

REVIEW OF APPLICATION FOR RECERTIFICATION BY THE LOW IMPACT HYDROPOWER INSTITUTE OF THE BENTON FALLS PROJECT, LIHI #79

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I. INTRODUCTION

This report summarizes the review findings of the application submitted by Benton Falls Associates (Applicant or licensee) to the Low Impact Hydropower Institute (LIHI) for recertification of the Benton Falls Hydroelectric Project FERC (P-5073). The Project is a 4.5-MW facility that operates in a run-of-river mode and is located on Sebasticook River approximately 5.3 miles upstream of the confluence with the Kennebec River in Benton, Maine. On September 17, 2021 LIHI received a complete application package for recertification of the Project. This current review was conducted using the new 2nd Edition LIHI Certification Handbook.

II. RECERTIFICATION PROCESS AND MATERIAL CHANGE REVIEW

Under the current LIHI Handbook (Revision 2.04: April 1, 2020), recertification reviews are a two-phase process starting with a limited review of a completed LIHI application, focused on three questions:

- (1) Is there any missing information from the application?
- (2) Has there been a material change in the operation of the certified facility since the previous certificate term?
- (3) Has there been a change in LIHI criteria since the Certificate was issued?

In accordance with the Recertification Standards, all Projects currently applying for renewal must go through a full review unless their most recent certification was completed using the 2016 version of the Handbook. While there were no material changes at the Project, the LIHI Handbook was materially changed, thus, this Stage II report was required for the Project.

A review of the initial application, dated July 2021, resulted in a Stage I Report dated September 3, 2021 that indicated additional data was needed, which was emailed to LIHI.

This Stage II assessment included review of the application package, public records in FERC's eLibrary since the last LIHI certification in 2015, and annual compliance statements received by LIHI during the past term of Certification.

III. PROJECT'S GEOGRAPHIC LOCATION

The Benton Falls Project is located on the Sebasticook River in Benton, Maine. The Sebasticook River is a tributary to the Kennebec River. The Project is the first dam on the river, located 5.3 miles from the confluence of the Sebasticook and Kennebec Rivers (Figure 1). The Burnham Dam project is located upstream of the Project in Pittsfield, ME.

IV. PROJECT AND IMMEDIATE SITE CHARACTERISTICS

The Benton Falls Project was licensed by FERC on March 8, 1984, and the existing dam was constructed the same year. The previous dam was at the same location as the current dam but was destroyed by flooding in 1936. Project works consist of a 500-foot long, 27-foot-high concrete gravity dam with a 300-foot-long integral uncontrolled spillway topped by 4-foot-high flashboards; a powerhouse located near the west dam abutment, constructed integrally with the dam, containing two horizontal Kaplan turbine/generators with a total rated capacity of 4.468 MW; a 350-foot-long tailrace channel; and a fish lift which contains a 600-gallon hopper and a minimum cycle time of approximately seven minutes (see Figures 2 - 6).



