REVIEW OF APPLICATION FOR CERTIFICATION BY THE LOW IMPACT HYDROPOWER INSTITUTE OF THE BONNY EAGLE HYDROELECTRIC FACILITY

Prepared by Patricia McIlvaine
June 28, 2021

I. INTRODUCTION

This report reviews the certification application submitted by Brookfield White Pine Hydro, LLC (BWPH), an affiliate of Brookfield Renewable (Brookfield), for the Bonny Eagle Project (Project), licensed by the Federal Energy Regulatory Commission (FERC) as Project No. 2529. In March 2013, Brookfield Renewable purchased FPLE Maine Hydro LLC, licensee for the Project, from NextEra Energy Maine Operating Services LLC[1]. The Bonny Eagle Project is a 7.2-MW hydroelectric generating facility located on the Saco River, in York and Cumberland counties, Maine. The Project operates as run-of-river[2] for three months of the year and as a peaking project for the remaining nine months.

II. PROJECT'S GEOGRAPHIC LOCATION

The Saco River is located in northeastern New Hampshire and southwestern Maine. It drains a rural area of 1,703 square miles of forests and farmland, emptying into the Atlantic Ocean at Saco Bay, 136 miles from its source. The Project is located approximately 21.0 river miles above the head-of-tide at Saco and 26 miles from the mouth of the river at Camp Ellis/Hills Beach. The river passes through the Project area in a generally northwest to southeast direction. The Bonny Eagle Project is the fifth most upstream of seven hydroelectric projects located on the main stem of the Saco River. BWPH owns all but the Swans Falls Project, which is owned Saco River Hydro LLC.

The two Bonny Eagle Project dams and generating station are located in the Towns of Hollis and Standish, with the tailrace extending into the Town of Buxton. The impoundment is located in the Towns of Hollis, Standish and Limington. Figure 1 shows the location of the Project and other dams in the river basin. The following table shows pertinent data for these seven projects.

Project	FERC #	River Mile	Upstream Passage Installed or Year Planned		Downstream Passage Installed or Year Planned	
			Fish	Eel	Fish	Eel
Swans Falls	11365	85.2	Assumed none at this FERC Exemption Project			
Hiram	2530	46	2032	2025	no	2032
Bonny Eagle	2529	26	2029	yes	yes	2030
West Buxton	2531	24	2027	yes	yes	2028
Bar Mills	2194	20	2025	yes	yes	2026
Skelton	2527	15.6	yes	yes	yes	2024
Cataract[3]	2528	6.3	yes	yes	yes	yes

[1] On July 29, 2013, the name FPL Energy Maine Hydro LLC was changed to Brookfield White Pine Hydro LLC.
[2] The facility operates within one-foot of full pond April 1-June 30 which is considered run-of-river.
[3] Certified by LIHI as Project # 169 effective April 3, 2020.

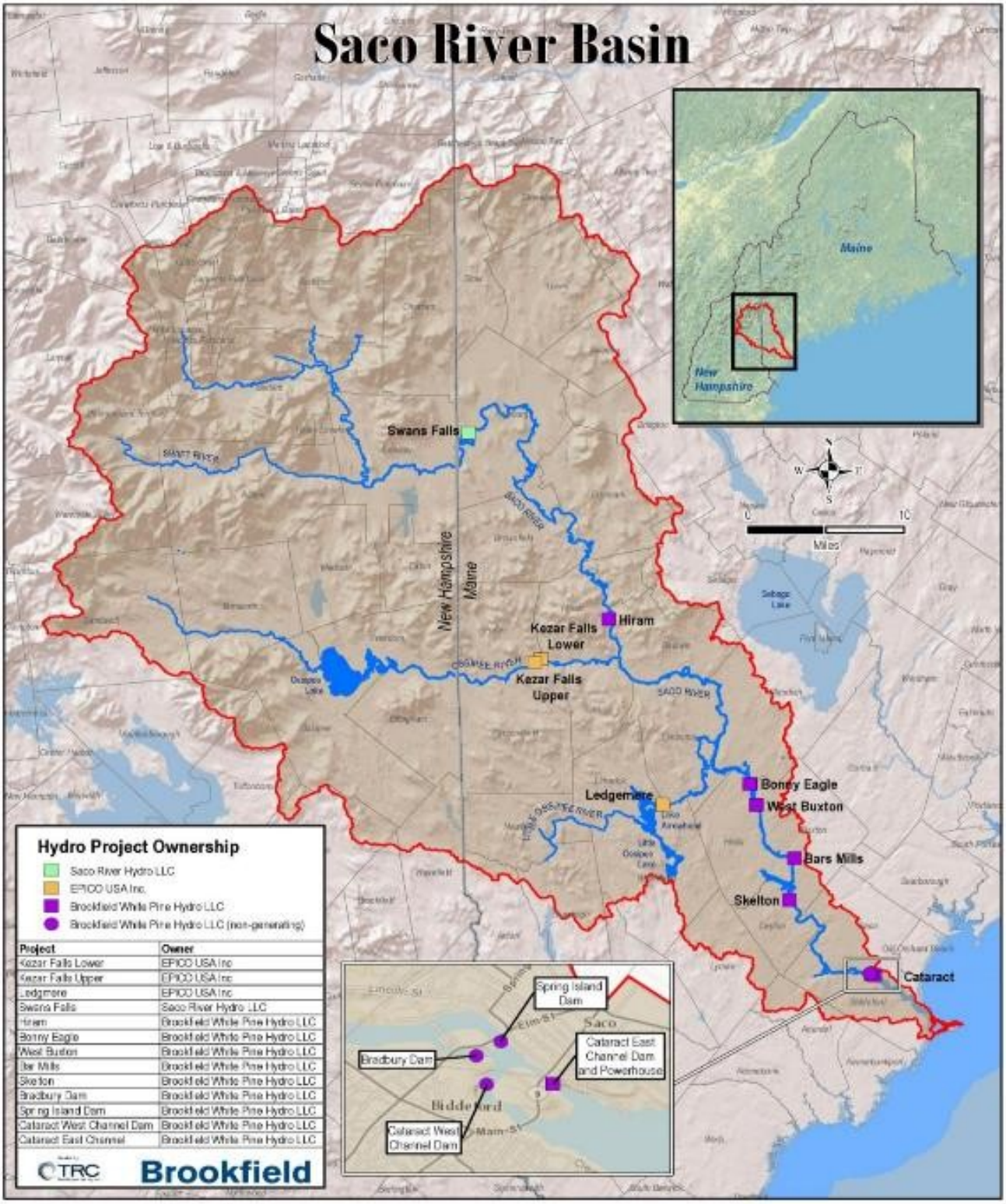


Figure 1 – Location of the Bonny Eagle Project and Upstream and Downstream Dams

III. PROJECT AND IMMEDIATE SITE CHARACTERISTICS

The Project consists of a 350-foot-long diversion dam, a 164-foot-long dam (constituting the intake) and two earth embankments on the main river channel, a powerhouse containing six generating units, a 347-acre impoundment and appurtenant facilities. The diversion dam is located at the so called "New River" channel while the intake and earth dikes are situated in a narrow gorge on the main river channel. A fairly large island (Bonny Eagle Island) separates the two channels, as shown in Figure 2.

Figure 2 - Dam, Powerhouse, Diversion Dam and Bypass Reach (New River Channel)

The "New River" diversion dam has a concrete gravity spillway with a permanent crest at elevation 212 feet, topped with a 4.5-foot-high rubber dam and a minimum flow gate section with a permanent crest at elevation 208 feet with a 9-foot inflatable gate designed to pass a minimum flow of 25 cfs in the new channel river. The main dam is comprised of a 164-foot-long intake structure and sluice, with a top elevation of 225 feet flanked by stone riprapped earth embankments with crest elevations at 228 feet (east shore is 370 feet long and west shore is 250 feet long). Eight penstock entrances are located in the intake with 3/8-inch bar steel trashracks with 2-inch clear spacing. Six of the penstocks serve the main turbine-generator units (two retired penstocks connect to retired pilot exciters). The powerhouse is about 35 feet downstream from the intake. The normal tailwater elevation is 180.6 feet and the tailwater is generally partially backwatered by the downstream West Buxton Project impoundment.

The Project's drainage area is 2,113.5 square miles. The impoundment area at the normal full pond elevation of 216.3 feet is 347 acres, extending upstream approximately 6.6 miles, and is 700 feet wide at the broadest point. The Project boundary generally extends to elevation 218 feet to encompass additional flowage rights. The area occupied by the non-reservoir features is estimated at 45 acres. The usable storage within the normal 4.3-foot operating range of the Project is approximately 1,150 acre-feet.

The Project commenced initial commercial operation in 1955. The LIHI application noted a modeled average annual generation of 44,478 MWh, with an average over the last 5 years of 39,067 MWh. Key features are shown on Figures 3 and 4, Figure 5 shows the Project Boundary.

Figure 3 – Dam, Powerhouse and Tailrace

Figure 4 – Diversion Dam on the New Channel

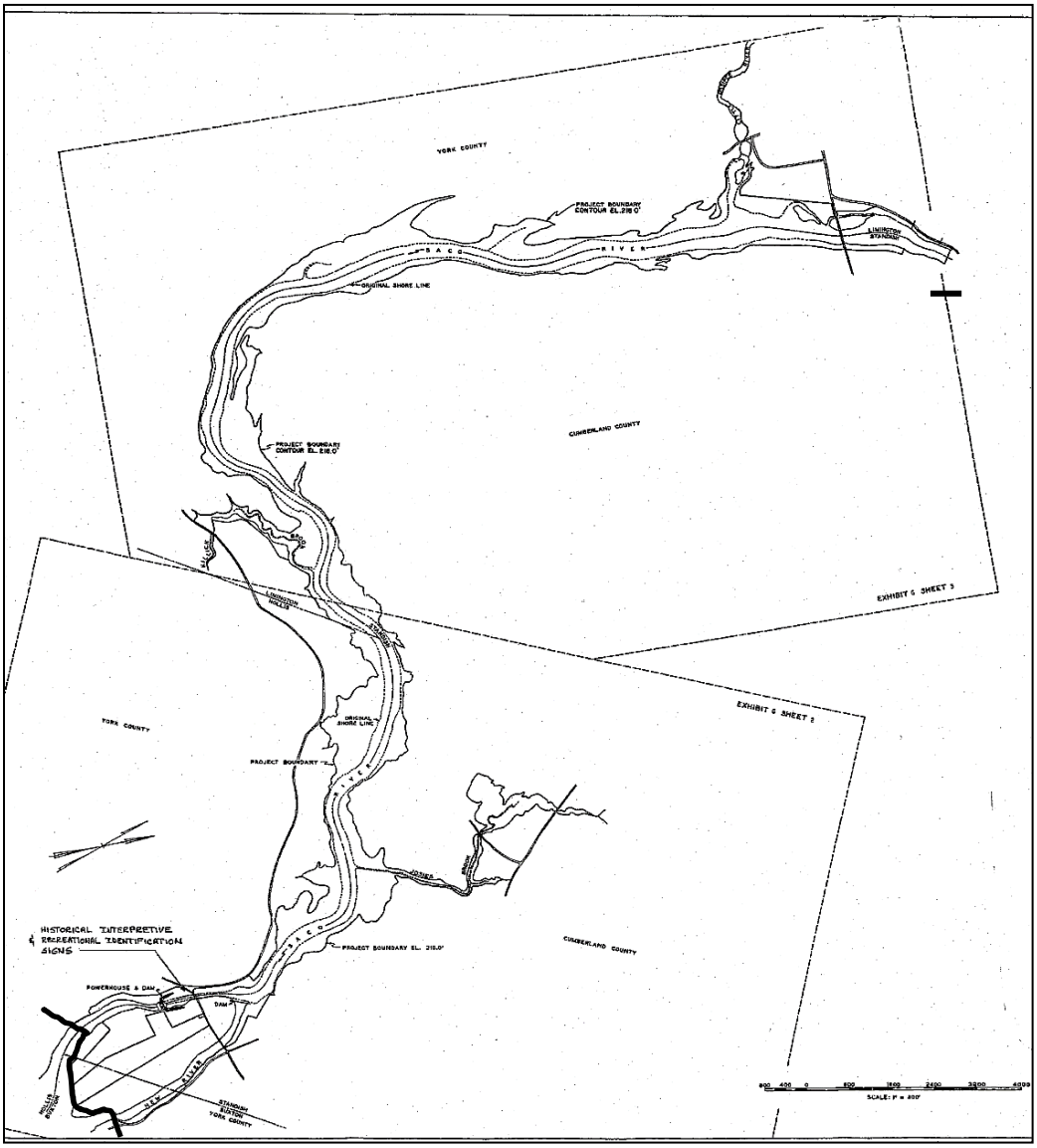


Figure 5 – Project Boundary

IV. ZONES OF EFFECT AND STANDARDS SELECTED

Three Zones of Effect (ZOE), shown on Figure 6, were designated by the Applicant.

- ZOE #1 - Impoundment- River Miles 32.6-26.0
- ZOE #2 - Bypass Reach (New River Channel) - River mile 26.2-25.5:
- ZOE #3 - Tailrace (Main River Stem) – River mile 26-25.5

Table 1 shows the selected Standards. Shown in red are what I believe are better selections as discussed under the *Shoreline and Watershed Protection Criterion*.

Figure 6 – Zones of Effect

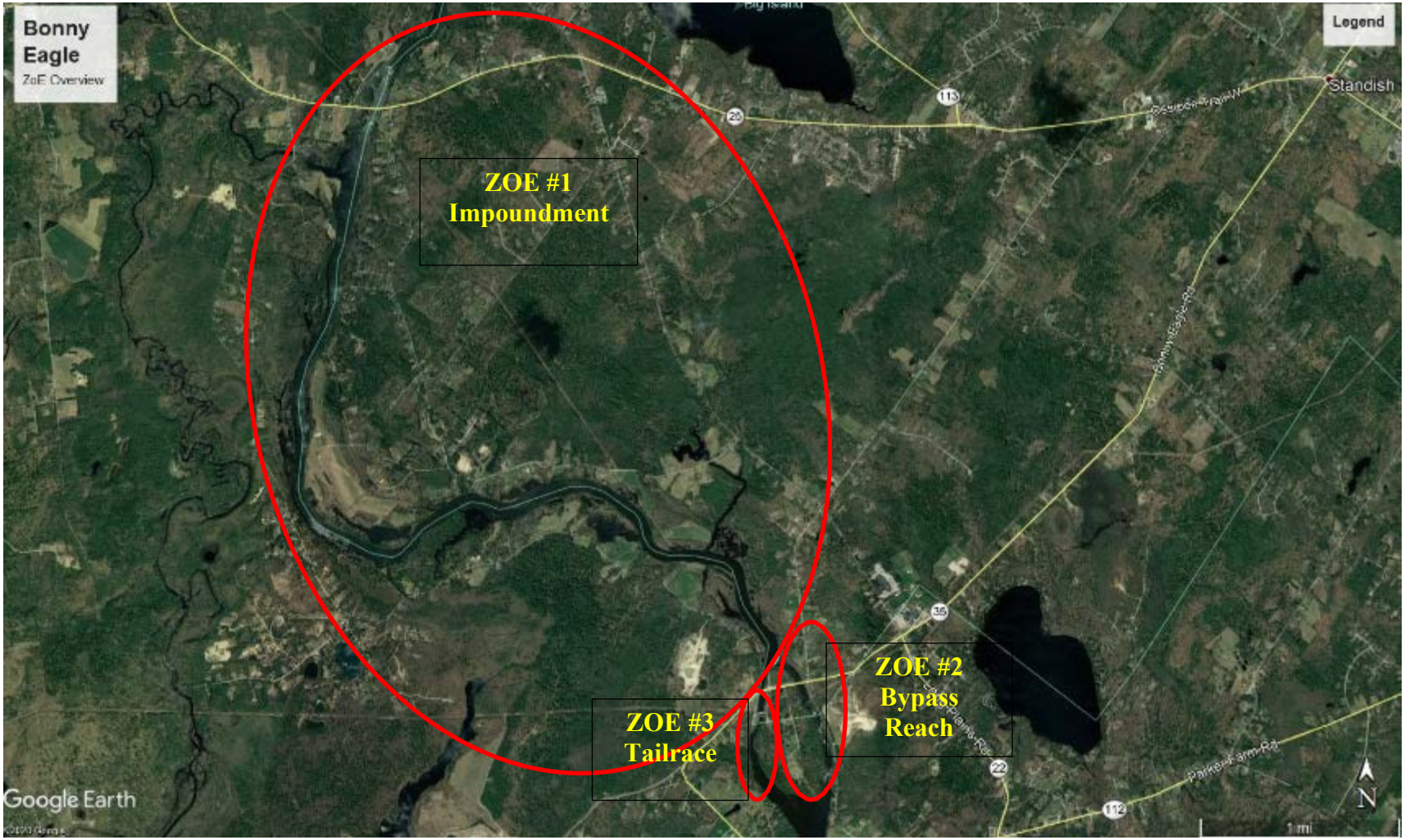


Table 1 – Standards Selected or Recommended

	CRITERION							
Zone	***A***	***B***	***C***	***D***	***E***	***F***	***G***	***H***
	Ecological Flows	**Water Quality**	**Upstream Fish Passage**	**Downstream Fish Passage**	**Shoreline and Watershed Protection**	**Threatened and Endangered Species**	**Cultural and Historic Resources**	**Recreational Resources**
#1 Impoundment	1	2	1	2	2	2	2	2
#2 Bypass Reach (New River Channel)	2	2	2	2	~~2~~ (1)	2	1	1
#3 Tailrace	2	2	2	1	~~2~~ (1)	2	1	2

V. REGULATORY AND COMPLIANCE STATUS

The original FERC license for the Bonny Eagle Project was issued to Central Maine Power (CMP) in 1970 and expired on December 31, 1993. The Project received a new license on February 26, 1998[4], expiring in 2038. A new Water Quality Certificate (WQC) was issued on August 22, 1997 by the Maine Department of Environmental Protection (MDEP)[5]. In 1998, CMP sold the Project and the license transferred to FPL Energy Maine Hydro, (a subsidiary of NextEra Energy Maine Operating Services LLC), which was then purchased by Brookfield Renewable in March 2013. In 2010, an inflatable dam was installed replacing wooden flashboards, resulting in incremental generation gains by improved head pond control and reestablishing the headpond after high flow events in a timelier manner than was previously possible. Approvals for its installation included a June 2, 2010 approval letter from FERC, a MDEP permit dated May 5, 2010, and the Saco River Corridor Commission permit dated April 6, 2010, all included in Appendix A. One turbine was replaced in 2019 but did not require any approvals according to BWHP, as the generation and hydraulic capacities did not change (See Appendix B information from Brookfield).

The Bonny Eagle Project was one of seven hydropower facilities incorporated into the Saco River Fish Passage Agreement (Fish Passage Agreement), established in 1994[6], (modified in 2007[7] and 2019[8]) and the Instream Flow Agreement for the Hydropower Projects on the Saco River (Instream Flow Agreement) in 1997[9]. Both agreements were established by Central Maine Power, the Project owner at the time, during the time of re-licensing of Bonny Eagle. The Fish Passage Agreement was signed by key fishery agencies and fishery-related non-governmental organizations (NGOs), establishing a timeline for sea-run fish passage at all seven hydropower facilities on the river, six of which are owned by Brookfield subsidiaries. The Fish Passage Agreement also requires funding for fishery related benefits as discussed under *Upstream Fish Passage.* The Instream Flow Agreement was also signed by many of the same agencies, along with the MDEP, similar NGOs, and the Cities of Saco and Biddeford. Provisions of both agreements are incorporated into the FERC license and WQC. Specific license and WQC requirements, key license amendments, and provisions of the two agreements are addressed under the applicable criteria.

A review of FERC's eLibrary was conducted for the past ten years. While there were a number of extensions for report filings requested over that period, there were no license violations found. Deviations from flow requirements are discussed under *Ecological Flow Regimes*.

