeline is approved by all the resource agencies. This timeline is based in part on the timeline for volitional upstream passage at the Ellsworth and Graham Lake Dams (P-2727), the requirements for which are pending issuance of a new license. In addition, updates to fisheries management and planning in the Union River are expected after the relicensing of the Ellsworth Project has concluded. The operational date may be revised as a result of either of these ongoing processes and by approval from all resource agencies. If the operational date is revised, the Licensee shall be notified no less than two years prior to the revised operational date.
- D. The Licensee shall test the effectiveness of the upstream passage facilities for passing adult alosines. The study plan for effectiveness testing shall be developed in consultation with the resource agencies. The study plan shall include the standard methods required by the resource agencies for upstream fishways at Maine hydroelectric projects on the Penobscot, Kennebec, Androscoggin, and Presumpscot Rivers (FERC No's. 2555, 2556, 2364, 2365, 2611, 2574, 2322, 2325, 5073, 2942, 2984, 2931, 2941, 2932, 2534), and other projects. These standard study methods consist of (1) evaluating attraction efficiency to the facility, and (2) evaluating effectiveness passing alosines that have entered the upstream fish passage structure. A minimum of 150 alosines shall be used in the study and 100 alosines must approach the facility for the study.
- E. The Licensee shall develop a Fishway Operation and Maintenance Plan (FOMP) covering all operations and maintenance of the upstream fish passage facilities for the Project. The FOMP shall be submitted to the resource agencies for review and approval. Thereafter, Licensee will keep the FOMP updated on an annual basis, to reflect any changes in fishway operation and maintenance planned for the year.

Justification

- A. Alewife have been documented at the base of the Green Lake Project Dam by Green Lake NFH staff, however the total number of alewife reaching the Project dams currently is unknown. Dedicated upstream passage would allow adult alewife to reach historic and productive spawning habitat in Green Lake.
- B. Goals and objectives of the American Shad and River Herring Management Plan (ASMFC 2009) are to protect and enhance the abundance of River Herring in inland and territorial waters of the Atlantic states, and where practical, restore River Herring to those waters where they had historical abundance but may now be absent by providing access to inland waters for pre-spawn adults.
- C. Efficiency testing of upstream fish passage facilities is critical to evaluating the success of the passage structures and operations, diagnosing problems, and determining when fish passage modifications are needed and what modifications are likely to be effective. It is essential to ensuring the effectiveness of fishways over the term of the license, particularly in cases where the changing size of fish populations may also change fish passage efficiency or limit effectiveness.

If you have any questions, please contact Casey Clark at 207-350-9791 or by email at casey.clark@maine.gov.

Sincerely,



Patrick C. Keliher, Commissioner

cc: Casey Clark, Lars Hammer, Sean Ledwin, MDMR
John Perry, Greg Burr, MIFW
Kyle Olcott, Laura Paye, MDEP
Oliver Cox, Julianne Rosset, Bryan Sojkowski, USFWS
Dan Tierney, Don Dow, NOAA

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