Figure 1 – Benton Falls Project Location

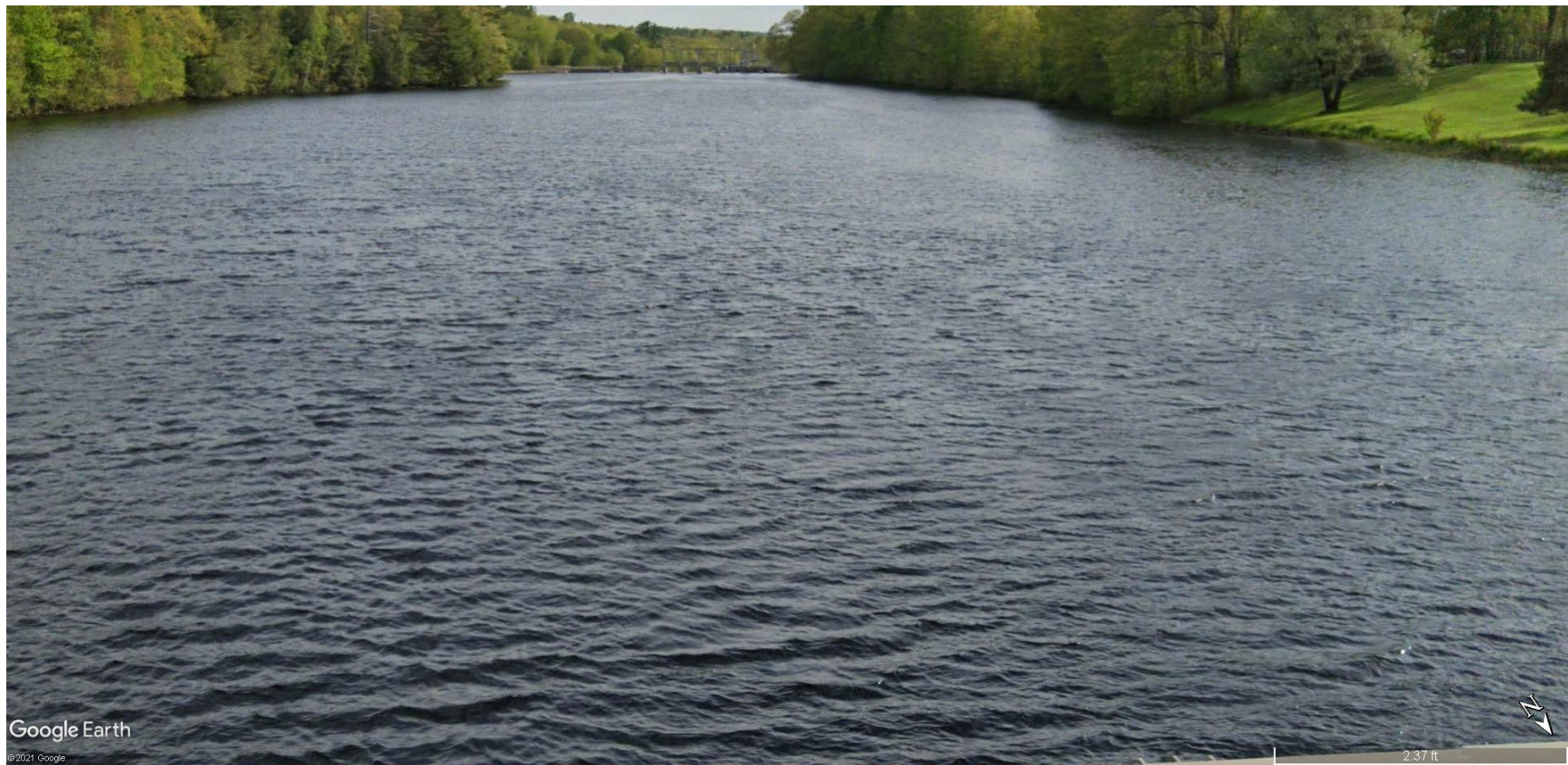


Figure 2 – Google Earth street view looking downstream at the Benton Falls Impoundment and Dam from Sebasticook Road/ Route 139 bridge.



Figure 3 – Benton Falls Project spillway gate, tailrace, fish lift and passage flume.



Figure 4 – Entrance to fish lift.



Figure 5 – Downstream fish passage pipe exit.



Figure 6 – Spillway and upstream eel ramp (at right).

V. ZONES OF EFFECT AND STANDARDS SELECTED

Two Zones of Effect (ZOE) were designated by the Applicant and were determined to be appropriate. Zone 1 includes the Benton Falls impoundment; Zone 2 includes the tailrace and downstream reach. Table 1 shows the Standards selected for each criterion for the three ZOE. Where applicable, reviewer recommendations for alternate standards are shown in **red**.

Table 1. Standards Matrix for the Benton Falls Project.

Zone:		1: Impoundment Reach	2: Downstream Reach
River Mile Extent:		RM 6.6 – 5.3	RM 5.3 – 5.2
Criterion		Standard Selected	
<i>A</i>	<i>Ecological Flows</i>	2	2
<i>B</i>	<i>Water Quality</i>	2, 3	2, 3
<i>C</i>	<i>Upstream Fish Passage</i>	1	2
<i>D</i>	<i>Downstream Fish Passage</i>	2	1
<i>E</i>	<i>Shoreline and Watershed Protection</i>	1	1
<i>F</i>	<i>Threatened and Endangered Species</i>	2 , 3	2 , 3
<i>G</i>	<i>Cultural and Historic Resources</i>	2	2
<i>H</i>	<i>Recreational Resources</i>	2	2

VI. REGULATORY AND COMPLIANCE STATUS

The Project was issued a license order from the Federal Energy Regulatory Commission (FERC) on March 8, 1984¹. The Maine Department of Environmental Protection (Maine DEP) issued a Water Quality Certificate (WQC) for the operation of the Project on September 29, 1983² which was amended in 2005³. The FERC license initially required an interim minimum flow of 100 cubic feet per second (cfs) from the Project until permanent minimum flows would be established by license article 29. However, following a request submitted by the licensee in 1987, FERC modified the license on May 3, 1988⁴ to remove the minimum flow requirement in lieu of run-of-river operations.

The current LIHI certification was issued effective November 23, 2015 expiring on November

¹ Appendix 1 <https://lowimpacthydro.org/wp-content/uploads/2021/10/BF-LIHI-recertification-application-July-2021-complete.pdf>

² Appendix 3 <https://lowimpacthydro.org/wp-content/uploads/2021/10/BF-LIHI-recertification-application-July-2021-complete.pdf>

³ Appendix 4 <https://lowimpacthydro.org/wp-content/uploads/2021/10/BF-LIHI-recertification-application-July-2021-complete.pdf>

⁴ Appendix 2 <https://lowimpacthydro.org/wp-content/uploads/2021/10/BF-LIHI-recertification-application-July-2021-complete.pdf>

23, 2020. It was subsequently extended three times, most recently to January 15, 2022. The certification includes the following conditions:

- Condition 1. If resource management agencies (Maine Department of Marine Resources, Maine Department of Inland Fisheries and Wildlife, US Fish and Wildlife Service and/or National Marine Fisheries Service) determine that a sufficient number of Atlantic salmon and/or American shad have been passed upstream of the facility, or other appropriate trigger has occurred, the Owner shall conduct fish passage effectiveness studies to demonstrate that Atlantic salmon and/or American shad are being safely passed downstream of the facility during outmigration. The Owner shall notify LIHI within 30 days of when the applicable resource agency(ies) determine that such fish passage effectiveness testing is required. The Owner shall then consult with the agencies in the design and implementation of these studies, allowing the agencies to participate in the testing if they so desire. The Owner shall provide LIHI the testing results along with an assessment made by the agencies as to whether or not they find that safe and effective passage is being provided by the current downstream passage methods. This condition can be satisfied by providing LIHI with a copy of the annual Fish and Eel Passage Facility Operating Report and Proposed Operating Plan, as long as appropriate data and agency positions regarding fish passage are contained in that report.
- Condition 2. As part of the Annual Compliance statement to LIHI, the Owner should include documentation of ongoing consultation with National Marine Fisheries Service regarding Atlantic salmon pursuant to the Endangered Species Act. The schedule for these ESA consultations shall be set through agreement of the Owner and NMFS. LIHI shall be notified of this schedule within 30 days of its establishment. LIHI shall also be provided a copy of any studies or authorizations issued during the course of this certification period on this issue.
- Condition 3. To contribute to water quality management on the lower Sebasticook River, the owner shall implement a Maine DEP-approved water quality sampling plan that evaluates the role of Benton Falls dam and impoundment in the nonattainment status of the river and report back to LIHI and Maine DEP on the findings. In addition to new water quality data, the Owner shall describe other point-source discharges in the vicinity of the facility to provide context for the facility's potential effects. The owner shall obtain a letter from Maine DEP on their assessment of whether or not the Benton Falls facility is the cause of the nonattainment status, and submit that letter to LIHI within 30 days of its receipt

Regarding Condition 1, resource agencies determined that shad passage effectiveness studies could be suspended in 2017 and no requests to resume those studies has occurred, while Atlantic salmon downstream effectiveness studies are partially dependent upon Condition 2. Regarding Condition 2, the Applicant has submitted a draft Biological Assessment to FERC that was developed in consultation with NMFS and requested that FERC initiate formal consultation with NMFS in light of the filed-Biological Assessment and conducted a desktop salmon smolt survival study. Condition 3 was deemed satisfied in 2017 with submittal of Maine-DEP's determination that the Project does not cause or contribute to non-attainment of state water

quality standards based on the monitoring that was conducted.

VII. PUBLIC COMMENT RECEIVED OR SOLICITED BY LIHI

The application was posted for public comment on October 5, 2021 and the notice was forwarded to agencies and stakeholders listed in the application. The deadline for submission of comments was December 4, 2021. No formal comments were submitted. Based on the completeness of the application and documents available on the FERC eLibrary, I did not need to contact resource agencies.

VIII. DETAILED CRITERIA REVIEW

A. ECOLOGICAL FLOW REGIMES

Goal: The flow regimes in riverine reaches that are affected by the facility support habitat and other conditions suitable for healthy fish and wildlife resources.

Assessment of Criterion Passage: The Applicant correctly selected Standard A-2, Agency Recommendation for both zones.

The Sebasticook River basin has a drainage area of 975 square miles and is the largest sub-basin of the Kennebec River system. At the dam, the basin drains an area of approximately 860 square miles. The normal impoundment elevation is maintained at 85 feet msl with a surface area of 83 acres.

The Project operates in a run-of-river mode to, in part, minimize impoundment water surface elevation (WSE) fluctuations. Impoundment WSE is measured continuously with pressure sensors deployed in the impoundment and gate settings are documented as needed (i.e., if there is a change in gate settings). Impoundment water levels are logged at fifteen-minute intervals using a pressure sensor. Project operations are modified as needed (modifying flow through a turbine or over the spillway) to maintain this set impoundment elevation so that water flow through the Project matches water inflow into the reservoir. Pond level does exceed normal elevation during extreme high flow events if hydraulic capacity of the units and spillway are exceeded.

The Applicant notes in its supplemental information filed with LIHI in response to the Stage 1 Review, that any modification to typical operations that require a drawdown of the impoundment are done according to FERC license requirements. A planned drawdown for any maintenance or repair work requires at least 30-day notice to FERC with prior consultation with appropriate resource agencies. Emergency drawdown requires notification to FERC and appropriate agencies.

Article 29 of the FERC license originally required the licensee to develop a study plan to determine minimum flow releases in consultation with state and federal resource agencies.

Article 28 required that in the interim, the licensee should release 100 cfs from the Project. In its February 11, 1987 Order Approving Minimum Flow Releases, FERC modified Article 29 to require a minimum flow of 350 cfs and development of a ramping rate plan. Subsequently, the licensee requested to amend Article 29 to remove the minimum flow and ramping rate plan requirement in lieu of requiring run-of-river operation, citing that this operating protocol is more economically efficient and environmentally beneficial. FERC granted the amendment request on May 3, 1988 with the additional requirement to develop a run-of-river monitoring plan. The run-of-river monitoring plan was submitted to FERC on June 10, 1988 and approved on September 9, 1988.