VI. PUBLIC COMMENT RECEIVED OR SOLICITED BY LIHI

The deadline for submission of comments on the LIHI certification application was March 12, 2021 and two comment letters were received, from Maine Department of Marine Resources (MDMR) and the Sebago Chapter of Trout Unlimited (TU), (Appendix A). Comments are discussed under the applicable criteria. No additional stakeholder outreach was needed.

[4] https://elibrary.ferc.gov/eLibrary/filedownload?fileid=8137289
[5] https://elibrary.ferc.gov/eLibrary/filedownload?fileid=8189502
[6] https://elibrary.ferc.gov/eLibrary/filedownload?fileid=10581245
[7] https://elibrary.ferc.gov/eLibrary/filedownload?fileid=11295611
[8] https://elibrary.ferc.gov/eLibrary/filedownload?fileid=15241947
[9] https://elibrary.ferc.gov/eLibrary/filedownload?fileid=8196699

VII. DETAILED CRITERIA REVIEW

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.

A. ECOLOGICAL FLOW REGIME

Assessment of Criterion Passage

The Applicant selected **Standard A-1 Not Applicable/De Minimis Effect** for the impoundment and **A-2 – Agency Recommendation** for the bypass and downstream reach ZOEs. Although given the impoundment restrictions, Standard A-2 would also be appropriate for the impoundment.

The Instream Flow Agreement's provisions for Bonny Eagle were adopted in the WQC and the license as described below in the license:

- Article 401 – requires the following impoundment elevation restrictions:
  a) From April 1 through June 30, no more than one foot below normal full pond elevation when the New River Channel dam flashboards are in place, and no more than one foot below the New River Channel dam spillway crest elevation when the flashboards are not in place; and
  b) From July 1 through March 31, no more than 4.5 feet below the normal full pond elevation when the New River Channel dam flashboards are in place, and no more than 4.5 feet below the New River Channel dam spillway crest when the flashboards are not in place

- Article 402 – requires the following run-of-river and minimum bypass reach flow requirements for the New River channel:
  a) From April l through June 30, operate as run-of-river with outflow approximately equal to inflow, with up to one foot drawdown of the impoundment;
  b) From July 1 through September 30, release an instantaneous minimum flow of 400 cubic feet per second (cfs) or inflow, whichever is less;
  c) From October 1 through November 15, or for an alternate six week period mutually agreed upon by the licensee, the U.S. Fish and Wildlife Service, the Maine Department of Inland Fisheries and Wildlife, the Maine Department of Marine Resources, and the Maine Atlantic Salmon Authority, release an instantaneous minimum flow of 600 cfs or inflow, whichever is less; this fall flow period shall be no less and no more than six weeks except upon mutual agreement among the licensee and fisheries agencies and shall start no sooner than September 1 and no later than October 1;
  d) From November 16 through March 31, release an instantaneous minimum flow of 250 cfs or inflow, whichever is less; and
  e) Year-round, release an instantaneous minimum flow of 25 cfs from the New River Channel dam. This minimum flow to the New River Channel shall be included in the total minimum flows required above.

- Article 403 – required the filing of a plan to monitor compliance with water level and minimum flow requirements.

Instream flow studies were conducted that showed the Project could not sustain the higher flows needed to optimize habitat for all species of interest and that showed conflicting optimal flows for some. Instead, a zone-of-passage study was conducted that suggested passage is available to all species at all flows due to the backwater effects from the downstream West Buxton project (FERC FEIS p. 4-32). This method and resulting seasonal minimum flows were incorporated into the Instream Flow Settlement Agreement including approvals from resource agencies. These flows were then incorporated into the WQC and FERC license. Zone of passage is also codified in Maine's WQ standards chapter 581.5, last amended in 1989 and effectively serves as an agency recommendation.

The 1997 Instream Flow Agreement comprehensively addressed licensing issues relating to instream flows at the mainstem Saco River hydroelectric projects. Among the key objectives of this agreement were to improve habitat for Atlantic salmon, American shad and river herring; to provide an improved zone of passage for anadromous fish; to improve anadromous fish spawning habitat; and to maintain and improve the habitat for resident aquatic life.

The Minimum Flow and Pond Level Monitoring Plan (Flow Plan) was filed on August 27, 1998 and accepted by the FERC on November 19, 1998. It does not appear that it has been updated since, even though the flashboards referenced in the Flow Plan were replaced in 2010 with an automated rubber dam, and the powerhouse is no longer manned 24/7 as flow monitoring is done at a regional facility in Massachusetts[10]. A condition has been recommended to update the Flow Plan to reflect current conditions for review and approval by FERC, and other applicable agencies.

Brookfield's National System Control Center monitors operations including impoundment elevations and flows through the Bonny Eagle Project. Based on information provided in the 1998 Flow Plan linked to the LIHI application, minimum flows to the bypass are released via an automated gate to accommodate the fluctuation of headpond levels to release the required 25 cfs (Figure 7).

[10] Brookfield noted that a roving operator is onsite daily, and staff can be dispatched to the site if necessary.

Figure 7 – Minimum Flow Gate at the Diversion Dam

The generating units provide the remainder of the minimum flows, which are monitored via generation output. Pond level sensors are mounted in front of the trashracks for headpond monitoring. There is no license or WQC high-level water limit at this site. However, the application notes that BWPH does have an administrative operating limit of 218.3 ft. to protect the dike embankment.

Between January 1, 2010 and March 23, 2021, three short-period deviations of license and/or WQC flow requirements occurred, as shown on the following table. Although suspected by FERC, it was confirmed that the fix of the PLC issue causing the June 2020 event was not the cause of the August 2020 event. After the August deviation, FERC advised BWPH that inspection for environmental impacts must be made and the assumption that none occurred due to the short event duration was inappropriate. Review of FERC records indicated that in the ten years before Brookfield took ownership (in 2013) only one event occurred (October 13, 2004) from units tripping due to a nearby substation power failure. While three deviations did occur in the seven years since taking ownership, they were all of short duration and BWPH took prompt corrective actions to remedy them and prevent re-occurrence. Overall, such a limited number of deviations indicates recognition by BWPH of the importance of maintaining flow compliance.

Dates of Deviation	Summary of Event
July 23, 2018	Unit No. 4 tripped offline about midnight causing the river flow to drop from approximately 450 cfs to below the required 400 cfs, for approximately 12 minutes.
June 18, 2020	A 13-minute deviation from the applicable minimum flow requirement of 620 cfs (i.e. the inflow rate at the time) occurred when an operator was transitioning to a different unit for testing purposes when the online unit tripped offline. Agencies were notified of the deviation on June 19th. It was discovered that Unit 6's programmable logic controller (PLC) was set up so that the exciter would trip the unit offline for all alarms rather than just on actual exciter alarms. A PLC change was made to remedy this issue.
August 4, 2020	A 17-minute deviation from the minimum flow requirement when Unit 6, the only unit online at the time, tripped offline due to an exciter alarm. Flows dropped as low as 200 cfs.

TU commented that the number of days in which at least 4,500 cfs is released to the bypass is minimal. Based on follow-up information provided by the Applicant (see Appendix B), the estimated typical percentage of time with flows near or in excess of 4,500 cfs is approximately 42 days per year, or 11.5% of the time. It was also noted that due to operational constraints of the rubber dam, flows in excess of the 25 cfs minimum flow are always passed into the bypass reach. TU also commented that data used to support all criteria are over 20 years old and should be updated. It is true that the flow studies were done in 1998, however, given the recent MDEP statement that the Project is meeting its WQC requirements and MDMR's support of Project certification due to the efforts being made to restore sea-run species, it does not appear either agency believes the issues raised by TU are problematic.

Based on my review of all available information, I believe that the Project conditionally passes this criterion with the condition identified in Section VIII.

The Project Conditionally Passes Criterion A – Ecological Flow Regimes

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 appropriately selected **Standard B-2 Agency Recommendation** for all ZOEs as Project operations are governed by the 1997 WQC, which was verified to still be valid and complied with via a letter from the MDEP dated November 24, 2020, submitted with the LIHI application.

The application notes that waters in all three ZOEs meet Class A water quality standards and that the Project is not within waters that are identified on the MDEP 303(d) list of impaired waters.

In addition to the flow requirements to ensure water quality standards, the WQC and FERC license

Article 409 required a study to monitor the macroinvertebrate community downstream of the West Buxton Project (FERC No. 2531), which is the first un-impounded riverine reach below the Bonny Eagle Project, to determine whether the macroinvertebrate community is meeting applicable aquatic life standards under the minimum flow regime required by Article 402 of Bonny Eagle's license. The Macroinvertebrate Monitoring Plan was filed with the Commission on August 28, 1998, and a report was filed on May 25, 2001 and supplemented on July 12, and October 4, 2001. The report concluded that the Saco River attains Biological Water Quality Standards for Class A based on the 38 §464, subsection 11 regulation.

The following summary is from the November 24, 2020 MDEP letter included in Section 7 of the application that provides confirmation that the WQC terms and conditions remain valid and in effect for The Bonny Eagle Project:

> *"Collectively, the Department finds that Brookfield has made provisions to monitor and mitigate the impacts of the BEHP on the waters of the Saco River. Further, over several years, Brookfield and previous license holders, have consulted and collaborated with the fisheries resource agencies to develop and enhance fish passage facilities and mitigate the impacts of the Project. The Department finds that the Terms and Conditions set forth by the Project WQC are valid and Brookfield has taken steps to fulfill the Conditions of the WQC. Therefore, the Department supports LIHI recertification [sic] of the Bonney Eagle Project."*

TU commented that impoundments typically decrease dissolved oxygen in the water and can increase diseases among indigenous species favoring a free-flowing water. While this may be true about impoundments in general, no evidence was provided to show it to be a problem in the Bonny Eagle impoundment, since these waters are listed on the state's latest Integrated Water Quality Monitoring and Assessment Report as meeting all water quality standards. Also, as noted above, the MDEP has confirmed the Project is in compliance with its WQC.

Based on my review, I believe the Project satisfies the requirements for this criterion.

The Project Passes Criterion B – Water Quality

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 **C-1 - Not Applicable/De Minimis Effect** for the impoundment and **C-2 – Agency Recommendation** for the bypass and downstream reach.

The 1996 Final Environmental Impact Statement (FEIS)[11] issued during re-licensing noted the

[11] https://elibrary.ferc.gov/eLibrary/filedownload?fileid=8243374

following diadromous species occur within the entire Saco River: American eel, alewife, Atlantic salmon, American shad, blueback herring, rainbow smelt, Atlantic tomcod, mummichog, threespine stickleback, ninespine stickleback and striped bass. Not all may be in the reaches of the Bonny Eagle Project, but the FEIS noted that Atlantic salmon, Atlantic shad and alewife have been known to historically exist at least up to the Hiram Project, which is upstream of Bonny Eagle, and which are the focus species for restoration under the Saco River Fish Passage Agreement.

The WQC and FERC license both adopted the provisions of the Fish Passage Agreement, which identified a schedule for upstream eel and anadromous fish passage to be installed at each Project[12]. License Article 406 incorporated the design, construction, and maintenance of upstream fish passage facilities pursuant to the Agreement's specified schedule. The license article was modified by FERC on July 18, 2007 and again on July 17, 2019, incorporating the terms of the amended 2007[13] and 2019[14] Fish Passage Agreements[15]. Based on the amendments, permanent upstream eel passage was required by June 1, 2018 and upstream passage for anadromous species is to be operational by May 1, 2029 (instead of 2022).

The eel ladder is located on the diversion dam and is constructed of a standard aluminum ramp and associated attraction water. The ramp empties into a collection tank at the top where eels are collected, and biological data is taken three times per week. The ladder typically operates from June 1 through September 30.

[12] Signatories to the 1994 Agreement included: American Rivers Inc.; Atlantic Salmon Federation; Central Maine Power Company (CMP); City of Biddeford; City of Saco; Maine Atlantic Sea Run Salmon Commission (MASRSC); Maine Council of the Atlantic Salmon Federation (MC-ASF); Maine Council of Trout Unlimited; Maine Department of Inland Fisheries and Wildlife (MDIF&W); Maine Department of Marine Resources (MDMR); Maine State Planning Office; National Marine Fisheries Service (NMFS); New Hampshire Department of Fish and Game (NHDFG); Saco River Salmon Club (SRSC); Swans Falls Corporation; Trout Unlimited ; U.S. Fish and Wildlife Service (USF&WS).

[13] https://elibrary.ferc.gov/eLibrary/filedownload?fileid=11295611

[14] https://elibrary.ferc.gov/eLibrary/filedownload?fileid=15241947

[15] 2007 and 2019 signatories were NMFS, USF&WS, MDMR, MDIF&W, Saco Salmon Restoration Alliance (SSRA, formerly the Saco River Salmon Club); Atlantic Salmon Council (ASF); and MC-ASF. Trout Unlimited did not sign either amendment.

Figures 8 and 9 – Upstream Eel Passage Facility

Monitoring studies required by the Fish Passage Agreement formed the basis upon which the signatories reached the current schedules for passage installation. As noted in their May 8, 2019 request to FERC to incorporate the 2019 Fish Passage Agreement schedule, Brookfield summarized the agency discussions saying:

> *"The above provisions have been carefully considered and balanced during the 2019 Amendment discussions in consideration of the management priorities of the agencies, the effect of each measure on the overall restoration of migratory species to the Saco River watershed, and their effect upon the developmental resources of the Projects. The Parties to the 2007 SRFAA and the 2019 Amendment agree that the proposed measures are both in the public interest and beneficial to the fishery resources of the watershed and will fulfill fisheries assessment and passage requirements."*

Section 5.4 of the Fish Passage Agreement specifies the studies required to evaluate the success of the downstream passage facilities, but no specific studies are required for evaluation of upstream passage effectiveness. Article 408 of the license requires development and implementation of a fishery agencies approved plan to evaluate the effectiveness of the upstream passage facilities at the Project. Article 408 states that the plan for effectiveness testing is due to the fishery agencies no later than 180 days prior to commencement of the upstream passage construction, now due in 2029.

According to follow-up information provided by Brookfield, annual Saco River diadromous fish passage meetings are held with the current signatories to the Fish Passage Agreement to discuss

past and future fish passage advancements and plans for the upcoming year for all Saco River Projects. Based on such meetings, current upstream eel monitoring efforts consist of trap checks three times per week where eel numbers, size and weight are recorded and reported in the annual Saco River Diadromous report to FERC and to fisheries agencies for review and comment. Review of these annual reports showed the Bonny Eagle eel ladder passed 634 eels in 2018, 784 in 2019 and 598 in 2020.

Finally, the Fish Passage Agreement established a funding mechanism to support other fishery agency management activities within the basin. While an integral part of the overall agreement, these provisions are managed outside of the context of the FERC licenses for the Saco River projects. The 2007 Agreement required $40,000 by 2010 and an additional $10,000 annually for 6 years (i.e. 2011-2016). The 2019 amendment to the Agreement extended this up to an aggregate of $10,000 per year for eleven years (2019-2029), for a total of $110,000. The follow-up information provided by BWPH includes a discussion of the funding uses. The 2019 and 2020 funds included the following:

- Brookfield provided the SRSA a check for $51,684.88 in January 2020.
- Brookfield provided $2,000 for the Fish Friends program in 2019 and 2020.
- MDIF&W has typically received $10,000 annually pursuant to the Agreement for brown trout studies, Saco impediment surveys, etc. but has deferred funding for 2019 to build up enough money for a larger project in future years. These funds will accumulate until MDIF&W is ready to use them.
- Brookfield provided funding to the SRSA and the USF&WS in the amount of $50,000 in 2019.

TU commented that LIHI certification of the Bonny Eagle Project should be withheld until the watershed restoration goals for sea-run species are met, and that this cannot be accomplished while continued delays in the installation of upstream anadromous species passage is allowed (i.e. installation delayed until May 2029 from 2022). Conversely, MDMR in their comment email stated that:

> *"The Project is in compliance with all fish passage requirements for the species that are managed by the Department of Marine Resources and currently are or could potentially be within the Project area. We have no concerns with the Low Impact certification for this Project."*

On November 20, 2020[16] Brookfield notified FERC of its intent to decommission and surrender the license for the Bar Mills Project (FERC No. 2194, located downstream of Bonny Eagle and West Buxton) rather than repower the non-operating Project. On December 30, 2020[17] FERC acknowledged the notice and a surrender application is expected to be filed by December 31, 2021. It is possible that this downstream change could trigger changes in the Fish Passage Agreement that could affect Bonny Eagle's fish passage requirements and/or implementation schedule.

[16] https://elibrary.ferc.gov/eLibrary/filedownload?fileid=15668144
[17] https://elibrary.ferc.gov/eLibrary/filedownload?fileid=15690135

Based on my review of the application, FERC records, the comment letters and additional information provided by Brookfield, I believe that the Project conditionally satisfies this criterion with the condition identified in Section VIII.

The Project Conditionally Passes Criterion C – Upstream Fish Passage

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 **D-1 - Not Applicable/De Minimis Effect** for the downstream reach and **D-2 – Agency Recommendation** for the impoundment and bypass.

As part of the sea-run restoration goals for the Saco River, river herring captured by BWPH fishery biologists at the downstream Cataract Project fish lift (at approximately 5 to 7 fish per surface acre) are released upstream of Bonny Eagle and other upstream BWPH Saco River Projects, as shown in the following table. Standard D-2 is applicable to the bypass because the minimum flow requirements are in part, required to ensure safe passage for downstream migration of these stocked fish.

YEAR	TOTAL ADULT RIVER HERRING STOCKED
2015	1500
2016	0 (Due to low Herring Run)
2017	1627
2018	1582
2019	1060
2020	1500

Similar to upstream passage requirements, the downstream passage provisions of the original and amended Fish Passage Agreement were adopted in the WQC and FERC license. License Articles 404 and 405 required construction of interim and permanent downstream fish passage facilities. The timing of installation is dictated by the Agreement. Downstream passage for anadromous species at Bonny Eagle was installed and became operational in 2018. Based on the Fish Passage Agreement and 2018 installation of upstream eel passage, downstream eel passage facilities are not required until 12 years after the upstream passage has been installed, thus due in 2030.

The downstream fish bypass, a top-drop gate passing 200 cfs, is located at the powerhouse in the existing log sluice which leads to a chute into the tailrace with 3-inch spaced trashracks. It is typically open from April 1 through December 31, as conditions allow. BWPH reported in 2019 that it was opened on March 30 (flow of 200 cfs) and remained in operation until December 16.

Figure 10 – Downstream Fish Passage Entrance

Article 407 of the license, which requires downstream fish passage monitoring, was modified by FERC's December 17, 1999 Order Modifying and Approving Downstream Fish Passage Facilities Study Plan. Pursuant to license requirements, downstream Atlantic salmon smolt studies were conducted at the Project in 1997 and reported in 1998. The studies determined that 91% and 93% of Atlantic salmon smolts, in each year respectively, utilized the current downstream passage. Also as noted below, in response to a suggestion made by NMFS in 2016, changes were made to the gate to pass flows as an overflow/top drop gate, as it would further improve passage. FERC agreed with the recommendations and approved the recommendations and gate replacement.

Also, in accordance with the Project license, downstream passage activities are reported in annual status reports which must be filed with FERC by March 31. By Order dated March 4, 2013, FERC eliminated these requirements in deference to the downstream passage provisions and study requirements of the 2007 Saco River Fish Passage Settlement Agreement, which was incorporated into the Project license by Order dated July 18, 2007, as summarized below.

Specifically, the 2007 Order incorporated the terms of the 2007 Settlement Agreement and required "a plan for a three-year study of Atlantic salmon kelts to determine/examine downstream passage routes at select Saco River sites" (Ordering Paragraph D) and a two-year semi-quantitative study of downstream passage effectiveness for clupeids (using, for example, standardized observations, video cameras, and rotary screw traps, or similar methods) (Ordering Paragraph E).

On June 29, 2010, FPL Energy, the Project owner at the time, filed its Saco River Kelt Passage Evaluation Plan and FERC subsequently issued an order approving the plan on August 18, 2010. The final Phase 1 of the Saco River Kelt Passage Evaluation was filed with FERC on January 27, 2011. Phase 2 required a radio-telemetry study of post-spawned Atlantic salmon kelts at the downstream Skelton and Bar Mills projects, pending availability of test fish. The final study plan including agency comments, was filed with FERC on July 27, 2011. FERC issued an order approving the Saco River Phase 2 Kelt Passage Evaluation Plan on November 3, 2011.

On March 26, 2015, BWPH filed a final study plan to conduct a Downstream Passage Evaluation for Juvenile Clupeids at the Bar Mills, Bonny Eagle, and West Buxton projects. FERC approved the plan on April 30, 2015. In accordance with the approved study plan, BWPH fish passage staff conducted visual observations twice per week at all three projects from approximately August 15 through October 15 during each year of the study (2015 - 2017). Relative abundance and behavior of juvenile clupeids in the areas of the forebays near the downstream fishways were noted. A report was filed with FERC on March 26, 2019 summarizing the observations.

The report filing also requested FERC to allow BWPH to discontinue downstream passage observation studies until such time as upstream passage is constructed at the projects, including at Bonny Eagle. This approach was agreed to by the fishery agencies attending the 2018 annual Saco River Diadromous Fish Passage meeting. In response to BWPH's request, monitoring under Article 407 was suspended until upstream anadromous fish passage is installed at Bonny Eagle via FERC's Order dated April 24, 2019.

Annual Saco River Diadromous Fish Passage meetings continue to be held to establish recommendations regarding what, if any, downstream fish passage studies for juvenile and adult American shad and river herring and adult Atlantic salmon should be undertaken in the coming year.

An inspection report issued by NMFS made the following recommendation as a result of their 2016 inspection:

> "*The upstream fishway entrance conditions can be improved by replacing the upward opening gate with another gate type that does not produce hydraulic conditions that deter fish from committing to the bypass. Upward opening gates produce rapid acceleration of the sluiced water which triggers an avoidance response in fish (Haro et al, 1997). A downward opening slide gate, a bottom hinge gate, or just keeping the gate fully open at all times will result in more conducive hydraulic conditions for downstream passage."*

In response to my inquiry about what response was made regarding this recommendation, Brookfield reported that a bottom hinge gate at the downstream bypass was already in place at the time of the inspection. The bottom opening slide gate in front of the hinge gate was removed from the water surface after the agency inspection so that water would flow over the hinge gate as suggested by NMFS.

Neither MDMR nor TU identified any specific downstream passage items other than the general comments addressed above under *Upstream Fish Passage*.

Based on my review of the application, FERC records, follow-up information from the Applicant, and comments received, I believe that the Project satisfies this criterion.

The Project Passes Criterion D – Downstream Fish Passage and Protection

E. SHORELINE AND WATERSHED PROTECTION

Goal: The Facility has demonstrated that sufficient 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

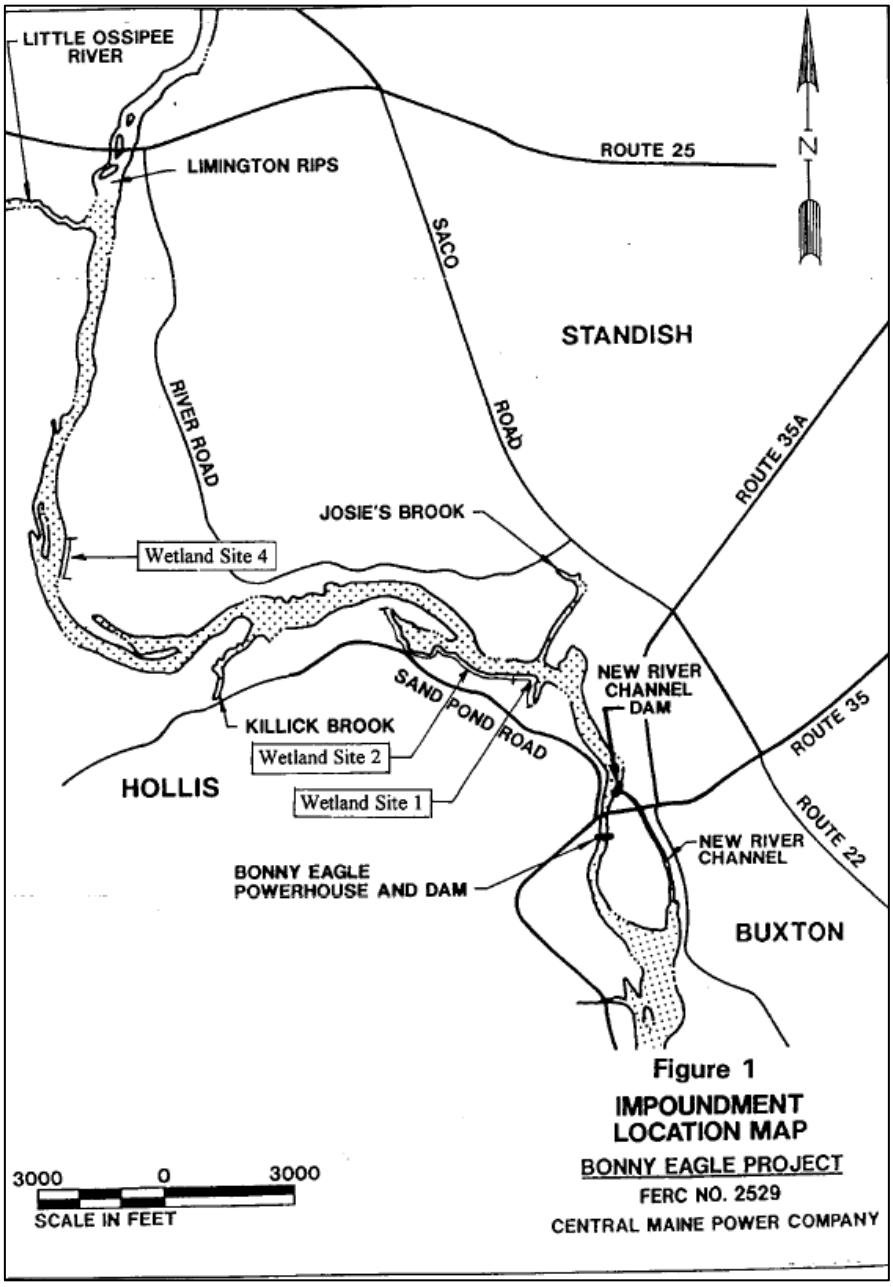
The Applicant selected **Standard E-2, Agency Recommendation**, for all three ZOEs, however I believe that **Standard E-1, Not Applicable/De Minimis Effect** is more appropriate for the bypass and tailrace/downstream reaches as none of the wetland areas subject to monitoring and protection under the FERC license are in these ZOEs.

The Project boundary encloses the dam and powerhouse and follows the reservoir shoreline up to the 218-foot elevation (NGVD) to encompass flowage rights. There are no significant shoreline lands along the impoundment within the Project boundary. A small parcel upstream of the powerhouse includes the canoe portage trail, and the Bonny Eagle Island located between the bypass reach and the downstream reach is owned by BWPH and is within the boundary. An estimated 45 acres of land is contained within the Project boundary, with the majority of the undeveloped lands being the island.

License Article 411 required development and implementation of a plan to monitor three wetland areas (shown on Figure 11), protection of these wetland areas, which may include creation of a 100-foot buffer around the impoundment to prevent agricultural use close to the river, seeding disturbed and eroded shorelines and protection of the buffer areas from disturbance, and a procedure to recommend alternatives to key agencies if the wetland enhancement activities are not successful.

The Wetlands Enhancement and Protection Plan (Wetlands Plan) was filed with FERC on August 27, 1998 and approved on September 17, 1998. The Plan outlined protection measures and monitoring for the three wetland sites and 5-year reporting requirements. As identified in the Wetlands Plan, Site 1 is a 21.3-acre parcel, approximately 2.9 acres of which lie within the Project boundary; Site 2 is a portion of the riparian area of at least four parcels of land owned by others and wholly within the Project boundary; and Site 4 is mostly outside of the Project boundary. The protection measures included revegetation of disturbed areas within the 100-foot buffer strip around the wetlands, discontinuing leases for agricultural uses within the buffer zone, installing fencing on areas within the Project boundary, and monitoring. While protection measures and buffers were put in place on lands owned by the license but outside of the Project boundary, these lands were not incorporated into the Project boundary.

Figure 11 – Wetlands Included in the Wetland Enhancement Plan



Monitoring reports are reviewed by the US Fish and Wildlife Service (USF&WS) and Maine Department of Inland Fish and Wildlife (MDIF&W) prior to submission to FERC. Reviews of the 2014 and 2019 reports showed agency agreement with the study results. Reports were filed on April 16, 2003; March 21, 2008, January 2, 2014; and April 3, 2019. As indicated in 2019 report:

> *"Riparian buffer sites 1 and 2 are well vegetated with trees, shrubs, and herbaceous vegetation and the soils are stable as observed during the current inspection. There was no evidence of livestock grazing or other agricultural activities. Both sites are in sound*

ecological condition and providing high value wildlife habitat. Native vegetation has become established at each site and soils are stable with no evidence of erosion. There is a minor amount of passive recreational activity at Site 1. There is a primitive boat launch and recreational activities at Site 2. The buffer at site 4 is vegetated with native grasses, sedges, perennial forbs, and other herbaceous species. The site is stable and providing high quality wildlife habitat. The site was last tilled in 2009 and the soil has not been disturbed since then. The bank along the Saco River is heavily vegetated with shrubs and trees. There are no areas with the potential for erosion and sedimentation on any of the sites. All three sites are meeting the goals and objectives of the Bonny Eagle Project Wetland Protection and Enhancement Plan. Wildlife species observed within and adjacent to the three buffer sites include wood ducks, mallards, great blue heron, downy woodpecker, eastern gray squirrel, white-tailed deer, American goldfinch, snapping turtle, bald eagle, red-winged blackbird, northern harrier, belted kingfisher, and eastern wild turkey."

Based on my review, I believe the Project passes this criterion. This assumes continued compliance with the Wetlands Plan, as it is possible that the state-endangered Blanding Turtle may exist in the wetland areas.

The Project Passes Criterion E – Shoreline and Watershed Protection

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 all three ZOEs.

A USF&WS Information for Planning and Consultation (IPaC) report was retrieved for the Project which showed the following species that may be present in the Project vicinity:

- Small whorled pogonia – Federally Threatened
- Northern long-eared bat – Federally Threatened

Critical habitat for the small whorled pogonia has not been identified by USF&WS and none for the Northern long-eared bat has been mapped near the Project. Neither species is expected to be affected by routine Project operations. Given that Project lands are limited to those needed for Project operations (including flowage rights) it is anticipated that the required conditions for the small whorled pogonia (described in the application) do not exist within Project lands. Limited vegetation removal may occur on lands surrounding the Saco River for maintenance purposes, and such activities are regulated by the Saco River Corridor Commission (SRCC)[18]. Requirements of the Final Section 4(d) rule for the Northern long-eared bat have been published for activities that may affect the species, which will be followed by BWPH during any periodic vegetation clearing activities.

[18] http://srcc-maine.org/

An inquiry with the MDIF&W identified the state-endangered Blanding's turtle as possibly being present in the Project vicinity. In addition, Northern long-eared bat (state endangered) and Eastern small-footed bat (state threatened) have the potential to episodically occur in the Project area during the migration and/or breeding season, in addition to several other bats listed as Species of Special Concern. Blanding's turtles are most typically found in vernal pools and small acidic wetlands located within larger forested wetlands. MDIF&W information recommends contacting the agency before disturbing such areas to ensure minimal impacts occur to the species. Thus, a condition is recommended to ensure this guidance is followed.

A Maine Natural Areas Program (MNAP) Project Review was included in the application. MNAP identified no rare botanical features within the Project area. Given the limited shoreline management activities, normal Project operation is not expected to impact any listed species. It is assumed that BBHP would consult with MDIF&W if any significant construction activities are conducted at the site in the future.

Based on this review, I believe that the Project conditionally satisfies the requirements of this criterion, with the condition recommended to minimize impacts to endangered species noted in Section VIII.

The Project Conditionally Passes Criterion F – Threatened and Endangered Species Protection

G. CULTURAL AND HISTORIC RESOURCE PROTECTION

Goal: The Facility does not inappropriately 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 has appropriately selected **Standard G-2, Approved Plan** for all the impoundment and **Standard G-1, Not Applicable/De Minimis Effect** for the bypass and tailrace/downstream reaches as to date, no cultural resources have been identified in those ZOEs.

License Article 416 required the development of a Programmatic Agreement (PA) and Cultural Resources Management Plan (CRMP). The PA which includes the CRMP, was executed on October 27, 1993. It identified the Bonny Eagle powerhouse and dam structures as eligible for listing on the National Register of Historic Places (NRHP). Phase I and Phase II cultural resources testing and subsequent field visits by Maine Historic Preservation Commission staff resulted in the identification of 10 aboriginal sites eligible for inclusion on the NRHP.

The PA/CRMP requires:

- Filing of annual summary reports with FERC and the State Historic Preservation Officer (SHPO) on activities conducted during the previous year and planned for the ensuing year. BWPH is required to file these annual reports by February 15 each year.

- To ensure that any cultural resources potentially present in the bypass or downstream reach are protected, the PA requires that BWPH consult with the SHPO prior to any Project-related land-clearing or ground-disturbing activities in this Zone and
- Any alteration of historic structures including major repair or replacement requires consultation with the SHPO to ensure the historic significance of the structures is not affected or effects are mitigated.

Annual reports were provided or found on the FERC elibrary for multiple projects including Bonny Eagle from 2014 to present. The reports describe the status of specific archaeological commitments made under the PA related to recovery and collection of found artifacts, erosion monitoring at some identified sites, and publication of site reports.

In 2010, wooden flashboards on the dam were replaced with an inflatable dam by the prior Project owner. In 2019, one turbine's runner, head cover, turbine shaft, and generator shaft were replaced in kind. LIHI staff requested documentation of SHPO consultation on these facility changes, and determinations of effect on cultural and historic resources. BWPH provided that documentation along with a June 22, 2021 letter from the SHPO which determined there were no adverse effects from these changes.

The Project Passes Criterion G – Cultural and Historic Resource Protection

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 has appropriately selected **Standard H-2, Agency Recommendation** for the impoundment and tailrace/downstream reach and **Standard H-1, Not Applicable/De Minimis Effect** for the bypass reach as there are no formal recreational features in this ZOE, although fishing occurs in this reach.

Recreation facilities required as part of the 1998 FERC license included a picnic and day use facility on Bonny Eagle Island (Article 414), a canoe portage trail (Article 413) and interpretive signage at the Bonnie Eagle powerhouse (Article 415). Also, Project recreation monitoring and reporting beyond that required by the formerly standard FERC Form 80 reporting, is required by Article 412. These monitoring reports must include the following information: (1) annual recreation use figures; (2) a discussion of the adequacy of the recreation facilities including a discussion regarding the need for a hard-surface boat launch along the impoundment; (3) a discussion regarding the adequacy of the Limington Rips recreation area; (4) methodology used to collect the data; (5) if there is a need for additional facilities, proposal of a recreation plan to address the needs; and (6) documentation of consultation with specific description of how the agencies' comments are accommodated by the report.

The canoe portage trail and interpretive signage were completed and as-built drawings for the portage were filed with FERC on June 30, 2000. The portage trail is located on the mainstem of

the Saco river and adjacent to the impoundment. It provides access for recreationists around the powerhouse. The egress is located just upstream of the dam and powerhouse on the west side of Bonny Eagle Island. The trail follows the powerhouse access road for a portion of its length and the ingress is located at the powerhouse tailrace. Very little use of the portage trail has been observed. Informal road side parking is utilized for fishing access below the diversion dam in the bypass reach and moderate use has been observed in the spring, summer, and fall. Access to the tailrace is limited to watercraft from below the Project or from the canoe portage trail by foot. Photographs of several of these features are included in the LIHI application.

The original proposed plan for parking, picnic tables, grills, signs, angler access, and whitewater boating access to the upper reach of the New River Channel, and a portable toilet in the future was filed on August 28, 1998 and approved by FERC. However, as part of consultation during permitting of the picnic area, local opposition was expressed including from the Town of Standish and the Saco River Corridor Commission, who denied a permit to construct the facility because of concern for the high probability of vandalism and irresponsible behavior at the site due to the lack of law enforcement available in the area. Community opposition was also a factor. As a result, the Bonny Eagle picnic area was removed as a requirement by FERC on October 31, 2000, although a requirement continued for re-evaluation of the feasibility of a barrier-free picnic area on Bonny Eagle Island during the filing of the 2003 monitoring report. Following review of the 2003 Article 412 Monitoring Report, FERC issued an Order on January 13, 2004, again removing the need for development of facilities on Bonny Eagle Island, until law enforcement in the area is able to provide appropriate protection. Likewise, monitoring of the need for such a facility was removed unless requested by a state agency.

Two other recreational features around the impoundment include a private boat launch and the Limington Rapids Rest Area which is leased to and maintained by the Maine Department of Transportation (MDOT). This area features parking, restrooms, and picnic tables some located under wooden pavilions. The boat launch is a small, trailered boat launch open to the public allowing access to the impoundment for a fee. It includes a state public right of way with limited parking.

The most recent FERC Environmental Inspection was conducted on September 19, 2019[19]. It reported that all recreational facilities were in place and available for public use, although a Part 8 sign at the Limington Rapids Rest Area was missing. BEHP submitted documentation to FERC of sign installation by October 15, 2019.

Based on my review, I believe the Project satisfies this criterion.

The Project Passes Criterion H – Recreational Resources

[19] https://elibrary.ferc.gov/eLibrary/filedownload?fileid=15367517

VIII. GENERAL CONCLUSIONS AND REVIEWER RECOMMENDATION

Based on my review, I believe the Bonny Eagle Project conditionally satisfies the requirements of a Low Impact facility and recommend it be certified for a five-year period with the following conditions.

Condition # 1 – The facility Owner shall update the Minimum Flow and Pond Level Monitoring Plan to reflect current conditions and monitoring features at the Project in consultation with the USF&WS, MDEP, and MDIF&W, and shall submit it to FERC for approval upon receipt of resource agency approval. The Owner shall provide LIHI with a copy of the submittal cover letter to FERC and a copy of the FERC's approval of the Plan.

Condition #2 – In annual compliance statements, the facility Owner shall provide status updates on the proposed decommissioning of the Bar Mills Project as it relates to potential changes in upstream or downstream fish passage requirements or implementation schedule at Bonny Eagle. If the Fish Passage Agreement is amended during the term of LIHI Certification, the owner shall provide a copy of the amendment(s) to LIHI with a summary of changes related to Bonny Eagle.

Condition # 3 – In annual compliance statements, the facility Owner shall provide documentation of consultation with MDIF&W and implementation of any recommended mitigation measures, should any ground disturbance of the Project wetlands or onsite tree removal be needed. This consultation is required due to the possible presence of protected bats and the endangered Blanding's turtle.

Appendix A

Agency and Stakeholder Correspondence

Gmail

Certification Comments <comments@lowimpacthydro.org>

Bonny Eagle Project Comments

Wippelhauser, Gail <Gail.Wippelhauser@maine.gov> Tue, Jan 12, 2021 at 10:32 AM
To: "comments@lowimpacthydro.org" <comments@lowimpacthydro.org>

I have reviewed the application for Low Impact Certification of the Bonny Eagle Hydroelectric Project.

The Project is in compliance with all fish passage requirements for the species that are managed by the Department of Marine Resources and currently are or could potentially be within the Project area.

We have no concerns with the Low Impact certification for this Project.