A review of the FERC eLibrary and the annual compliance filing to LIHI indicated that no issues related to run-of-river operations have occurred during the previous certification period.

Based on my review of the application, supporting documentation, and publicly available information, the Project is operated in a manner such that it does not adversely affect fish and wildlife resources under its limited flow regime. As such, the Project continues to satisfy the Ecological Flow Regimes criterion.

B. WATER QUALITY

Goal: Water Quality is protected in waterbodies directly affected by the facility, including downstream reaches, bypassed reaches, and impoundments above dams and diversions.

Assessment of Criterion Passage: The Applicant selected Standard B-2, Agency Recommendation for both zones. This review finds that Standard B-3 is more appropriate as discussed below.

In 1983, the Maine Department of Environmental Protection (Maine DEP) issued a 401 water quality certificate with a finding that the Benton Falls Project did not negatively impact water quality. The 401 water quality certificate was amended in 2005 to update the fish passage requirement.

The entire Sebasticook River, from the confluence of the East Branch and West Branch to its confluence with the Kennebec River is designated as Class C by Maine DEP. Class C waters are of such quality that they are suitable for the designated uses of drinking water supply after treatment; fishing; recreation in and on the water; industrial process and cooling water supply; hydroelectric power generation; navigation; and as habitat for fish and other aquatic life. Water quality standards for Class C waters include:

- Dissolved oxygen may not be less than 6.5 parts per million as a 30-day average based upon a temperature of 24 degrees centigrade or the ambient temperature of the water body, whichever is less.
- Between April 15th and October 31st, the number of *Escherichia coli* bacteria in Class C waters may not exceed a geometric mean of 100 colony forming units (CFU) per 100 milliliters over a 90-day interval or 236 CFU per 100 milliliters in more than 10% of the samples in any 90-day interval.

Article 27 of the FERC license required the licensee to file a report following consultation with the resource agencies, on the results of a 5-year water quality monitoring study (1988 to 1992). The water quality monitoring included the annual collection of dissolved oxygen (DO), turbidity, and chlorophyll-a from June 15 through September 15, in the impoundment immediately upstream of the turbine intakes, downstream of the dam in the tailrace area, and approximately 1,000 feet downstream from the toe of the dam. During the monitoring period, DO typically decreased due to algal blooms which usually would occur at flows less than 400 cfs. However, DO never decreased below the State standard. FERC approved the report on November 10, 1993.

The Sebasticook River from Burnham Bridge (which is approximately 14 miles upstream of Benton Falls Dam) downstream to the Kennebec River confluence is listed in Maine DEP's most recent Integrated Water Quality Monitoring and Assessment Report⁵ as impaired due to dioxin concentration, DO concentration, and PCBs. The report notes that the DO impairment is likely due to the Benton Falls impoundment, which would be a good candidate for monitoring to confirm or reject continued DO impairment.

As noted in the previous LIHI Recertification Report, the project owner was informed of this potential impact of the impoundment on DO and began working with Maine DEP to conduct water quality testing during low flow conditions. Condition 3 of the previous LIHI certification required that the Benton Falls Project conduct water quality sampling in consultation with Maine DEP to verify that the Project does not cause or contribute to violations of Maine water quality standards. This testing included both upstream and downstream monitoring of dissolved oxygen concentrations using data sondes deployed during 7Q10 low flow conditions. Additionally, biweekly vertical profile sampling and grab samples were collected from June through October 2016. Maine DEP was consulted regularly for input regarding sampling locations and frequencies. The study report concluded that the Benton Falls dam is not causing or contributing to state water quality standards violations. However, Maine DEP was not satisfied with the data trends recorded by the downstream sonde and the way the instrument was calibrated during deployment. In 2017 Maine DEP approved a truncated version of the 2016 field work to provide additional context for evaluation. DO and water temperature samples were collected from the impoundment, tailrace, and upstream of the impoundment in July and August and submitted to Maine DEP in September. Based on its review of the data, Maine DEP concluded that the Project does not cause or contribute to non-attainment of the State's water quality standards.

The consistent impoundment levels and run-of-river operations minimize Project impacts on water quality. A review of the FERC eLibrary and the Applicant's annual compliance letters to LIHI, indicated that no issues related to water quality have occurred during the previous LIHI certification period.

Based on my review of the application, supporting documentation, and publicly available information, the Project does not appear to impact water quality in the river and therefore continues to satisfy the Water Quality criterion.

⁵ https://www.maine.gov/dep/water/monitoring/305b/2016/28-Feb-2018_2016-ME-IntegratedREPORT.pdf

C. UPSTREAM FISH PASSAGE

Goal: The facility allows for the safe, timely, and effective upstream passage of migratory fish. This criterion is intended to ensure that migratory species can successfully complete their life cycles and maintain healthy populations in areas affected by the facility.

Assessment of Criterion Passage: The Applicant appropriately selected Standard C-1, Not Applicable/De Minimis Effect for the impoundment zone and Standard C-2, Agency Recommendation for the downstream zone.