Gail Wippelhauser, Ph. D.
Marine Resources Scientist
Maine Department of Marine Resources
#172 State House Station
Augusta, ME 04333

Cell: 207-904-7962 (teleworking during COVID)

Phone: 207-624-6349

email: gail.wippelhauser@maine.gov

January 21, 2021

Ms. Shannon Ames, Executive Director
Low Impact Hydropower Institute
329 Massachusetts Avenue, Suite 2
Lexington, MA 02420

TROUT UNLIMITED
Sebago Chapter

Transmitted via e-mail to comments@lowimpacthydro.org

Subject: **Bonny Eagle Comments**

Dear Ms. Ames:

On behalf of its over 600 members in southwestern Maine, Sebago Chapter of Trout Unlimited ("Sebago TU") submits these comments on the Brookfield White Pine Hydro (Brookfield) revised application for Low Impact Hydro Institute (LIHI) certification dated January 8, 2021. It has been nearly twenty-three years since Federal Energy Regulatory Commission (FERC) relicensed the project and we assert that for that reason increased scrutiny should be applied to this application.

We believe that this project, because of both its impoundment and the cumulative effects of it and that of the other six other mainstem dams on the Saco River operated by Brookfield, is causing continuing adverse ecological impact to the watershed. This has been evidenced by reports filed by Brookfield that document the failure to achieve the watershed's fisheries restoration goals. We have attached the two reports that illustrate this directly: 2017 Saco River Diadromous Fish Passage Report[1] that deals with anadromous fish especially shad and 2018 Upstream Eel Passage Monitoring Report[2] that deals specifically with American eels. As if this were not enough, at the same time, the restoration schedule has been moving steadily to the right for the last two decades - most recently by the 2007 Agreement Amendment.[3] The Bonny Eagle Project itself has had upstream fish passage implementation delayed until 2029, the West Buxton Project immediately downstream has seen two delays, the first from 2019 to 2020 - subsequently to 2027.

Despite the unrelenting stocking and fertilized egg planting efforts of the Saco River Salmon Restoration Alliance and Hatchery, Atlantic salmon returns remain disappointing with only three returning fish documented in 2020. We have included the Maine Department of Marine Resources Report[4] for 2020 as Attachment C. Please note the improved returns for the Penobscot, Kennebec and the Narraguagus indicating that at-sea factors should not be blamed for poor returns on the Saco.

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[1] 2017 Saco River Diadromous Fish Passage Report published February 2018 prepared for Brookfield White Pine Hydro LLC
[2] 2018 Upstream Eel Passage Monitoring Hiram Hydroelectric Project FERC No. 2530 Prepared for Brookfield White Pine Hydro Lewiston, Maine dated January 29, 2019.
[3] Brookfield Saco River Fish Passage Assessment Agreement Amendment for Brookfield White Pine Hydro LLC's Cataract Project (No. 2528), Skelton Project (No. 2527), Bar Mills Project (No. 2194), West Buxton Project (No. 2531), Bonny Eagle Project (No. 2529), Hiram Project (No. 2530) dated May 8, 2019.
[4] Recent Trap Counts for Fish Returns to Maine by River accessed at https://www.maine.gov/dmr/science-research/searun/programs/trapcounts.html on the MDMR website

A number of factors have affected our indigenous fisheries in southwestern Maine since the 1700s. These include dams, pollution from the effluents produced by the mills the dams once supported, and siltation and loss of overhead cover due to agricultural use of shoreland. Maine now has the largest percentage of forested land of any state in the country. Since the late 1970s, the Clean Water Act has prevented our rivers from being used as the open industrial sewers as they had formerly been. Dams without effective fish passage are what remain of these three major factors. Without free-swim access to critical habitat, the life cycles of our indigenous species are compromised and restoration efforts reduced to a travesty.

On page 1 of the application, Brookfield describes the dam as creating a "*riverine impoundment*." This describes a habitat that is neither fully riverine nor a true impoundment with the result that it is not fully suitable for indigenous aquatic species evolved for either habitat. The impoundment decreases dissolved oxygen and increases disease among indigenous species favoring free-flowing waters. Indeed, the resultant habitat is one most beneficial to introduced species such as smallmouth bass at the expense of mature and young of the year (YOY) alosines, American eels, Atlantic salmon, brook trout and white suckers. All of these are co-evolved, indigenous fish historically abundant in the watershed. Similar effects of the six other Brookfield mainstem dams in the watershed exacerbate the effects of the Bonny Eagle impoundment, so the failure to meet the watershed's fish passage goals is not surprising - it is an expectable outcome.

On page 10 of the application, Brookfield states: *During normal operations, the project releases flows depending on electrical demand, available storage, and river flow and the bypass reach receives a minimum flow of 25 cfs. During high flow periods, all six generator units may be run 24 hours a day, with flows in excess of 4,500 cfs being passed as spillage over the New River Channel dam into the bypass reach*." Please note that this statement is quite misleading. The number of days that 4,500 cfs goes into the bypass reach are dwarfed by the number of days that the bypass reach receives minimum flows.

Beginning on page 25, Brookfield dutifully documents the information required to meet LIHI certification criteria for Ecological Flow Regimes, Water Quality, Upstream Fish Passage, Downstream Fish Passage, Watershed and Shoreline Protection, Threatened and Endangered Species Protection, Cultural and Historic Resources Protection, and Recreational Resources. Please note that the supporting study data provided is over 20 years old. Data that old is suspect - the studies should be repeated, their data refreshed. The courts decided in American Rivers v. FERC[5] that dealt with the relicensing of FERC projects in Alabama, five years was a reasonable shelf life for study data.

Accordingly, **Sebago TU requests that LIHI certification be held in abeyance for the Bonny Eagle Project until the applicant demonstrates that watershed fisheries restoration goals are being met**. The net ecological effect of LIHI certification for the Bonny Eagle Project at this time is zero; the effect of the certification for Brookfield will be the preferential sale of its electricity in states where there are statutory goals for use of renewable energy and LIHI certification is accepted as proof of that. The costs of preparation of Brookfield's application will ultimately be passed on to its ratepayers.

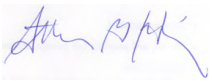
When confronted with the inadequacy of fish passage that Brookfield has provided on its lower four dams on the Kennebec River, the response of Brookfield's spokesperson was: "*These and other dams in Maine have been there for decades and centuries and we are going to use science and engineering to*

[5] American Rivers and Alabama Rivers Alliance v. FERC and United States Secretary of the Interior, No. 16-1195 (D.C. Cir. 2018)

make sure there are solutions for everyone and everything, for people and for fish."[6] On both the Saco and the Kennebec, this remains to be seen. Should LIHI determine that the applicant has met its criteria and certifies the project, it would serve to underline just how misrepresentative those criteria are and how misleading that your organization can be in its use of the term "*low impact.*" Truly, LIHI would be paraphrasing the old hospital one liner: 'The operation was a success but the patient died.'

Sebago TU appreciates the opportunity to comment on this application.

Respectfully,



Stephen G. Heinz
Sebago TU FERC Coordinator

Reply to: heinz@maine.rr.com

Attachments:
A - 2017 Saco River Diadromous Fish Passage Report (without data tables)
B - 2018 Upstream Eel Passage Monitoring Report (entire report - 12 pages)
C - Recent Trap Counts for Fish Returns to Maine by River (table with legend - single page)

[6] Portland Press Herald article of January 3, 2020 "4 dams, the future of Kennebec fish runs and salmon's survival at stake in federal licensing battle" accessed at https://www.pressherald.com/2021/01/03/4-dams-the-future-of-kennebec-fish-runs-and-salmons-survival-at-stake-in-federal-licensing-battle/

Attachment A

Brookfield

Brookfield Renewable
150 Main Street
Lewiston, ME 04240

Tel 207.755.5600
Fax 207.755.5655
www.brookfieldrenewable.com

March 26, 2018

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

Subject: **2017 Saco River Diadromous Fish Passage Report for the Cataract Project (FERC No. 2528), Skelton Project (FERC No. 2527), Bar Mills Project (FERC No. 2194), West Buxton Project (FERC No. 2531), and Bonny Eagle Project (FERC No. 2529)**

Dear Secretary Bose:

Brookfield White Pine Hydro LLC (BWPH), licensee for the Cataract Project (FERC No. 2528), Skelton Project (FERC No. 2527), Bar Mills Project (FERC No. 2194), West Buxton Project (FERC No. 2531), and the Bonny Eagle Project (FERC No. 2529) herein files with the Commission the 2017 Saco River Diadromous Fish Passage Report as required by the West Buxton Project license, Article 401, pursuant to fishway prescriptions 4.D.

Please contact Matt Leblanc by e-mail (matthew.leblanc@brookfieldrenewable.com) or by phone (207) 252-4870 if you have any questions or comments.

Sincerely,

Matt LeBlanc for

Kelly Maloney
Manager, Compliance - Northeast

Attachment

Cc: S. Michaud, M. Swett, A. Zarrella, N. Stevens, J. Seyfried, M. LeBlanc, K. Murphy, K. Bernier, BWPH

K. Howatt, MDEP
J. Pellerin, J. Perry; MDIFW
G. Wippelhauser; MDMR
S. McDermott, W. McDavitt; NMFS
A. Bentivoglio, S. Shepard; USFWS

BWPH File: 2528/01, 2527/01, 2194/01, 2531/01, 2529/01

2017
Saco River Diadromous Fish Passage Report

A Report on the Operation of
Brookfield White Pine Hydro LLC Fish Passage Facilities at the
Cataract East and West Channel Projects (FERC No. 2528)
Springs and Bradbury Projects (FERC No. 2528)
Skelton Fish Project (FERC No. 2527)
Bar Mills Project (FERC No. 2194)
West Buxton Project (FERC N0. 2531)
Bonny Eagle Project (FERC No. 2529)

Februay 2018

Prepared by
Brookfield White Pine Hydro LLC

Table of Contents

Cataract Executive Summary

In 2017, the Cataract fishways (East Channel fishlift and West Channel Denil) were operated by personnel from Brookfield White Pine Hydro LLC (BWPH).These fishways were built to pass target diadromous fish species (Atlantic salmon, American shad, river herring, and American eel) as part of resource agency plans to restore these species to the Saco River. 2017 marked the twenty-third full year of operation of the Cataract fishways.

In 2017, the East Channel fishway successfully passed 34,435 river herring, 3,390 American shad, 4 Atlantic salmon and 2,030 juvenile American eels; and the West Channel fishway successfully passed 6,162 river herring, 252 American shad, and 5 Atlantic salmon. In addition to the 34,435 river herring successfully passed through the East Channel fish lift, BWPH biologists trucked an additional 4,357 above the Bar Mills, West Buxton, and Bonny Eagle projects in 2017 to meet upriver stocking goals.

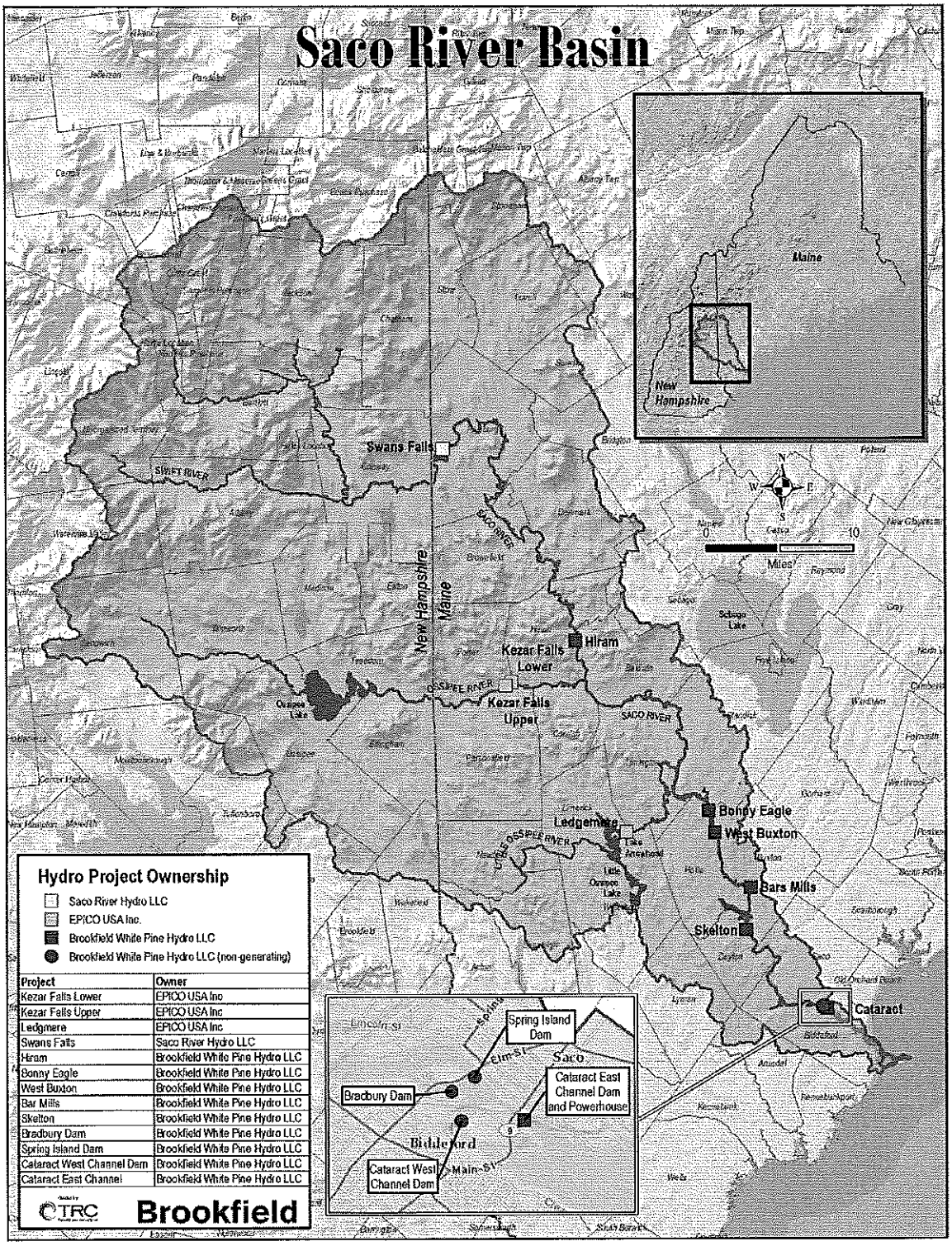
Currently, remnant populations of American shad and river herring appear to be large enough to serve as the necessary brood stock for Saco River restoration purposes without resorting to out-of-basin transfers of adults to the Saco River. The Saco River has the largest documented American shad run in the state of Maine and had been an important source of brood stock for shad restoration on the Kennebec River from 1999 through 2001. At this time, the small run of Atlantic salmon returning to the Saco River consists mainly of hatchery origin strays from other rivers and possibly small numbers of wild fish. In the future, increased Saco River Salmon Club (SRSC) fry releases, stocking of parr and smolts by the USFWS, and natural spawning should increase the local component of the Saco River run.

1.0 Introduction

The Cataract Project is located on the Saco River in the cities of Biddeford and Saco and in the towns of Dayton and Buxton in the State of Maine. The project is licensed by the Federal Energy Regulatory Commission (FERC No. 2528) and is owned by Brookfield White Pine Hydro LLC (BWPH). The project includes the Cataract (East Channel) Dam and East Channel

fishlift and an integral intake powerhouse containing a single turbine generator on the northeastern side of Factory Island in the City of Saco; and the West Channel dam and Denil fishway in the cities of Saco and Biddeford (see Figure 1). The impoundment formed by these dams extends upriver in the cities of Biddeford and Saco about 0.3 mile to another set of dams at Spring Island (see Figure 1), referred to as Bradbury and Spring Island dams. The fish locks at these two dams were first operational in June 1997. The impoundment formed by these dams extends upriver approximately 9.3 miles through the cities of Biddeford and Saco and the towns of Dayton and Buxton to BWPH's Skelton Project. A 90-foot high fish lift was constructed at the Skelton Project and first became operational in the fall of 2001.

In 2017, the Cataract fishways were operated by personnel from BWPH hydro operations division. This marked the twenty-third full year of operation of these fishways which were built to pass target diadromous fish species (Atlantic salmon, American shad, river herring, and American eel) as part of resource agency plans to restore these species to the Saco River. Although fishway construction was completed in the spring of 1993, the fishways were not completely operational until June 2, 1993 (East Channel) and June 25, 1993 (West Channel). Subsequently, 1993 did not constitute a full year of operation.



Project	Owner
Kezar Falls Lower	EPICO USA Inc
Kezar Falls Upper	EPICO USA Inc
Ledgmere	EPICO USA Inc
Swans Falls	Saco River Hydro LLC
Hiram	Brookfield White Pine Hydro LLC
Bonny Eagle	Brookfield White Pine Hydro LLC
West Buxton	Brookfield White Pine Hydro LLC
Bar Mills	Brookfield White Pine Hydro LLC
Skelton	Brookfield White Pine Hydro LLC
Bradbury Dam	Brookfield White Pine Hydro LLC
Spring Island Dam	Brookfield White Pine Hydro LLC
Cataract West Channel Dam	Brookfield White Pine Hydro LLC
Cataract East Channel	Brookfield White Pine Hydro LLC

Figure 1. Map of the Saco River basin and locations of Brookfield hydro facilities.

1.1 Operation of the Cataract East Channel Fishway

The fishways at the Cataract Project are designed to operate up to river flows of 11,000 cubic feet per second (cfs). The fishway at the East Channel dam consists of a lower entrance flume and crowding area, a 45-foot high fishlift or elevator, and an upper exit flume leading into the impoundment. Upper flume water flow is approximately 40 cfs with a velocity of 1 foot per second (fps). Total attraction water flow is approximately 80 cfs with an entrance velocity averaging 5 fps. In an effort to enhance fish passage in 1995, the East Channel fishlift attraction water system was reprogrammed to shut off water flow to the lower flume downstream attraction water diffuser and increase water flow to the upper diffuser. This change increased velocity in the lower flume and eliminated the upwelling flow from the lower diffuser. The modification proved successful in 1995, and has been continued since. (See 1995 Cataract Fishway study report Section 4.4 for more detailed information on water flow modification and fish passage observations made at the East Channel fishlift.)

A counting window and sorting, trapping, and trucking facilities are located near the exit of the upper flume. Fish can be released to swim into the Cataract impoundment or can be transported to upstream locations (i.e. Springs and Bradbury impoundment for shad) (see Figure 2). Fish transport takes place in one of two stocking trucks assigned to the fishway. The trucks are equipped with 990 gallon circular fiberglass insulated tanks with aeration systems utilizing bottled oxygen and water pumps that circulate water in the tanks.

In 2017, the East Channel fishway was opened on May 1 and remained in operation (other than limited down time for general repairs and maintenance) until October 30 when it was closed for the season.