The Project waters support a mix of coldwater and warmwater fish species. The Applicant notes in its supplemental information filed with LIHI in response to the Stage 1 Review, that migratory fish species observed at the Project include alewife, blueback herring, American shad, American eel, striped bass, sea lamprey, and Atlantic salmon.

There are no barriers to upstream fish passage in the impoundment zone. As such, this review finds that Standard C-1, Not Applicable/De Minimis Effect is appropriate for this zone of effect.

Fish passage facilities were required at the Project per the FERC License, the WQC, and the 1998 Lower Kennebec River Comprehensive Hydropower Settlement Accord between state and federal agencies, stakeholders, and Kennebec Hydro Developers Group (the 1998 KHDG Agreement)⁶ which was related to removal of the Edwards Dam and fish passage at several projects owned at that time by KHDG, including Benton Falls. By letter dated June 23, 2004, Maine Department of Marine Resources (Maine DMR) informed the Project owner that the conditions in the 1998 KHDG Agreement triggering upstream fish passage were completely met at the Project as of June 13, 2003. On January 3, 2005, the Applicant filed functional design drawing with FERC for the permanent upstream passage facilities. The design drawings were developed in consultation with state and federal resource agencies and approved by FERC on January 24, 2005. Beginning in 2006 and each year after, the Applicant has filed annual reports with FERC that summarize the fish passage facility operation of the previous year and the proposed passage facility operation for the next year. During the development of each report, the Applicant consults with US Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), Maine DEP, Maine DMR, and Maine Department of Inland Fisheries & Wildlife (Maine DIFW) for feedback.

Upstream eel passage consists of a ramp located at the eastern side of the concrete spillway at the dam (Figure 6). Attraction and transport water is supplied from an approximately 15 gallon per minute pump discharging through a spray bar located at the extreme upstream end of the ramp. In 2021, 34,067 eels were counted in the upstream passage facility. Since the previous LIHI certification in 2015, an average of 9,283 eels have passed upstream of the dam annually. As noted in the Project's 2020 Fish and Eel Passage Facility Operating Report and 2021 Proposed Operating Plan, Maine DMR informed the Applicant that a portion of the ledge along the base of the spillway has been altered, which makes it difficult for eels to climb from the tailrace to the eastern part of the spillway where the upstream eel passage is located. The Applicant responded to a LIHI staff inquiry stating that they did not alter the ledge and at a 2021 site visit the matter

⁶ https://elibrary.ferc.gov/eLibrary/filelist?accession_number=19980529-0382&optimized=false

was discussed with Maine DMR and they said they now thought this was no longer as big a concern as they once thought. Eel returns improved dramatically in 2021 over the seven prior years (Table 2).

Table 2. Summary of annual American eels observed in the eel ramp at Benton Falls.

Year	Number of Eels Passed
2011	34,980
2012	206,040
2013	97,481
2014	33,554
2015	13,263
2016	5,271
2017	7,282
2018	758
2019	3,037
2020	1,304
2021	34,067

Construction of the permanent fish lift facility at the Project commenced in July 2005 and the facility became operational May 1, 2006. The upstream fish passage facility (Figures 3, and 4) consists of an elevator designed to pass alewives, American shad, and Atlantic salmon. The fish passage system consists of an automatically adjusted entrance gate, a horizontally moving crowder system, a separation screen, a single hopper, an adjustable exit flume trip gate system, an elevated exit flume to the impoundment equipped with a viewing window, fish counter, and blockage screens, a downstream migrant bypass pipe to the tailrace, attraction flow piping, and a video monitoring system. The fish lift contains a 600-gallon hopper that operates on a minimum cycle time of approximately seven minutes. A total attraction flow of up to 60 cfs can be provided at the entrance gate with 30 cfs through the exit flume and 30 cfs through gravity flow piping from the impoundment.

In 2020, 2,847,171 river herring, 10 American shad, 22 striped bass, and 12 sea lamprey were observed using the fish lift. No Atlantic salmon were passed in 2020. The most recent Atlantic salmon counts at the Project are 4 fish in 2009 and 1 in 2013. Average annual counts from 2015 to 2020 include 3.5 million river herring, 282 American shad (although most years were under 100, while 1,447 shad were counted in 2015), 102 striped bass, and 14 sea lamprey. In both 2016 and 2018 a single landlocked salmon passed upstream.

As discussed in more detail below in Section F. Threatened and Endangered Species, the Applicant has been consulting with NMFS regarding Atlantic salmon and Atlantic sturgeon and collaboratively developed a draft Biological Assessment (BA) and proposed Species Protection Plan (SPP) to protect both species. The Draft BA and SPP were filed with FERC on November 30, 2021. The purpose of the BA is to determine the potential effects of operating the Project and associated fish passage facilities on the Gulf of Maine Distinct Population Segment of Atlantic salmon. Since the fish lift began operating in 2006, a total of five salmon have been passed upstream, four in 2009 and one in 2013. No shortnose sturgeon or Atlantic sturgeon have

been observed by the Applicant in the vicinity of Benton Falls dam.