Downstream passage is provided by a sluice at the East Channel forebay area located between the spill gate and the unit intakes, and by a sluice located in the West Channel next to the West Channel fishway exit. Also, two hinged flashboards at the East Channel have been

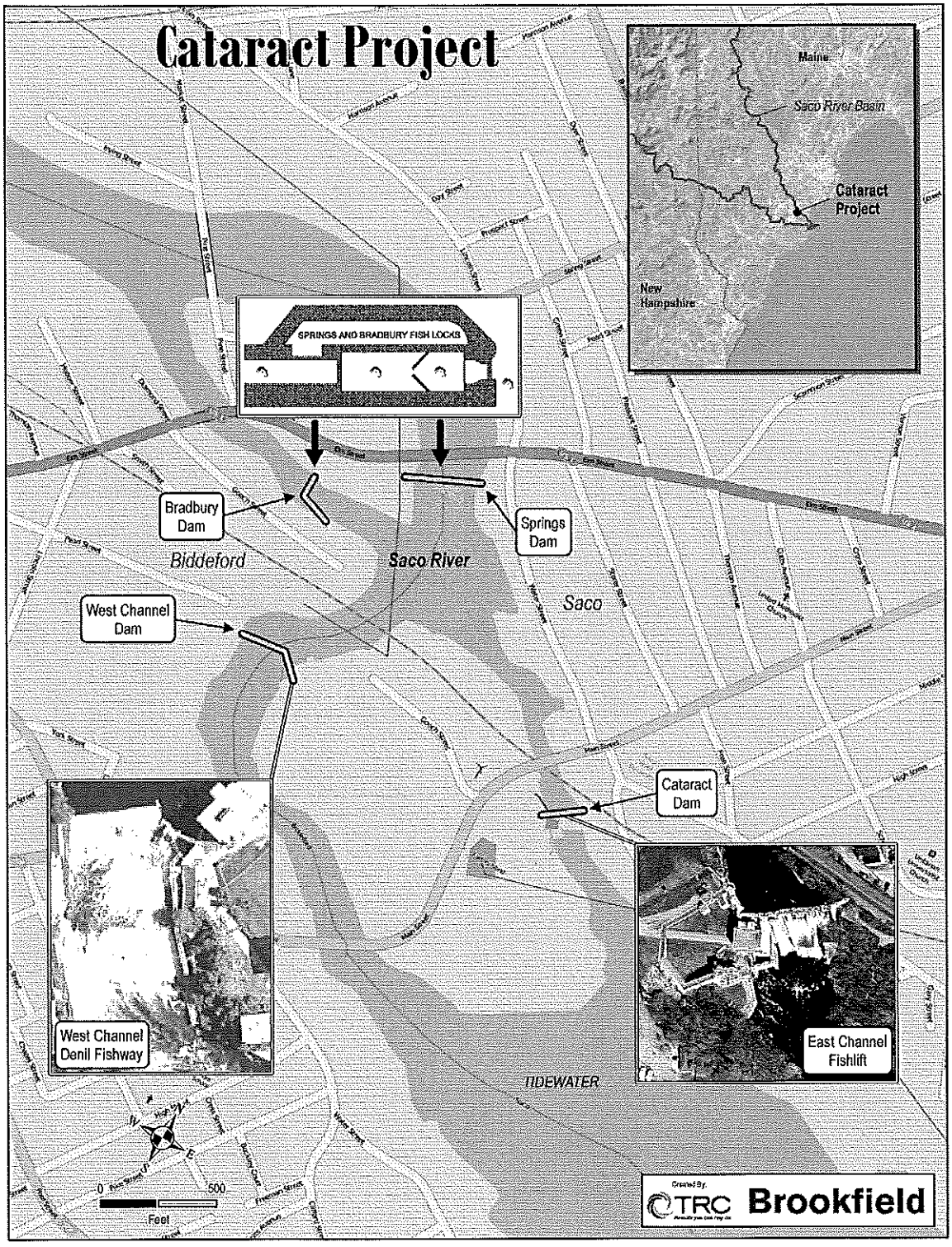


Figure 2. Map of the Cataract Project.

used to facilitate downstream passage at the Cataract facility since 1997. The Cataract headpond is observed for downstream migrants daily starting mid-June and continuing throughout October. The boards are dropped when adequate numbers of fish appear in the headpond area and fishway personnel are stationed to observe downstream passage. "Adequate numbers" are typically signified by a sudden appearance of more than 25 post-spawned shad. BWPH biologists surveying the area have observed that shad will typically migrate in schools; therefore, a sudden appearance of post-spawned shad will trigger a controlled spill. Results of these observations indicate that downstream passage is accomplished by this technique and will be continued in the future.

1.2 Operation of the Cataract West Channel Fishway

The 550-foot-long Denil fishway at the West Channel is 4 feet wide with a 1-foot vertical by 8-foot horizontal slope. The minimum depth of water in the fishway is 2.5 feet with a minimum flow of 12 cfs. The maximum attraction water flow is 33 cfs with an entrance velocity of 2 to 6 fps. A counting window and associated trapping structures are located near the exit of the fishway and target species can swim freely into the Cataract impoundment. A floating trash boom was installed in front of the West Channel exit to help keep floating debris from entering the fishway.

In 2017, the West Channel fishway was opened on May 1 and remained in operation (other than limited down time for general repairs and maintenance) until October 30, 2017 when it was closed for the season.

A 200 foot long rubber dam was installed at the West Channel spillway during the summer of 2006. This rubber dam helps to more easily and safely control river flows during high water events and allows a quicker and safer recovery of headpond levels after such events. There are, however, two sections of flashboards of approximately 35 feet each (one section on each side of the spillgate) that remain on the West Channel spillway.

The West Channel flashboards were lost on June 14, 2014 and not replaced until September 6, 2017.

The following biological data have been compiled to provide a summary of fishway monitoring information collected at the Cataract fishways in 2017. East Channel water temperature and Saco River flow data for 2017 are provided in Attachment 1. Saco River flow data was monitored at the Skelton Project and provided by BWPH's river control center.

2.0 River Herring, American Shad, and Atlantic Salmon Information

During 2017, fishway operations concentrated on passing and/or transporting diadromous fish species (Atlantic salmon, American shad, river herring and American eel) targeted for restoration on the Saco River.

2.1 River Herring - East Channel

In 2017, a total of 34,435 river herring successfully ascended the East Channel fishlift. The first river herring were lifted on May 16th (Table 1) when river water temperature was 12 °C. and the last river herring was lifted on July 6th when river water temperature was 21.5 °C. The river herring run encompassed a 67-day period. The peak of the run occurred between May 18th and May 29th when 32,881 fish passed, representing 95% of the river herring passing the East Channel. The river herring daily lift schedule was adjusted manually by fishway personnel depending on the number of fish observed and the time of the run. In May and June, approximately 182 lifts and 243 lifts respectively, (Attachment 1) were made to capture river herring.

2.1.1 River Herring Trap and Transport Operations

A total of 34,435 river herring were allowed free passage into the Cataract impoundment as part of the evaluation studies for the Skelton fishway. In addition,4,357 river herring were trucked from East Channel to above the Bar Mills, West Buxton, and Bonny Eagle

Projects to achieve upriver stocking goals.

2.1.2 River Herring Biological and Fishway Mortality Data

The majority of river herring mortalities (~550) were a result of a single event when the number of fish in the hopper was underestimated resulting in more biomass (fish) in the truck transport tank than what could be supported by the life support system (supplemental oxygen and circulation pumps). Subsequently, additional training was provided for estimating the number of fish in each lift, and no additional issues occurred.

2.2 American Shad - East Channel

In 2017, a total of 3,390 American shad successfully ascended the East Channel fishlift. The first shad was lifted on May 20th (see Table 2) when river water temperature was 15.5 °C, and the last shad was lifted on July 22nd when river water temperature was 24°C. The shad run encompassed a 69-day period with the peak occurring between June 13th and June 29th when 2,804 fish (83% of the run) passed upstream.

The daily lift schedule was adjusted by fishway personnel depending on the number of fish observed and the time of the run. In May, June, and July, approximately 182, 243, and 106 lifts respectively (Attachment 1), were made to capture shad.

An underwater camera connected to a television monitor and VCR was first used in 1995 to gather information on fish behavior within the lower flume of the East Channel fishlift. The camera documented that shad exhibit a fallback behavior in and around the East Channel lower flume V-gate crowder. On occasion, shad would swim upstream through the V-gate crowder into the hopper area, then within minutes (and sometimes seconds) swim back downstream through the V-gates and out of the lower flume into the tailrace. Also, on many occasions, shad were reluctant to pass through the V-gate crowder in the fishing position. (See 1995 Cataract fishway study report Sections 3 and 4 for detailed information on camera study and results).

Since 1996, the underwater video camera, combined with keeping the V-gate crowder wide open, was a very important technique that increased East Channel fishway efficiency. Fishway personnel observed that by keeping the V-gate crowder open, shad moved readily into the trapping area. Utilizing the underwater camera, fishway personnel could observe shad as they passed through the wide open V-gate crowder, then close the crowder and trap before the shad had a chance to fall back. This technique will continue in 2018.

2.2.1 American Shad Trap and Transport Operations

The majority of the American shad captured at the East Channel fishlift were transported to the Diamond Riverside Boat Ramp stocking location (approximately half mile upstream of the fishway), while the remaining shad were allowed to freely swim through the fishway into the Cataract impoundment. This year the transport operations began on June 7 and ended on July 19 with 3,163 shad successfully transported upstream. A total of 38 transport trips were made and no transport mortalities were observed. Both trucks operated without any mechanical problems. A total of 227 American shad were allowed to swim freely through the fishway; typically passing in conjunction with large numbers of river herring. The trucking trip from the fishway to the Diamond Riverside Boat Ramp takes about 15 minutes and a round trip takes about 1 hour.

2.2.2 American Shad Biological and Fishway Mortality Data

In addition to the 3,390 American shad successfully passing through the Cataract East Channel fishway, a total of 72 shad mortalities were noted. This represents a total fishway mortality of 2.1% which falls within the range of annual shad mortality since the fishway went into operation in 1995 (1.2 – 4.8%). The majority of the mortalities drifted downstream and were discovered at the end of the upper flume area on the water diffusion screen. Many of these fish can only be sampled when the upper flume is drained. As a result, many of these fish are in various stages of decomposition and biological data collection is difficult. Scale samples were collected from a majority of the fish, and will be archived for future aging if requested.

2.3 Atlantic Salmon - East Channel

In 2017, four Atlantic salmon (Table 3) ascended the East Channel fishlift on June 13 (19.5°C), June 17 (20.5°C), June 19 (21.5°C), and July 19 (23.0°C).

The daily lifting schedule was adjusted by fishway personnel depending on the number of fish observed and the time of the run. In May, June, July, August, September, and October, approximately 182, 243, 106, 49, 57, and 49 lifts (Attachment 1) were made, respectively. An underwater camera connected to a television monitor and VCR was first used in 1995 to gather information on fish behavior within the fishway. The camera documented that Atlantic salmon exhibit a strong fallback behavior in and around the East Channel lower flume V-gate crowder. Salmon regularly would swim upstream through the V-gate crowder into the hopper area, then within minutes (and sometimes seconds) swim back downstream through the V-gates and out of the lower flume into the tailrace. (See 1995 Cataract fishways efficiency report for detailed information on camera study and results).

The underwater camera allows fishway personnel to observe salmon as they pass through the V-gate crowder, and then close the gate and trap the salmon before they can fall back. During the months of August and September, when the salmon returns across the State of Maine are low, the lower trap area is monitored using a video recorder and the previous days footage is reviewed daily by fish passage staff. If a salmon is observed to have entered the lower trap area, then fishway personnel stationed at the TV monitor to wait for and capture the fish. This process almost always resulted in a salmon capture within a 24-hour period. This technique has resulted in the majority of salmon captures at the East Channel since 1995.

In 2017, camera operations started as soon as the fishway opened, and continued from May through October. Using the underwater camera greatly increases the efficiency of East Channel fishway and will be continued in 2018.

2.3.1 Atlantic Salmon Trap and Transport Operations

No Atlantic salmon were transported from the Cataract East Channel fishway in 2017.

2.3.2 Atlantic Salmon Biological Data

Of the four Atlantic salmon passing the East Channel fishlift in 2017, one was identified as a multi-sea winter fish, while the other three were all one-sea winter fish (grilse).

2.4 River Herring - West Channel

In 2017, a total of 6,162 river herring successfully ascended the West Channel Denil fishway. The first river herring passed the viewing window on May 18th (Table 4) when river water temperature was 13.0°C and the last river herring passed the viewing window on June 24th when river water temperature was 22.5°C. No river herring mortalities were noted.

2.5 American Shad - West Channel

In 2017, a total of 252 American shad successfully ascended the West Channel Denil Fishway. The first shad passed the viewing window on May 19th (Table 5) when river water temperature was 14°C and the last shad passed the viewing window on July 27th when river water temperature was 23.0°C.

2.6 Atlantic Salmon - West Channel

In 2017, the five Atlantic salmon (Table 6) ascended the West Channel Denil on May 28 (14.5°C), June 4 (16.0°C), June 5 (15.5°C), June 11 (17.0°C), and October 10 (19.0°C).

2.6.1 Atlantic Salmon Biological Data

Of the five Atlantic salmon passing the West Channel fishlift in 2017, three were identified as a multi-sea winter fish, while the other two were both grilse.

2.7 American Eel

The East Channel eel passage is a permanently hinged ramped structure that has the ability to operate during all tidal cycles and river flows. The upstream eel passage for East Channel was operational on from June 1st to September 18th and passed a total of 2,030 eels in 2017. (See Table 9 for Cataract East Channel Eel Inventory).

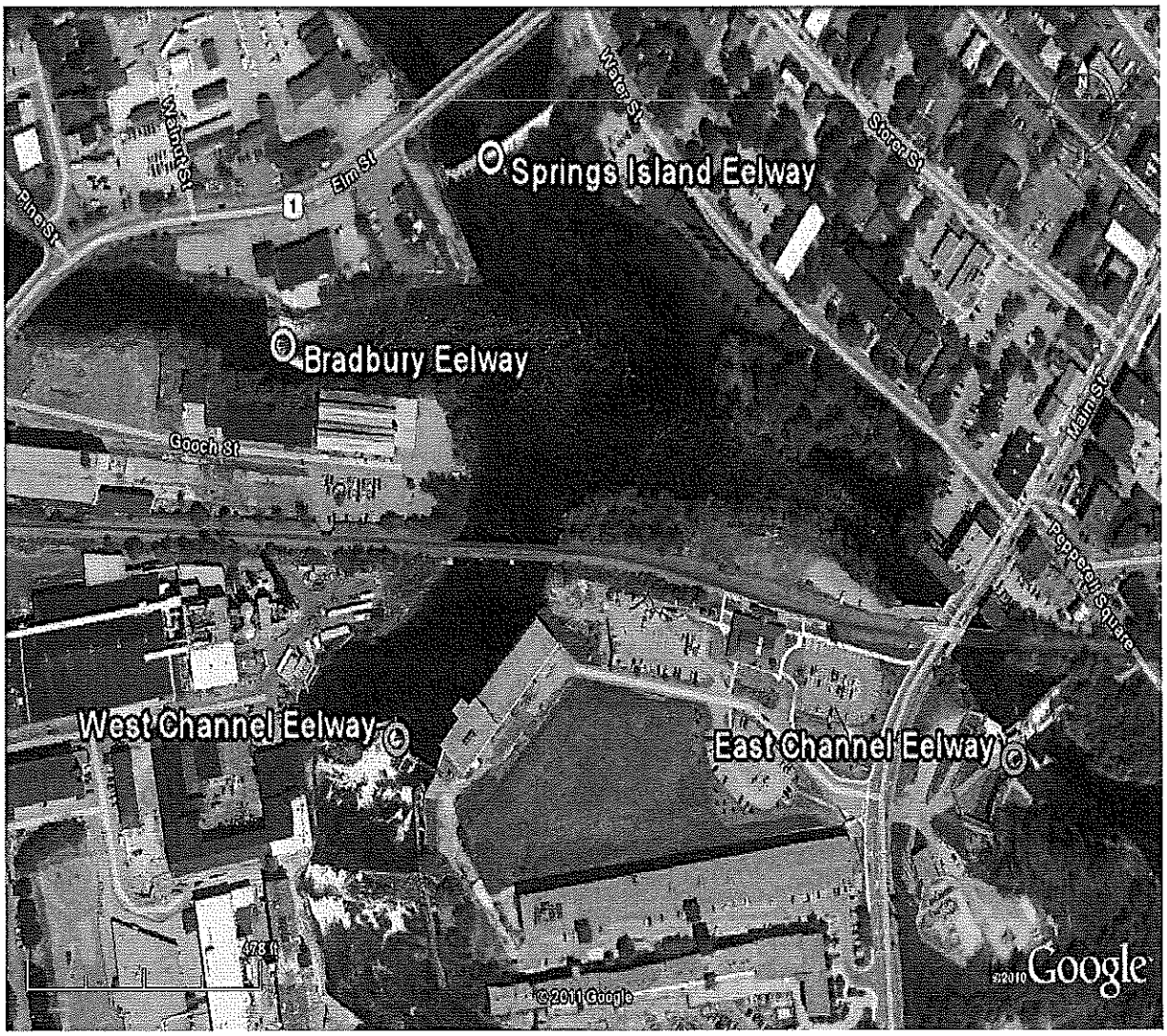
The upstream eel passage at West Channel is seasonally installed below a small section of flashboards located between the old upstream fishway and the rubber dam. The West Channel flashboards were lost on June 14, 2014 and not replaced again during the 2017 season, thus the West Channel eel passage was not installed in 2017.

2.7.1 Downstream American Eel

Downstream passage for adult American eels consists of nightly shutdowns of the Cataract unit starting September 1st and continuing for eight weeks for eight hours per night. River flows are passed through open gates or downed hinge boards during this time.

2.8 Downstream Fish Passage - East and West Channel

Downstream passage is provided by a sluice at the East Channel forebay area located between the spillgate and the unit intakes, and by a sluice in the West Channel next to the West Channel fishway exit. Both the East Channel and West Channel downstream bypasses pass approximately 52 cfs apiece at full pond. The East Channel downstream bypass and the West Channel downstream bypass were opened on March 30st, and remained open, other than limited



downtime for general cleaning, repair and maintenance throughout 2017. In general, headpond/bypass observations are conducted at the Cataract Project at a minimum first thing every morning previous to the first upstream lift of the day, as well as in conjunction with other studies that may be occurring throughout the year. In addition to the downstream sluice, since 1997 two hinged flashboards at the East Channel are lowered to facilitate downstream passage at the Cataract facility since 1997. The boards are dropped when adequate numbers of fish appear in the headpond area and fishway personnel are stationed to observe downstream passage.

2.8.1 Post-spawned River Herring

No post-spawned river herring were observed in the Cataract impoundment in 2017.

2.8.2 Post-spawned American Shad

As agreed upon during agency consultation in January 1996, controlled spills were attempted in addition to the present downstream passage sluices.
Since 1997, observations of control spills have documented that effective passage for shad can be accomplished if the taintor gate is closed, spills are conducted on sunny days, and when adequate numbers of fish are present. "Adequate numbers" are typically signified by a sudden appearance of a school of more than 25 or 30 post-spawned shad observed in the headpond at once.

The controlled spill consists of 2 hinged flashboards being dropped for a combined flow of 400 cfs for a period of time ranging from 2 to 4 hours. The time period is dependent upon river conditions and visual observations of shad numbers and behavior. Fishway personnel are positioned directly above the downed boards, which provide a clear view of the fish and an accurate count of passage numbers.

In 2017, small numbers of shad (5 to 10 fish at a time) were observed periodically in the East Channel headpond area and no controlled spills were conducted . The West channel flashboards were lost on June 14, 2014 The thirty five foot section of missing flashboards

allowed free passage to all out migrating fish throughout the entire year. It is expected that the majority of post-spawned shad utilized the lost flashboard area as a route of downstream passage in 2017. BWHP plans to continue to use this method to pass river herring and shad downstream in 2018.

2.8.3 Juvenile Clupeids

During late-July and mid-October fishway personnel observed small numbers of juvenile clupeids in the East Channel upper flume and in the East Channel headpond area. Ten juveniles were sampled from the East Channel upper hopper area on July 30 and ranged from 46 to 56 mm total length.

3.0 Non-Target Fish Species

3.1 East Channel Fishway

Thirteen (13) non-target species totaling 759 fish ascended the East Channel fishway in 2017 (see Table 7). Striped bass (602 fish) (the vast majority were returned to the tailrace) was the most numerous of these species. Five gizzard shad were caught in 2017 and immediately culled on site. One lamprey was captured attached to an American shad and returned to the tailrace. Innumerable striped bass were captured in the fishlift hopper, but were not lifted to the upper flume area. On these occasions, fishway personnel would lower the hopper back into the lower flume and allow the striped bass to swim back into the tailrace. These striped bass ranged from 10 to 26 inches in length with the majority averaging 10-15 inches long. The eels ranged from 6 to 20 inches long and were observed feeding on the occasional dead herring that fall underneath the elevator into the hopper pit.

3.2 West Channel Fishway

Seven non-target species totaling 73 fish utilized the West Channel Denil fishway in 2017 (see Table 7). These included; striped bass (30 fish), smallmouth bass (20 fish), white wucker (9

fish), brown trout, (8 fish), largemouth bass (3 fish), and brook trout (2 fish). One gizzard shad was passed at the West Channel denil only to be captured and culled at the Skelton fishway a few days later. No carp or sea lampreys were caught in 2017.