A review of the FERC eLibrary and the annual compliance filing to LIHI indicated that no issues related to upstream fish passage have occurred during the previous LIHI certification period.

The project is in compliance with its passage requirements and no changes have been sought by agencies. Based on this, and on my review of the application, supporting documentation, and publicly available information, the Project provides adequate upstream passage and continues to satisfy the Upstream Fish Passage criterion.

D. DOWNSTREAM FISH PASSAGE AND PROTECTION

Goal: The facility allows for the safe, timely, and effective downstream passage of migratory fish. For riverine (resident) fish, the facility minimizes loss of fish from reservoirs and upstream river reaches affected by Facility operations. Migratory species are able to successfully complete their life cycles and maintain healthy populations in the areas affected by the Facility.

Assessment of Criterion Passage: The Applicant appropriately selected Standard D-2, Agency Recommendation for the Impoundment zone and Standard D-1, Not Applicable/De Minimis Effect for the Downstream Reach Zone.

The Applicant notes in its supplemental information filed with LIHI in response to the Stage 1 Review, that resident fish species observed at the Project include smallmouth bass, largemouth bass, white sucker, white perch, yellow perch, pumpkinseed sunfish, redbreasted sunfish, splake, brook trout, fallfish, black crappie, brown trout, landlocked salmon, brown bullhead, carp, northern pike, golden shiner, common shiner, creek chub, and white catfish.

The potential for entrainment of both migratory and residential species that wander near the Project intakes is minimized by trashrack overlays. A hinged overlay made of grating bars with 1-inch clear spacing is installed over the intake for Unit #1 by September 1 and is raised for storage on December 1. Unit #2 has permanent trashracks with 1-inch clear spacing. In December 2017, the Applicant conducted a desktop passage survival study for Atlantic salmon smolts. The report concluded that there is a high probability of smolt survival through all routes (i.e., turbines, fishway, and spill gates) based on the configuration of the Kaplan turbine units, the configuration of the spill gates, and the opportunity for salmon to be routed through the downstream fishway. Whole-station survival of smolts was predicted to range from 90.3 to 96.5 percent depending on operations and river flow conditions.

The downstream fish passage facility (Figure 5) is designed to pass all species and consists of a surface bypass system (two 3-foot wide intakes leading to transition chamber and then a 24-inch bypass pipe with a total capacity of 30 cfs). In addition to the downstream passage facility, American eel may pass downstream over the spillway or through the Project's gates. During the eel downstream migratory season from 2015 through 2020, the Applicant raked the trashracks on a daily basis or any time trash began to build up. In most years, no eels are retrieved during raking but in both 2015 and 2019, two eels each were collected, and Maine DMR was notified. In the 2020 annual passage report the Applicant stated that for the 2021 downstream passage

season, they collaborated with Maine DMR to monitor the movement of eels downstream from September 1 through October 31. A DIDSON Sonar was installed above the downstream surface passage and operated nightly to 1) record eel movement through the surface passage, and 2) identify if eels are passing through or becoming impinged on the trash racks. Following the downstream passage season, the video recordings will be reviewed by the Applicant and Maine DMR staff to determine if further downstream eel passage effectiveness testing is warranted.

Benton Falls is required to conduct effectiveness studies of downstream passage facilities at the project for alewives, Atlantic salmon, and American shad. In 2016, the Applicant, Maine DMR, NMFS and USFWS agreed to suspend testing of shad downstream passage effectiveness testing with the condition that the Applicant consult with each agency annually to determine if shad passage effectiveness testing should be restarted. Passage counts in 2019 were two to three times higher than previous years, however in 2020 counts were lower than in any other year. Currently, there are no plans to restart shad effectiveness studies. Similarly, there are no plans for Atlantic salmon effectiveness studies due to their extremely low abundance at the Project. An alewife effectiveness test was conducted as part of the fish passage facility commissioning, and the application states that the effectiveness of the facility to pass alewives is demonstrated by the increasing passage counts (Table 3).

Table 3. Summary of annual river herring observed in the upstream fish lift at Benton Falls.

Year	Upstream River Herring Passage Count
2015	2,157,983
2016	3,183,034
2017	3,547,091
2018	5,579,901
2019	3,493,855
2020	2,847,171

Standard D-1 is appropriate for the downstream zone because once in this zone there are no Project-related barriers to further downstream movement.

A review of the FERC eLibrary and the annual compliance filing to LIHI indicated that no issues related to downstream fish passage have occurred during the previous LIHI certification period.

Based on my review of the application, supporting documentation, and publicly available information, the Project provides adequately protective downstream passage and continues to satisfy the Downstream Fish Passage and Protection criterion.

E. SHORELINE AND WATERSHED PROTECTION

Goal: The Facility has demonstrated that enough action has been taken to protect, mitigate and enhance the condition of soils, vegetation and ecosystem functions on shoreline and watershed lands associated with the facility.

Assessment of Criterion Passage: The Applicant appropriately selected Standard E-1, Not Applicable/De Minimis Effect for both zones.