4.0 Atlantic Salmon Redd Survey

Atlantic salmon spawning surveys (redd counts) were conducted once per week by boat or by foot in the Skelton tailrace area in conjunction with monitoring for adult eel mortalities during the months of September, October, and November. No salmon redds were observed in 2017.

5.0 2018 Cataract East and West Channel Fishway Operation Plans

The East and West Channel fishways will be operated in 2018 with the benefit of experience and insight gained since 1993. General operational plans are summarized below.

5.1 Upstream Passage

Identify and enumerate all fish species utilizing the East and West Channel fishways. Striped bass will be returned to the estuary unless safe passage of Atlantic salmon, American shad or river herring is potentially compromised. In the event passage is compromised; limited numbers of striped bass will be allowed access to the East Channel headpond. Allow all other species (i.e., trout, black bass, etc.) to pass into the Cataract impoundment at both the East and West Channel fishways.

Utilize the underwater camera to guide operation of the East Channel fishway V-gate crowder to enhance shad, river herring, and Atlantic salmon capture efficiency. Allow all river herring to swim freely into the Cataract impoundment for the evaluation of the Skelton fishway. Transport all American shad captured at East Channel above the Springs and Bradbury dams. Collect biological information (i.e. sex, fork length, and scale sample) from river herring and shad mortalities .

Allow all Atlantic salmon from the East and West Channel fishways to swim freely into the Cataract impoundment. Any salmon captured upstream at the Skelton fishlift will be trucked to the Ossipee River. Biological information (i.e., sex, fork length, and marks observed only) will be collected from Atlantic salmon utilizing the East and West Channel fishways.

5.2 Downstream Passage

Continue to operate the downstream passage sluices as well as lower two flashboards on the East Channel to pass out migrating American shad and river herring. Also, continue to obtain and document information on emigration routes, timing, and numbers of adult and juvenile shad and river herring exiting the Cataract impoundment.

Spring Island and Bradbury Executive Summary

In 2017, the Springs and Bradbury fish locks were operated by personnel from Brookfield White Pine Hydro, LLC (BWPH).These fish locks were built to pass anadromous fish species (Atlantic salmon, American shad, and river herring) as part of resource agency plans to restore these species to the Saco River. 2017 marked the twentieth year of operation for the Springs and Bradbury fish locks.

Despite numerous studies conducted to improve American shad passage through the fish locks since 1997, (see 1997-2002 Springs and Bradbury Fish lock reports) shad passage numbers remain low. BWPH in consultation with the resource agencies, has explored many strategies to improve shad passage at Springs and Bradbury Dams, including; a fallback study, radio-telemetry study, structural modifications, flow modifications, added lighting, underwater camera work, and years of visual observations. Poor shad passage may be related to mechanical or flow issues associated with the fish locks, but there are also questions about the behavior of a schooling fish species and lack of imprinting to upstream habitats which also may affect upstream passage motivation.

In 2003, BWPH proposed and received permission from the resource agencies to truck American shad captured at the East Channel fishway around the Springs and Bradbury Dams as an interim passage measure until American shad numbers increase in the Saco River.

In 2014, in an attempt to increase American shad passage at the Springs and Bradbury dams, a total of 60 adult American Shad were collected out of the East Channel fish lift at the Cataract Project on three dates (June 16, 19, and 23), gastrically radio-tagged. and immediately released into the East Channel via the flume. Releases coincided with operational modifications made by Brookfield to adjust the differential between the Spring Island and Bradbury headpond and tailrace elevations to achieve an approximate velocity of 8.0 ft/s through gates at Spring Island and Bradbury dams. Movements of radio-tagged shad were monitored via a series of six stationary telemetry receivers (located downstream of the East and West Channel dams, upstream and downstream of Spring Island dam, and upstream and downstream of Bradbury dam. Results of this study may be found in BWPH's *Assessment of Upstream Passage of Adult American Shad at the Spring Island and Bradbury Fish Locks, Cataract Project, Saco River, Maine* (December 2014).

During 2017, BWPH successfully trucked 3,163 American shad around the Springs and Bradbury dams. In addition, 479 American shad were passed volitionally into the East and West Channel headponds during times when large numbers of river herring were being passed.

In 2017, 40,597river herring were allowed free passage through the Cataract fishways and were monitored upstream the Springs and Bradbury fish locks as well as at the Skelton fishway. A total of 5,121 river herring were captured at the Skelton fishway in 2017.

Nine Atlantic salmon were passed through the East and West Channel fishways in 2017. One Atlantic salmon was captured at the Skelton fishway.

6.0 Introduction

The Cataract Project (FERC No. 2528) is located on the Saco River in the cities of Biddeford and Saco and in the towns of Dayton and Buxton in the State of Maine. The project is licensed by the Federal Energy Regulatory Commission (FERC) and is owned by Brookfield White Pine Hydro, LLC. The project includes the Cataract (East Channel) dam, East Channel fishlift, and an integral intake powerhouse containing a single turbine generator on the northeastern side of Factory Island in the City of Saco; and the West Channel dam and associated Denil fishway in the cities of Saco and Biddeford. The impoundment formed by these dams extends upriver in the cities of Biddeford and Saco about 0.3 miles to another set of dams at Spring Island (see Figure 1) referred to as Bradbury and Spring Island dams. These dams are also part of the Cataract Project, and fish locks at these two sites were first operational in June 1997. The impoundment formed by these dams extends upriver about 9.3 miles through the cities of Biddeford and Saco and the towns of Dayton and Buxton to BWPH's Skelton Station.

6.1 Operation of the Springs and Bradbury Fish Locks

The fish locks at Springs and Bradbury dams are designed to operate at river flows up to 11,000 cubic feet per second (cfs) and consist of a 5.0 foot wide by 28.0 foot long lock chamber and a 5.0 foot wide by 11.0 foot long exit way (Figure 3). The lock fluctuates water elevation allowing salmon, shad, and river herring to ascend the 5.0-ft elevation difference at the dams (see Figure 3).

The locks have a minimum water depth of 5.0 ft and operate with a flow of approximately 80 cfs. Fishway entrance velocities are 4 to 6 feet per second (fps). The 80 cfs attraction water attracts the fish through the downstream lock gate. The fish then swim through the crowder and remain in the lock chamber. During the cycling process, the downstream gate closes and the surface water elevation in the lock chamber rises from 44.0 to 49.2 ft. The upstream gate then opens and the crowder slowly moves toward the upstream gate and guides the fish into

the upstream reservoir.

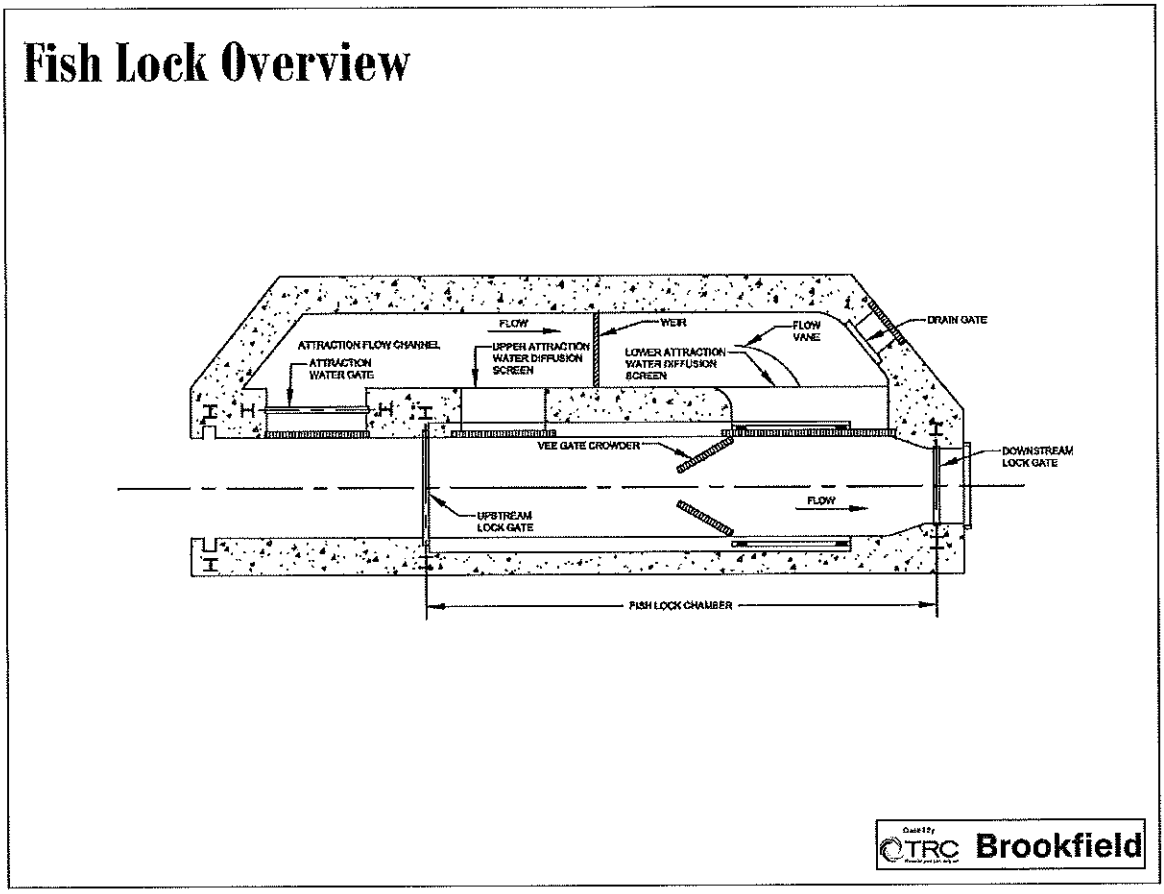


Figure 3. Generic drawing of a fish lock system, similar to what is installed at Springs and Bradbury dams.

The upstream gate then closes and the crowder moves back to its original position (referred to as the fishing position). The discharge gate then opens, returning the surface water elevation in the lock chamber to 44.0 ft. and the downstream gate opens to complete the process.

The hydraulic capacity of the Bradbury gate is approximately 2,060 cfs. River flows up to 2,060 cfs are normally passed through the Bradbury gate because the flows from this gate are directly in line with the Cataract East Channel powerhouse intake structure. This operation produces a more efficient flow pattern than flows out of the Spring Island gates which are directed towards

the West Channel. River flows in excess of 2,060 cfs are passed via gates at the Spring Island gatehouse.

In 2017, the Springs dam fish lock was opened on May 11, 2017 and ran with limited downtime for routine maintenance until October 30st 2017 when it was closed for the season. Although many fishway cycles were completed previous to May 11, the hourly automatic cycling of both Springs and Bradbury fishways coincided with the first herring passed at the Cataract East and West Channel fishway.

Fishlock cycle time was adjusted daily and ranged from every one hour to every eight hours. Since underwater video cameras were not utilized during the 2017 season at the Springs and Bradbury fish locks, cycling continued throughout the night. This allowed continual passage during the early morning and late evening hours throughout the season. Any alarms or shutdown of operations are automatically sent in to the river control center where fishway operations personnel were immediately notified. In the past, it appeared that when river herring were in the area, a one half hour to one hour cycle time captured the most fish.

River water temperature data (see Attachment 1) is monitored at the exit of the Skelton fishway via subsurface probes. River flow data (see Attachment 1) is collected at the Saco River Control Center and is documented as a daily mean river flow as passed through the Skelton Station.

6.2 Springs Dam Fish Lock - River Herring, American Shad, and Atlantic Salmon Information

6.2.1 River Herring

Previous studies have demonstrated that river herring successfully use the Springs Dam fish lock, therefore river herring were not counted passing through the fish lock in 2017.

6.2.2 American Shad

Despite numerous studies conducted to improve American shad passage through the fish locks since 1997, shad passage numbers remain low. Therefore, in consultation with the resource agencies trucks American shad captured at the East Channel fishway around the Springs and Bradbury Dams. During 2017, BWPH successfully trucked 3,163 American shad around the Springs and Bradbury dams (Please refer to Appendix A for a Summary of American Shad Passage Studies Previously Conducted at Springs and Bradbury Dams).

6.2.3 Atlantic Salmon

In 2017, a total of 9 Atlantic salmon passed through the Cataract East and West Channel fishways, one of which passed the Skelton fishway. Atlantic salmon were not counted passing through the Springs fish lock in 2017, but have readily passed through the fish locks or through the open taintor gates in the past.

6.2.4 American Eel

An upstream eel passage was designed, constructed, and installed at the Springs Island Dam in 2010. This new upstream eel passage is a permanently hinged structure that has the ability to raise and lower during high river flows. The Spring Island eel passage entrance is below the flashboards, therefore, the flashboards must be in place for installation and proper operation. The Spring Island flashboards were lost in June, 2014 and have not been replaced. Therefore, the Spring Island eel passage was not operational during the 2017 season.

6.3 Bradbury Dam Fish Lock - River Herring, American Shad, and Atlantic Salmon Information

6.3.1 River Herring

Previous studies have demonstrated that river herring successfully use the Bradbury Dam fish lock, therefore river herring were not counted passing through the fish lock in 2017.

6.3.2 American Shad

Despite numerous studies conducted to improve American shad passage through the fish locks since 1997, shad passage numbers remain low. Therefore, in consultation with the resource agencies trucks American shad captured at the East Channel fishway around the Springs and Bradbury Dams. During 2017, BWPH successfully trucked 3,163 American shad around the Springs and Bradbury dams (Please refer to Appendix A for a Summary of American Shad Passage Studies Previously Conducted at Springs and Bradbury Dams).

6.3.3 Atlantic Salmon

In 2017, a total of 9 Atlantic salmon passed through the Cataract East and West Channel fishways, one of which passed the Skelton fishway. Atlantic salmon were not counted passing through the Springs fish lock in 2017, but have readily passed through the fish locks or through the open taintor gates in the past.

6.3.4 American Eel

An upstream eel passage was designed, constructed, and installed at the Bradbury dam in 2010. This new upstream eel passage is a permanently hinged structure that has the ability to raise and lower during high river flows. The Bradbury eel passage entrance is below the flashboards, therefore, the flashboards must be in place for installation and proper operation.

The Bradbury flashboards were lost in June, 2014 and have not been replaced, therefore, the Bradbury eel passage was not operational during the 2017 season.

7.0 2018 Fishway Operations

The Springs and Bradbury fish locks will be operated in 2018 with the benefit of experience and insight gained in 1997-2017. General operational plans are summarized below.

1.) In the interim, due to less than desired shad passage effectiveness, truck all American shad captured at the East Channel fishway around the Springs and Bradbury Dams. Allow free passage of all American shad through the West Channel fishway.

2.) Pass all river herring and Atlantic salmon through the East and West Channel fishways, allow free passage through the locks and monitor passage at the Skelton fishway.

3.) Use the deep gate adjacent to the Springs Dam fish lock entrance to provide a continuous attraction flow throughout the fish migration period.

Skelton Project Executive Summary

The Skelton fishlift is the newest of the five fishways on the Saco River owned and operated by Brookfield White Pine Hydro LLC. The two head-of-tide fishways at the East and West Channels of the Cataract Project were first operational in 1993, while the Springs and Bradbury fishways became operational in 1997.

This fishway was built to pass anadromous fish species (Atlantic salmon, American shad, and river herring) as part of resource agency plans to restore these species to the Saco River. 2017 marked the sixteenth full year of operation of the Skelton fishlift. Due to logistical difficulties arising from precise rock blasting activities adjacent to the power house, severe winter weather conditions, and delays in the arrival of fishway electrical and mechanical components the new Skelton fishway was not operational until the fall of 2001. Therefore, 2001 did not constitute a full season of operation.

During the 2003 season, lifting ceased at the Skelton fishway during the summer months due to the Maine Department of Marine Resources (MDMR) safe handling temperature protocol for adult Atlantic salmon. This precluded most American shad from utilizing the Skelton fishway in 2003. During the 2004 and 2005 seasons, a camera was placed above the Skelton elevator enabling full visibility of the contents of the hopper shortly after initial lifting. This allowed fishway operators to observe for salmon or shad within the elevator and lower captured Atlantic salmon back into the tailrace (when river water temperature exceeds 22°C) while continuing to capture American shad.

In 2017, the Skelton fishlift was operated by personnel from BWPH operations division. It was opened on May 3rd and remained in operation, other than limited downtime for routine maintenance, until October 30th when the fishway was closed for the season. A total of 5,121 river herring, 221 American shad, and 1 Atlantic salmon successfully passed upstream.

The Skelton fishway will be operated in 2018 with the benefit of experience and insight gained during the 2001 through 2017 operating seasons. Estimates of passage effectiveness will be made

by enumerating American shad, river herring, and Atlantic salmon passing at the Cataract fishways, then comparing these passage numbers with the number of these fish captured at the Skelton fish lift. Behavioral issues such as lack of imprinting to upriver locations (especially for American shad) and spawning below the project (all three target species) will need to be taken into account when determining effectiveness. The underwater cameras will be utilized with the intention of observing Atlantic salmon, American shad, and river herring behavior in and around the fishway in an attempt to assist in capture efficiency.

8.0 Introduction

The Skelton Project (FERC No. 2527) is located on the Saco River in York County, Maine, approximately 11.1 miles upstream of the City of Saco. The Project is located in the towns of Buxton, Dayton, and Hollis, Maine. The Project is one of seven hydroelectric projects located on the mainstem of the Saco River.

The Skelton Project consists of a 1,695-foot long earth and concrete dam, a powerhouse that is integral to the dam, and an impoundment. The tailrace is excavated in the original riverbed and there is no river bypass section. The nameplate generator capacity of the Project is 21.6 megawatts (MW). The arrangement of the Project facilities is shown on Figure 4. Each of the eight spill gates maintains the capacity to pass 8,000 cubic feet per second (cfs).

The powerhouse contains two vertical-shaft Kaplan turbine-generator units. The Kaplan turbine units have a hydraulic capacity of 3,800 cfs. The generators are equally sized and have a combined nameplate rating of 16.8 MW. The gross head available to the site is approximately 76.5 feet.

The Skelton impoundment at the normal full pond elevation of 127.5' is approximately 488 surface acres. It extends upstream approximately 2.8 miles and is 0.2 miles wide at the broadest

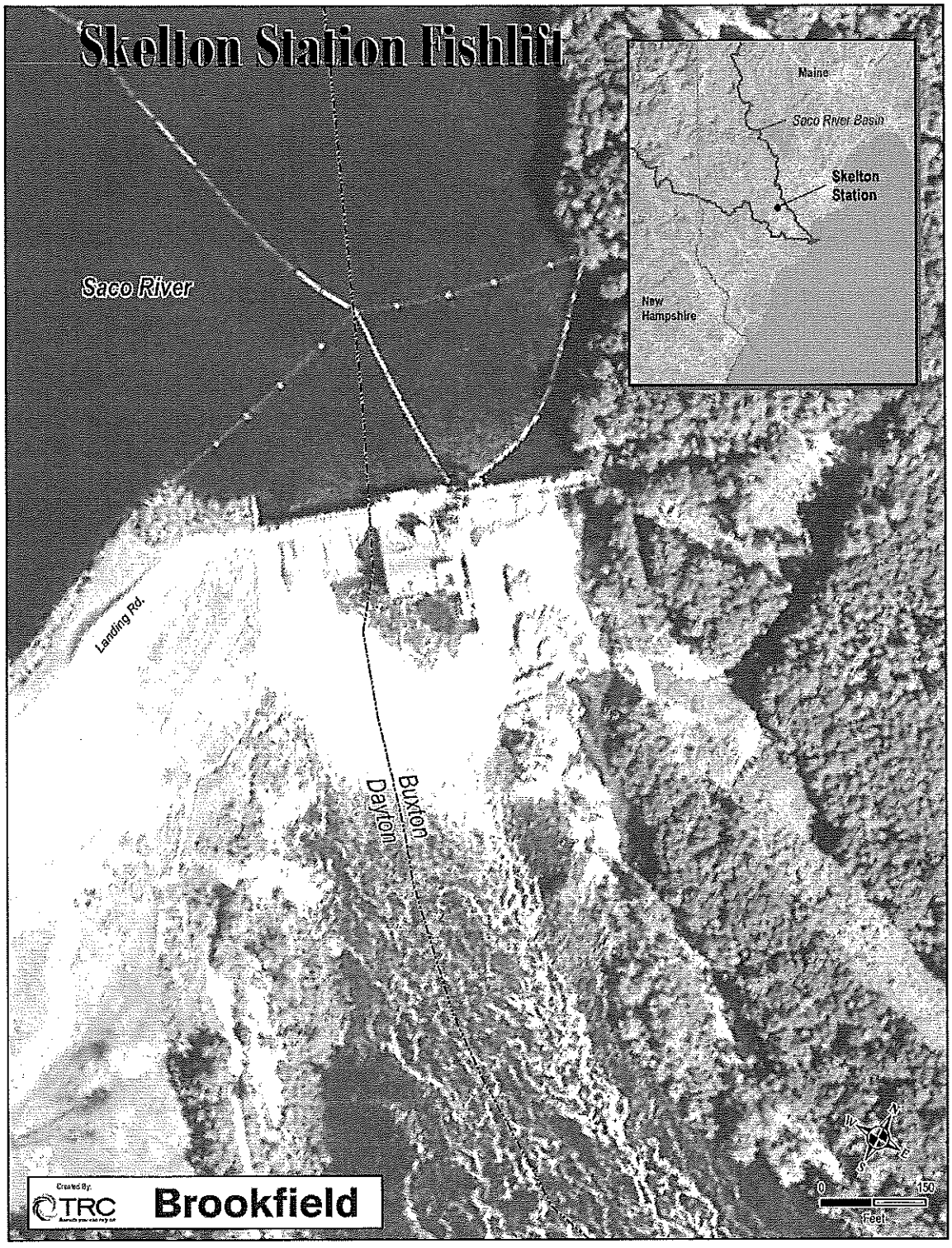


Figure 4. An aerial view of the Skelton Dam on the Saco River, Maine.

point. The impoundment includes 2.1 miles of Cook's Brook at its confluence with the Saco River.