The FERC Project boundary covers approximately 27 acres of land and approximately 84 acres of water. The Project has a gross reservoir volume of 953 acre-feet. Benton Village and Benton Falls sit in a broad valley cut through deep marine and lacustrine deposits of gravel, sand, silt, and clay surficial deposits. The generally flat or gently rolling topography of the valley is cut by the steep gully banks of the Sebasticook River. The steep banks and riverbed include prominent outcrops, which periodically resurface upstream to the upper end of the project's pool. The Sebasticook River is bordered on both shores by bands of relatively steep (8 to 15 percent slope) silty loam. Land use surrounding the Project area includes agricultural and residential with limited small commercial uses. There are no lands of ecological significance.

The Project is not required to have, nor does it have a shoreline management or similar plan. The run-of-river operations and consistent impoundment water surface elevations minimize the potential for the Project to negatively affect the shoreline.

A review of the FERC eLibrary indicated that no issues related to shoreline and watershed protection have occurred during the previous LIHI certification period.

Based on my review of the application, supporting documentation, and publicly available information, the Project's operations sufficiently protect shoreline and watershed lands. Therefore, the Project continues to satisfy the Shoreline and Watershed Protection criterion.

F. THREATENED AND ENDANGERED SPECIES PROTECTION

Goal: The facility does not negatively impact federal or state listed species.

Assessment of Criterion Passage: The Applicant selected Standard F-2, Finding of No Negative Effect, for both zones. However, for reasons discussed below this review finds that Standard F-3, Recovery Planning and Action is more appropriate for both zones.

A USFWS IPaC report generated by the Applicant, included the federally-endangered Atlantic salmon and the federally-threatened Northern long-eared bat. No critical habitat is present for either species in the Project area. Critical habitat for Atlantic salmon is designated in the mainstem Kennebec River both upstream and downstream of the Sebasticook River confluence, but the designation does not extend into the Sebasticook River.

As noted above, only 5 Atlantic salmon have passed upstream of the Project in the past 15 years, and none have passed since 2013. Additionally, no shortnose sturgeon (federally endangered) or Atlantic sturgeon (federally threatened in the Gulf of Maine) have been observed in the vicinity of Benton Falls dam by the Applicant. Based on the possibility of Atlantic salmon passing upstream at the Project in the future, the Applicant met with NMFS in June of 2017 to discuss and outline the process for obtaining a take permit for Atlantic salmon under Section 7 of the Endangered Species Act (ESA). Given the extremely low population of Atlantic salmon present at the dam, NMFS did not recommend salmon passage efficiency testing as part of the Section 7

process. Instead, they requested that the Applicant prepare a desktop survival estimate of salmon entrainment through the Project. As discussed above, the report concluded that there is a high probability of salmon smolt survival through all routes⁷. In December 2017, the Applicant prepared a draft BA and SPP that contained the requested survival estimates and submitted these to NMFS for review. NMFS provided feedback on both documents in 2018 and in June of 2019. This feedback led to changes to the draft documents. The Draft BA and SPP were filed with FERC on November 30, 2021⁸. The purpose of the BA is to determine the potential effects of operating the Project and associated fish passage facilities on the Gulf of Maine Distinct Population Segment of Atlantic Salmon.

The Atlantic Salmon Species Protection Plan contains measures that were developed to avoid and minimize adverse effects of Project operation on the species. Current salmon protective measures that the Applicant employs include providing upstream and downstream passage, run-of-river operations, maintaining instream flows, and implementing debris management measures. The following proposed protection measures were developed by the Applicant in consultation with the resource agencies, and were considered to be the most appropriate measures to protect and enhance Atlantic salmon in the Sebasticook River:

- **Modify fishway and project operation** – (1) if any Atlantic salmon are encountered at the Project, hourly operation of the fish lift shall be changed to an increased frequency of 20 minutes and maintained for one month following the last salmon encountered or until river water temperature reaches 24°C, whichever comes first. Increased lift frequency may be discontinued if advised by NMFS or other relevant resource agencies. (2) if 40 Atlantic salmon are observed passing upstream in two consecutive years, site-specific salmon adult upstream and kelt passage studies (telemetry) will be performed. After the first year of 40 Atlantic salmon passing upstream at the Project, the Applicant will begin planning studies in consultation with NMFS and other relevant agency staff. (3) implement the NMFS-recommended operational changes if two or more salmon pass upstream of the Project in a given passage season.
- **Adult salmon passage studies** - similar to the upstream site-specific studies, site-specific downstream salmon smolt passage studies will be conducted two years following the successful upstream passage of two or more salmon. The applicant will consult with resource agencies to develop a study plan once two salmon are passed upstream.

The Shortnose and Atlantic Sturgeon Species Protection Plan states that should any sturgeon be observed entering the fishway, the Applicant shall implement the procedures and reporting requirements outlined below:

- If a sturgeon is observed inside the hopper or entering the hopper before it is lifted, suspend lift operation and observe the sturgeon until it exits the hopper.
- If a sturgeon is observed in the flume of the fishway, immediately contact Maine DMR to remove the fish from the flume with a long-handled net outfitted with non-abrasive knotless mesh used to place the sturgeon back into the river downstream of the dam.

⁷ https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20211130-5109&optimized=false

⁸ https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20211130-5109&optimized=false

This net will be kept onsite at the project. The flume has a screen at the exit, which has 1-inch clear spaced bars which would prevent sturgeon from exiting the flume and passing upstream.

- If any injured sturgeon are found in the fishway, immediately report to NMFS and Maine DMR. Injured fish must be photographed if possible. If the fish is badly injured, the fish should be retained by the Applicant, if possible, until notified by NMFS with instructions for potential rehabilitation.
- If any dead sturgeon are found in the fishway, immediately report to NMFS. Specimens should be stored in a refrigerator or freezer by the Applicant until they can be collected by NMFS for analysis.

By email dated July 19, 2021, Maine DIFW provided the Applicant with a list of state-listed Threatened and Endangered species, and Species of Special Concern that have been documented in the general vicinity of the Project. The list includes three state-threatened mussel species: brook floater, tidewater mucket, and yellow lampmussel, and eight bat species that likely occur in the Project area during migration and/or breeding season: little brown bat (endangered), northern long-eared bat (endangered), eastern small-footed bat (threatened), and five special concern species: big brown bat, red bat, hoary bat, silver-haired bat, and tri-colored bat. Hydropower projects can negatively impact mussels through erosion and sedimentation and desiccation and asphyxiation via stranding. The potential for the Benton Falls Project to have these impacts is minimized by the run-of-river operations that ensure inflow equals outflow and shoreline erosion is minimized by relatively stable water levels. Impacts to the state listed bats would be minimized by adherence to the US Fish and Wildlife Service 4(d) rule should any tree cutting be needed.

Based on my review of the application, supporting documentation, and publicly available information, the Project complies with requirements under the SPP and is unlikely to affect other listed species, and continues to satisfy the Threatened and Endangered Species criterion.

G. CULTURAL AND HISTORIC RESOURCE PROTECTION

Goal: The facility does not unnecessarily impact cultural or historic resources that are associated with the Facility's lands and waters, including resources important to local indigenous populations, such as Native Americans.

Assessment of Criterion Passage: The Applicant appropriately selected Standard G-2, Approved Plan, for both zones.

Article 30 of the FERC license required the completion of a cultural resources evaluation to establish the significance of sites potentially eligible for listing on the National Register of Historic Places, and preparation of a cultural resources management plan that would assess any impacts to the sites and present measures to avoid or mitigate these impacts. As stated in the FERC license and the July 2021 application for LIHI recertification, the provisions of article 30 were motivated by the discovery of six archeological sites within the Project boundary in 1981.

Long term monitoring of erosion at archeological site 52.34 was conducted from 1988 to 2008

and detected no significant erosional damage to this site. Subsequently, by letter dated November 22, 2010, the Maine Historic Preservation Commission stated that “Benton Falls Associates have discharged all responsibilities concerning archeological sites around the Benton Falls impoundment stemming from the Benton Falls FERC license.” The recertification application states that this finding completed all required monitoring for archeological sites.

A review of the FERC eLibrary and the annual compliance filing to LIHI indicated that no issues related to cultural or historic resources have occurred during the previous LIHI certification period.

Based on a review of the application, supporting documentation, and publicly available information, the Project has satisfied its monitoring requirements, run-of-river operations are unlikely to affect cultural or historic resources, and the Project continues to satisfy the Cultural and Historic Resource Protection criterion.

H. RECREATIONAL RESOURCES

Goal: The facility accommodates recreation activities on lands and waters controlled by the facility and provides recreational access to its associated lands and waters without fee or charge.

Assessment of Criterion Passage: The Applicant appropriately selected Standard H-2, Agency Recommendations for both zones.

No fee is charged for public access to recreational facilities at the Project per Standard License Article 18. The Project’s recreation plan (“Exhibit R”) was approved concurrent with the FERC license. There is relatively minor recreational use at the Project. The licensee provides for canoe portage along the east bank of the Sebasticook River along with 1.6 acres of land for fishing and boat launching access (provided at the impoundment canoe takeout). The last FERC environmental inspection occurred in 2006 and concluded that all facilities were intact, functional and in compliance with requirements, and no follow up was needed.

A review of the FERC eLibrary indicated that no issues related to recreation have occurred during the previous LIHI certification period.

Based on my review of the application, supporting documentation, and publicly available information, the Project continues to satisfy the Recreational Resources criterion.

IX. GENERAL CONCLUSIONS AND REVIEWER RECOMMENDATION

Based on my review, I believe that the Project continues to meet the requirements of Low Impact Certification and recommend it be recertified for a five-year period with continuation of the current Condition 1 as modified below.

Condition 1: The facility Owner shall design and conduct downstream passage effectiveness studies if requested by, and in consultation with the resource agencies. Along with annual compliance statements, the facility Owner shall submit copies of the annual Fish and Eel Passage

Facility Operating Report and Proposed Operating Plan and if applicable, any plans, schedules, and reports including agency comments for any downstream passage studies that are conducted.