The Skelton fishlift is the newest of the five fishways on the Saco River. The two head-of-tide fishways at the East and West Channels of the Cataract Project were first operational in 1993, while the Springs and Bradbury fish locks became operational in 1997.

Due to a number of major unanticipated setbacks during the construction process (i.e. logistical difficulties arising from precise rock blasting activities adjacent to the power house, severe winter weather conditions and delays in the arrival of fishway electrical and mechanical components) the fishway was not operational until the fall of 2001. Therefore, 2002 marked the first full operational season for the Skelton fishway.

In 2017, the Skelton fishway was operated by personnel from Brookfield White Pine Hydro, LLC (BWPH) operations division. 2017 marks the sixteenth full year of operation of the Skelton fishway. This fishway was built to pass anadromous fish species (Atlantic Salmon, American shad, and river herring) as part of resource agency plans to restore these species to the Saco River. Information learned during the 2001 through 2017 operating seasons will be used to effectively operate the fishway in 2018.

8.1 Operation of the Skelton Fishway

The Skelton fishway was opened on May 3rd and ran continuously other than limited downtime for routine maintenance until October 30th when the fishway was closed for the season

MDMR does not allow handling of Atlantic salmon when river temperature exceeds 22°C. Starting in 2005, a camera mounted above the Skelton elevator hopper has been utilized to monitor each lift for the presence of salmon and shad in the initial stage of each lift (before the hopper is lifted all the way to the top).

This allows fishway operators to observe for the presence of salmon within the elevator and lower captured Atlantic salmon back into the tailrace (when river water temperature exceeded 22°C) while continuing to capture American shad throughout the season.

The fishway at the Skelton Project is designed to operate up to river flows of 11,000 cfs. The fishway consists of a lower entrance flume and crowding area, a 90-foot high fishlift or elevator, an upper exit flume leading to the impoundment, and a trap and truck station located at the top of the lift. (see Figure 4) Depending upon species and numbers collected in any particular lift, the elevator may be directed to the upper flume area or may bypass the flume and continue on to discharge into the trap and truck tank. All fish discharged into the dump-tank must be manually netted into the holding tank, or placed into a discharge pipe releasing them into the Skelton impoundment.

The lower flume is approximately 55 feet long and maintains a velocity of between 1 and 1.7 fps, while the entrance velocity averages 3 to 6 fps. Total attraction water flow ranges from approximately 50 to 120 cfs depending on elevation of the tailrace. A problem identified during the start-up and shake-down period prevented desired flows from being met in 2001. When total attraction water flow would approach 60 cfs, a major vibration would occur in the attraction water piping. During the winter of 2001-2002, the previous licensee made the following modifications in an attempt to alleviate the vibration problem: 1. Move the pipe expansion joints from the valve side of the reducer to the pipe side of the reducer; 2. Install new valves and orifice plates lower in the three attraction water down pipes leading to the lower flume; 3. Remove the three manual valves; and 4. Provide additional supports to the 36" piping. These modifications were successful, and greatly reducing the vibration in the piping while still allowing desired flows in 2002. Approximately 50 cfs provided a five fps entrance velocity when Skelton station was passing a minimum flow of 400 cfs while 90 to 110 cfs was required to attain a five fps entrance velocity while both units were operating at 100%.

A counting window is located in the upper flume. Fish that are discharged into the upper flume via the elevator can be counted, and species can be determined before being allowed to

pass into the Skelton impoundment. The elevator can also discharge fish into a 5,000-gallon circular tank located above the upper flume. At this location, fish may be sorted and either placed into another holding tank to await trucking, or may be released directly into a bypass tube that discharges into the headpond.

Four cameras were utilized to monitor fish movement in and around the fishway in 2017. Three cameras were placed on the floor of the lower flume looking towards the surface directly downstream of the V-gate crowder. This location is used to detect fish entering or leaving the trap area. The fourth camera was placed above the fishway elevator attached to a safety railing. As eluded to previously, this camera provides a view of elevator contents shortly after initial lift cycle and allows for operation of the Skelton fish lift even when river temperature exceeds 22°C.

From June 24th to August 27th the Saco River temperature exceeded MDMR safe handling levels for Atlantic salmon. On August 28, 2017 river water temperatures again dropped below MDMR safe handling levels allowing salmon capture to continue. A summary of river temperature and river flow is provided in Attachment 1.

During the busiest of the fish migration period, fishway personnel were stationed at the Skelton fishway control room every day for between eight and twelve hours, seven days per week. The underwater video camera monitors were observed for fish activity and lifts were conducted as needed. If fish were not observed, a lift would be conducted "blindly" every one to two hours. During the remainder of the year, two to five lifts were conducted each day and fish activity in the lower flume was recorded while personnel were not present. Recordings were reviewed for fish activity within 24 hours. If salmon were observed on the recording, or lifted blindly, more intensive trapping operations resumed.

8.2 River Herring, American Shad, and Atlantic Salmon Information

8.2.1 River Herring

In 2017, 40,597 river herring were passed at the Cataract fishways. These fish were all allowed free passage through the Cataract East and West channel fishways, and the Springs and Bradbury fish locks. A total of 5,121 river herring were captured at the Skelton fishway. It is expected that the remainder of the river herring that were not lifted at the Skelton fishway commenced to spawn below the project.

The river herring daily lift schedule was adjusted by fishway personnel depending on the number of fish observed and the time of the run. This schedule maximized fish passage while minimizing labor requirements and wear and tear on fishlift components.

8.2.2 American Shad

During the 2017 season, 3,163 American shad were trucked above the Springs and Bradbury Dams to the Diamond Riverside boat launch release site (approximately half mile upriver from Cataract). 221 shad were lifted at Skelton fishway in 2017. It is assumed that many of the American shad that were not lifted at the Skelton fishway commenced to spawn below the project, as post-spawned American shad and juvenile American shad have historically been observed at the downstream Cataract Project. Also, the 9.3 miles between the Skelton Project and the Cataract Project provides adequate spawning habitat for approximately 25,000 adult American shad.

In 2018, Brookfield proposes to continue to truck all American shad around the Springs and Bradbury Dams. All American shad captured at the Skelton fishway will be released into the Skelton impoundment.

8.2.3 Atlantic Salmon

Nine Atlantic salmon were passed at the Cataract East and West Channel fishways in 2017. One of those fish was captured at the Skelton fishway in 2017.

BWPH biologists followed the Atlantic Salmon Trap Operating and Fish Handling Protocols provided by the MDMR in 2002 (See Attachment 2). Atlantic salmon monitoring at the Skelton fishway typically began at 08:00 and it was continually monitored for fish activity until between 16:00 and 19:00 depending on fish activity. Typically if there was an Atlantic salmon observed on the underwater cameras, biologists would quickly capture the fish. Between two and ten lifts would be made during the day regardless of fish activity. If a Salmon was captured during the morning hours, and temperatures and weather were conducive to holding fish, the salmon would be held in the 1,000 gallon holding tank. The tank was continually supplied with fresh water until another salmon was captured or until it was obvious that another salmon would not be immediately captured. Salmon were not held during warm weather days and were not held for more than four hours. After the salmon were transferred into the tank truck, the truck immediately left for the forty minute drive to the Ossipee River. In 2017, water temperatures exceeded 22°C on June 24, 2017 and stayed above 22°C until August 28, 2017.

During observations from 2001-2017, Atlantic salmon did not appear to have any problems finding the fishway entrance during generation flows. It also appears that salmon readily enter the trap area. In 2002, biologists experimented with passing minimum flows through different gates in an attempt to attract fish closer to the fishway entrance when the station is not generating. On October 9, 2002, minimum flow was passed through gate #5 instead of the normal gate #2. Gate #2 is an automatic gate, which can be run remotely by the River Control Center thus ensuring minimum flows during headpond level changes and during periods of inflow equal to outflow. Gate #5 is closest to the fishway on the East side of the river by passing minimum flow next to the fishway, BWPH biologists hoped to attract more salmon into the fishway during periods of no generation. Flows passing through gate #5 crashed over the ledges and dumped into the tailrace just below the fishway entrance thus tearing off the wooden end to the downstream passage sluice. The gate remained open for approximately five hours and no salmon were observed either on the cameras or in the tailrace area.

8.2.3.1 Atlantic Salmon Spawning Survey (Redd Survey)

Atlantic salmon spawning surveys (redd counts) were conducted once per week by boat or by foot in the Skelton tailrace area in conjunction with monitoring for adult eel mortalities during the months of September, October, and November. No salmon redds were observed in 2017.

8.3 Downstream Fish Passage

The downstream passage at the Skelton fishway was opened March 30th and remained open throughout the rest of 2017. Downstream passage observations were conducted most mornings at the Skelton Project bypass area between May 3rd and June 30th previous to the first upstream passage lift of the day. Between July 1st and October 30th, downstream passage observations were conducted most mornings and late afternoon/evening.

In addition to the standard downstream fish passage, the Skelton fishway also contains a downstream migrant pipe. The migrant pipe passes approximately 8 cfs over an overflow gate at the lower end of the upper flume of the upstream fishway (15 to 35 cfs). This gate and pipe allows safe downstream passage to any migrating fish drawn into the upper flume by the flows needed for the upstream fish passage.

8.3.1 Post Spawned River Herring

No post spawned river herring were observed utilizing the Skelton bypass in 2017.

8.3.2 Post Spawned American Shad

No post spawned American shad observed utilizing the Skelton Project in 2017.

8.3.3 Post Spawned Atlantic Salmon

No post-spawned Atlantic salmon were observed above the Skelton project in 2017.

8.3.4 Juvenile Clupeids

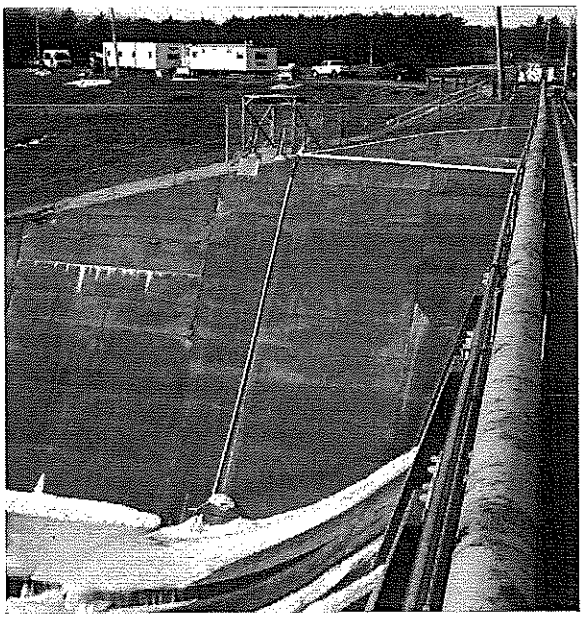
Juvenile clupeid observations were conducted most mornings and afternoons in the Skelton headpond, downstream bypass, and downstream migrant pipe area from July 1st hrough October 30th. During July and August, small schools of juveniles were occasionally seen out in the Skelton headpond but not utilizing the downstream bypass. No juveniles were observed utilizing the downstream passage or downstream migrant pipe outside of this time.

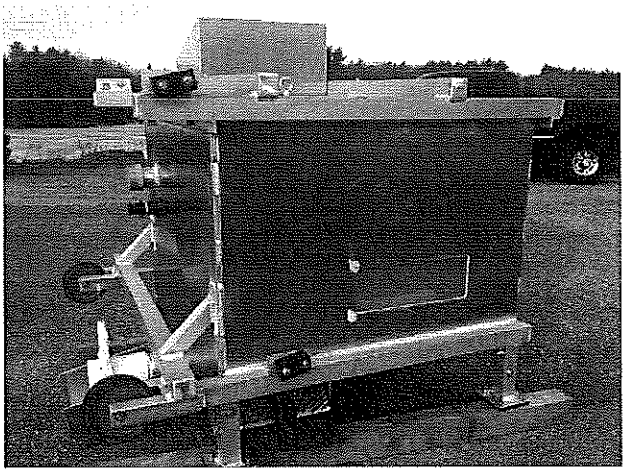
8.3.5 American Eel

Thirteen (13) weekly surveys were conducted for adult American eels mortalities in below the Skelton Project in 2017 between September 1st and November 30th (see Table 14). The surveys consisted of slowly scanning the shoreline and shallow areas of the Skelton tailrace area from a boat or by walking the shoreline with polarized glasses looking for eels. Between September 1st and October 24th , Saco river flows were so low that observations could only by foot survey along the shore. Heavy rains during late October quickly brought river levels high, along with turbidity, and although boat observations were attempted, visibility was very low. No dead eels were observed below the Skelton Project in 2017.

8.3.6 Upstream American Eel

2017 marked the fourth year of operation for the new Skelton eel lift. The lift was first operational on June 1st and ran continuously until September 18th when it was shut down for the season. The Skelton eel lift successfully passed 6,965 eels in 2017 (see Table 10).





8.4 Non-Target Fish Species

Seventeen (17) non-target species totaling 628 fish ascended the Skelton fishway in 2017 (Table 8). Sunfish (152 fish), were the most numerous of these non-target species, followed by smallmouth bass (147), and American eel (137). One gizzard shad was immediately culled while all three striped bass were returned to the tailrace.

Multiple other non-target fish were captured in the Skelton fishway hopper but were lowered back to the tailrace before dumping once it was determined that there were no target species captured. At the request of Maine Department of Inland Fisheries and Wildlife (MDIFW) the majority of the brook trout and brown trout captured at the Skelton fishway were released back into the Skelton tailrace area. All remaining non-target species were allowed free passage into the Skelton impoundment.

8.5 2018 Fishway Operations

The Skelton fishway will be operated in 2018 with the benefit of experience and insight gained during the 2001 through 2017 operating seasons.

All fish utilizing the fish lift will be identified and counted. Estimates of passage effectiveness will be made by enumerating American shad, river herring, and Atlantic salmon passing at the Cataract fishway, then comparing with the number of these fish captured at the Skelton fish lift. Behavioral issues such as lack of imprinting to upriver locations (especially for American shad) and spawning below the project (all three target species) will need to be taken into account when determining effectiveness.

The underwater cameras will be utilized with the intention of observing Atlantic salmon, American shad, and river herring behavior in and around the fishway in an attempt to assist in capture efficiency.

All American shad and river herring will be allowed free passage into the Skelton headpond. All Atlantic salmon will be trucked to the Ossipee River until river temperature reaches 22°C. Trucking salmon will be resumed when river temperature falls below 22°C.

Cameras will continue to be utilized in identifying and capturing American shad river temperature exceeds MDMR's safe handling temperature of 22°C (i.e. shad will be lifted, salmon will be returned to tailrace).

A flow of at least 25 cfs will be maintained through the 24" pipe to retain a 1 fps upper flume velocity for both upstream and downstream migrants.

9.0 Bar Mills

The Bar Mills downstream bypass was opened on March 30th (flow of 120 cfs) and remained in operation until December 31, 2017. Approximately 1,727 (7 fish per surface acre) adult river herring were transported from the Cataract East Channel fish lift and stocked above the Bar Mills Project in 2017. Juvenile clupeid observations were conducted twice per week in the evening between August 15th and October 15th (see Table 12). Small to moderate numbers of juvenile clupeids (schools of 20 to 200) were observed during late August and early September. All juveniles were observed dimpling in the headpond. No fish were observed near or using the

downstream bypass or in front of the units. BWPH will continue to stock river herring above the Bar Mills Project in 2018 and monitor out-migrating juvenile clupeid routes of passage in 2018.

The Bar Mills upstream eel passage was installed and operational on June 1st and remained in operation until September 18th. Only 2 eels were captured in 2017. The Bar Mills spillway is 264 feet long topped with heavily leaking hinged boards. It is expected that juvenile American eels pass across the entire length of the spillway through the leakage between hinged boards.

10.0 West Buxton

The West Buxton downstream bypass was opened on March 30th (flow of 200 cfs) and remained in operation until December 31st. Approximately 1,003 adult river herring (8 fish per surface acre) were transported from the Cataract East Channel fish lift and stocked above the West Buxton Project in 2017. Juvenile clupeid observations were conducted twice per week in the evening between August 15th and October 15th (see Table 12). Small to moderate numbers of juvenile clupeids (schools of 20 to 200) were observed during late August and early September. All juveniles were observed dimpling in the headpond. No fish were observed near or using the downstream bypass or in front of the units. BWPH will continue to stock river herring above the West Buxton Project in 2018 and monitor out-migrating juvenile clupeid routes of passage in 2018.

The West Buxton upstream eel passage was operational on June 1st and remained in operation until September 18th. 2,425 American eels passed upstream at the West Buxton eel passage and ranged in size from 80 mm to 600 mm (Table 11).

11.0 Bonny Eagle

The Bonny Eagle downstream bypass was opened on March 30th (flow of 200 cfs) and remained in operation until December 31st. Approximately 1,627 adult river herring (7 fish per acre) were transported from the Cataract East Channel fish lift and stocked above the Bonny Eagle Project in 2017. Juvenile clupeid observations were conducted twice per week in the evening between

August 15 and October 15 (see Table 13). Small to moderate numbers of juvenile clupeids (schools of 20 to 200) were observed during late August and early September. All juveniles were observed dimpling in the headpond. No fish were observed near or using the downstream bypass or in front of the units. BWPH will continue to stock river herring above the West Buxton Project in 2018 and monitor out-migrating juvenile clupeid routes of passage in 2018.

The Bonny Eagle upstream juvenile American eel passage was installed in fall of 2017 and will be operational on June 1, 2018.

Appendix A

Summary of American Shad Passage Studies Conducted Previously at Springs and Bradbury Dams

A shad fallback study was conducted at the Cataract East and West Channel fishways in 1999 to identify if fallback contributed to the low fish lock passage rates observed in 1998. This study consisted of tagging 247 American shad and releasing them into the Cataract headpond to observe whether the fish were falling back into the tailrace and being captured in the fishway for a second time. None of the 247 tagged American shad were recaptured at the Cataract East or West Channel fishways.

During the 2000 season, 10 American shad were radio tagged, released at the Cataract fishlift, and tracked manually for two weeks in June. In short, the ten shad swam a circuit that ran from the East Channel forebay up past Jubilee Park and to the Spring Island fishway. Although nine of the ten-tagged fish made appearances at the Spring Island fish lock, and two at the Bradbury fish lock, radio telemetry data indicated that shad spent most of their time between the East Channel forebay and the upper end of Jubilee Park. It did not appear that shad were "holding up" in any particular location for long periods of time. All Spring Island gates were closed during the tracking period and no fish passed through the open Bradbury gate.

During the 2001 season, BWPH experimented with a variety of measures to enhance fish passage including adjusting the flow through the deep gate at the Spring Island dam which is adjacent to the Spring Island Lock, installation of lights just inside the fish lock entrances, and the use of additional cameras for monitoring passage.

Deep gate flow adjustments were made in 2001 in an attempt to help attract fish to the fish lock by providing more flow, as well as to try to hold shad in the vicinity of the fish lock during fish lock operations by providing a constant flow in that area. Numerous settings of the deep gate adjacent to Spring Island Lock were attempted and the results. indicated that

the deep gate setting effected fish passage at the Spring Island lock. A deep gate setting of 0.25 ft. appeared to work the best (with all other gates closed). When the deep gate was opened at 1 ft or more shad did not readily enter the fish lock entrance. At the lower settings (1 to 3 ft) a back eddy was created which tended to lead fish away from the fish lock. At higher deep gate settings (> 3 ft), attraction flow from the fish lock entrance was masked by flows from the deep gate.

Mercury vapor lights were installed in 2001 in an attempt to eliminate shadows at the fish lock entrances. A 500-Watt mercury vapor lamp was installed inside the fishway entrance but behind the crowder of each fish lock during the season. Results of the study were inconclusive; however BWPH will continues using the lights to enhance fish lock passage effectiveness.

In an attempt to gather additional information about shad activity in and around the fish locks, additional cameras were added in 2001. . The cameras were installed in an attempt to establish whether shad were entering and leaving the fish lock entrance, or not entering the fish lock at all. The tailrace camera observed many shad. Approximately half of those observed in the tailrace were observed at the entrance camera, and very few actually swam up to the crowder. Most shad were seen in small schools of 2 to 8 fish and would enter and quickly exit the fish lock entrance. Camera observations indicated that American shad do not appear to be having any difficulties finding the fish lock entrance; but hesitatant to actually enter the fish lock, or approach the fish crowder. This hesitation that occurs just inside the fishway entrance may be attributable to the crowder doors, or possibly disorienting flows encountered in the fish lock flume.

In 2014, in an attempt to increase American shad passage at the Springs and Bradbury dams, a total of 60 adult American Shad were collected out of the East Channel fish lift at the Cataract Project on three dates (June 16, 19, and 23), gastrically radio-tagged, and immediately released into the East Channel via the flume. Releases coincided with operational modifications made by Brookfield to adjust the differential between the Spring Island and Bradbury headpond and tailrace elevations to achieve an approximate velocity of

8.0 ft/s through gates at Spring Island and Bradbury dams. Movements of radio-tagged shad were monitored via a series of six stationary telemetry receivers (located downstream of the East and West Channel dams, upstream and downstream of Spring Island dam, and upstream and downstream of Bradbury dam. Results of this study may be found in BWPH's *Assessment of Upstream Passage of Adult American Shad at the Spring Island and Bradbury Fish Locks, Cataract Project, Saco River, Maine* (December 2014).

Attachment B

2018 UPSTREAM EEL PASSAGE MONITORING

HIRAM HYDROELECTRIC PROJECT

FERC NO. 2530

Prepared for:

Brookfield White Pine Hydro
Lewiston, Maine

Prepared by:

Kleinschmidt

Pittsfield, Maine
www.KleinschmidtGroup.com

January 29, 2019

2018 Upstream Eel Passage Monitoring

Hiram Hydroelectric Project

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September 2018

2018 UPSTREAM EEL PASSAGE MONITORING
HIRAM HYDROELECTRIC PROJECT

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APPENDICES

1.0 INTRODUCTION

Brookfield White Pine Hydro, LLC (White Pine Hydro) is the licensee for the Hiram Hydroelectric Project (Hiram Project) (FERC No. 2530), located on the Saco River in York and Cumberland counties in southern Maine (Figure 1). The Hiram Project is approximately 46 river miles upstream from the confluence of the Saco River and the Atlantic Ocean (Figure 1).

In 2007, the licensee entered into the Saco River Fisheries Assessment Agreement (Agreement) with state and federal agencies, and several non-governmental organizations (FPL Energy 2007). The Agreement sets forth a comprehensive plan to provide fish passage at dams on the main stem of the Saco River, including constructing one upstream American eel passage system at the Hiram Project by June 1, 2020. As noted in the 2007 Agreement, the schedule for the development and implementation of eel passage measures may be delayed following consultation and agreement with the U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), and Maine Department of Marine Resources (MDMR) that American eels are not yet sufficiently abundant to require passage or to provide enough data to allow for a determination of the type or location of eel passage measures.

In accordance with the Agreement, White Pine Hydro monitored juvenile eel movements at the Hiram Project in 2018 to determine whether they congregate or attempt to ascend the Hiram dam or other project structures. White Pine Hydro submitted a draft study plan to the USFWS, MDMR, NMFS, Maine Department of Environmental Protection, and Maine Department of Inland Fisheries and Wildlife on February 12, 2018; comments were received from USFWS that were incorporated into a final study plan.

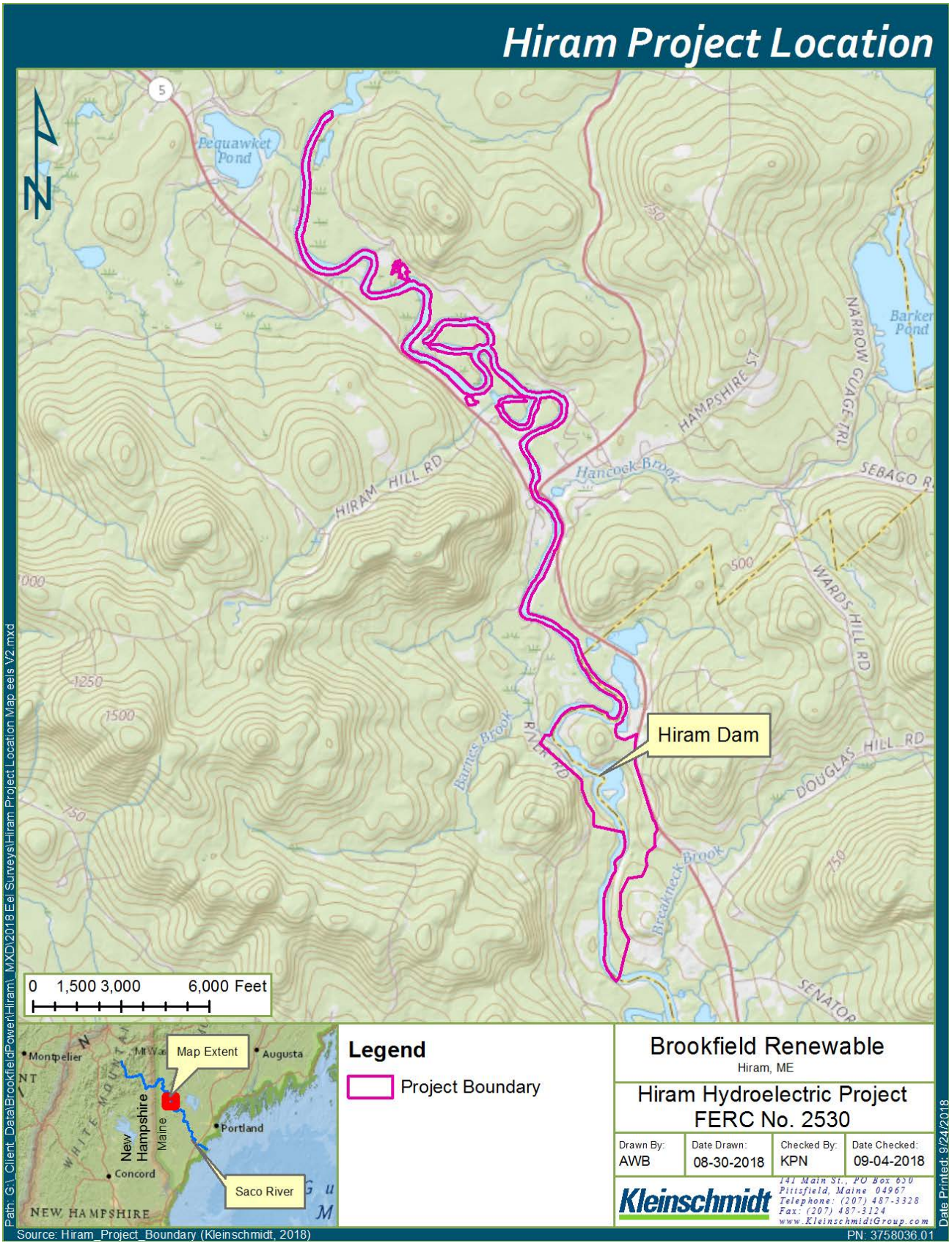


FIGURE 1 HIRAM PROJECT LOCATION MAP

2.0 METHODS

In accordance with the study plan, biologists conducted 15 nighttime surveys at the Hiram Project during the 2018 upstream eel migration season (i.e., June through August) from safely accessible locations along project structures. The survey focused on spill and debris gates, discharge areas below the gates, the spillway, and the tailrace (Figure 2). Surveys were conducted twice a week from June 5 to June 28, 2018 and once a week from July 5 to August 16, 2018. The monitoring schedule was developed to target the beginning, peak, and end of the migration period. Surveyors used binoculars and spotlights to observe eels during non-spill conditions from the top of the dam and the tailrace. During each survey, biologists noted the location of juvenile eels, the approximate number of eels at each location, the approximate size classes of eels at each location, and weather conditions. Each survey lasted approximately 1 hour and took place after sunset between 20:40 and 00:05. White Pine Hydro ended the monitoring after the August 16, 2018 survey because no eels were observed in the first 2.5 weeks of August 2018.

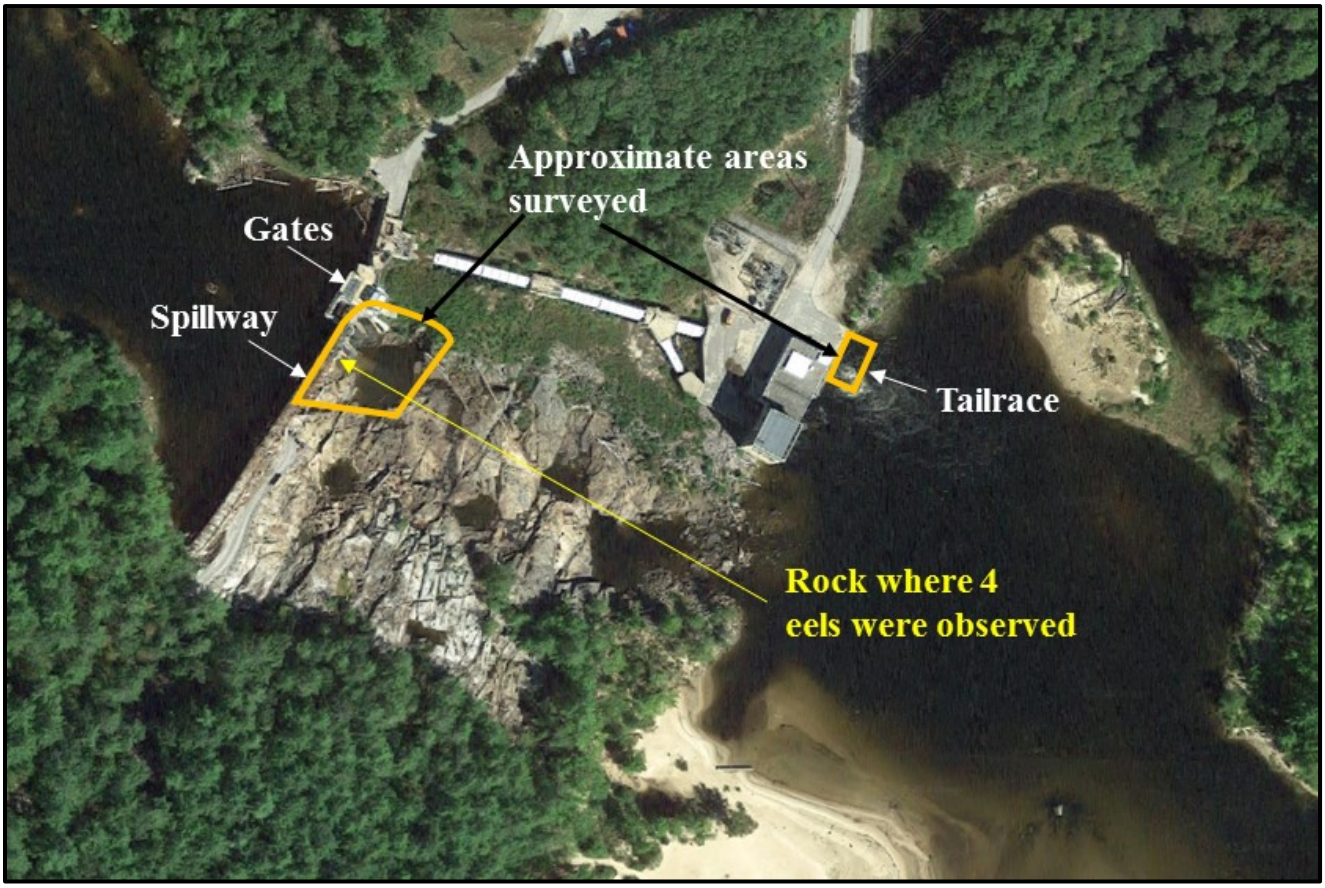


FIGURE 2 SURVEY AREAS FOR 2018 JUVENILE EEL MONITORING AT THE HIRAM PROJECT

3.0 RESULTS

Five eels were observed throughout the monitoring period. Four eels were observed on bedrock to the right of the spill gates (Figure 2, Photo 1) and one eel was seen on the concrete downstream of a debris gate (Photo 2). The number of eels observed during each survey ranged from 0 to 2; eels were observed on June 7 (1), July 5 (2), July 12 (1), and July 24, 2018 (1) (Table 1). The lengths of eels ranged from approximately 3 to 5 inches (75 to 125 mm). No eels were observed at the tailrace. One or both units were operating during each survey. There was no spill during the monitoring except during the August 1, 2018 survey (Table 1); however, there was leakage through the debris gates during every survey.

PHOTO 1 **LOCATION OF JUVENILE AMERICAN EELS ON BEDROCK ADJACENT TO THE SPILL GATES AT THE HIRAM PROJECT DURING THE 2018 NIGHTTIME SURVEYS**

PHOTO 2 **LOCATION OF A JUVENILE AMERICAN EEL DOWNSTREAM OF A DEBRIS GATE AT THE HIRAM PROJECT DURING THE 2018 NIGHTTIME SURVEYS**

TABLE 1 SUMMARY OF THE 2018 NIGHTTIME JUVENILE EEL SURVEY RESULTS AT THE HIRAM PROJECT

2018 Date	Start Time	End Time	# Eels Observed	Description/Location	Length (inches and mm)	Spillway Flow (cfs)	Temperature (°F), Weather	24-hr Precipitation (inches)[1]	Percent Full Moon[2]
6/5	23:00	23:50	0	N/A		0.0	Approximately 50°, cloudy, lightly raining	0.14	67
6/7	22:45	23:45	1	Bedrock at base of dam	3-5" (75-125 mm)	0.0	55°, clear	0.00	48
6/12	21:00	22:10	0	N/A		0.0	75°, clear to partly cloudy	0.00	5
6/14	23:00	23:55	0	N/A		0.0	55°, light rain	0.14	1
6/19	21:00	22:00	0	N/A		0.0	52°, clear	0.02	34
6/21	23:30	0:05	0	N/A		0.0	54°, clear	0.00	56
6/26	23:00	23:45	0	N/A		0.0	57°, clear	0.00	96
6/28	23:25	0:00	0	N/A		0.0	70°, 1 hour after big rain storms, warm and muggy	0.64	99
7/5	20:55	21:55	2	Bedrock at base of dam	3-5" (75-125 mm)	0.0	Warm, clear, humid	0.00	63
7/12	20:55	21:50	1	Bedrock at base of dam	3-5" (75-125 mm)	0.0	Approximately 70°, partly cloudy	0.00	0
7/19	22:55	23:45	0	N/A		0.0	60°, clear	0.00	50
7/24	21:00	21:55	1	Concrete spillway	3-5" (75-125 mm)	0.0	71°, clear	0.03	87
8/1	22:45	23:15	0	N/A		315.8	70°, no rain (had been raining earlier in the evening)	0.38	80
8/9	20:40	21:15	0	N/A		0.0	74°, clear	0.54	5
8/16	22:20	23:00	0	N/A		0.0	63°, clear to partly cloudy	0.01	33
TOTAL			**5**	-	-	-	-	-	-

[1] Weather Underground (2018)
[2] The Old Farmer's Almanac (2018)

4.0 SUMMARY

The 2018 monitoring confirmed that there were very few juvenile American eels at the Hiram Project. The number of juvenile eels observed at the Hiram Project was low compared to observations reported from other dams on the Saco River in recent years using the same survey methods. For example, 59 eels were observed at the Bonny Eagle Hydroelectric Project in 2016 (Kleinschmidt 2016), and 1,020 were observed at the West Buxton Hydroelectric Project in 2015 (Kleinschmidt 2015). Pursuant to the Agreement, White Pine Hydro plans to consult with the resource agencies regarding the study results and whether there is currently a need for installation of an eelway at the Hiram Project.

5.0 REFERENCES

FPL Energy Maine Hydro LLC. 2007. Saco River Fish Passage Assessment – Offer of Settlement and Explanatory Statement – Cataract Project (no. 2528), Skelton Project (No. 2527), Bar Mills Project (No. 2194), West Buxton Project (No. 2531), Bonny Eagle Project (No. 2529), Hiram Project (No. 2530), March 26, 2007.

Kleinschmidt. 2015. Upstream Juvenile Eel Passage Study. West Buxton Hydroelectric Project. FERC No. 2531. November 2015.

Kleinschmidt. 2016. Upstream Juvenile Eel Passage Study. Bonny Eagle Hydroelectric Project. FERC No. 2529. September 2016.

The Old Farmer's Almanac. 2018. Moon Phase Calendar. Available at https://www.almanac.com/astronomy/moon/calendar.

Weather Underground. 2018. Historical Weather. Available at https://www.wunderground.com/history/.

ATTACHMENT C

Recent Trap Counts for Fish Returns to Maine by River

River	Trap Location	Am.Shad	At.Salmon (MSW)	At.Salmon (grilse)	River Herring	Striped Bass	Sea Lamprey	Trap Opened	Trap Closed	Updated
Androscoggin	Brunswick	23	5	0	67	1	41	June 1	November 6	November 16, 2020
Aroostook	Tinker Dam	NC	3	0	NC	NC	NC	July 2		October 30, 2020
Kennebec	Benton Falls	9	0	0	2847095	0	6	May 1	October 31	October 21, 2020
Kennebec	Lockwood Dam	180	47	4	143269	347	46	May 1	October 31	November 16, 2020
Narraguagus	Cherryfield	780	93	13	NC	0	0	April 29		October 15, 2020
Penobscot	Milford fish lift	11276	1576		1952537	325	5565	April 22	November 16	November 16, 2020
Penobscot	Orono	2	26	0	121787	0	1028	April 22	November 16	November 16, 2020
Penobscot	Weldon Dam	NC	NC	NC	NC	NC	NC	April 30	November 16	November 16, 2020
Saco	Cataract (East + West Channels)	5368	2	1	34404	264	0	May 1		August 30, 2020
Saco	Skelton	48	2	0	34249	48	0			August 30, 2020
St. Croix	Milltown Dam	3	0	0	611907	0	0	April 15		July 30, 2020
Union	Ellsworth	0	3	0	526907	0	0	May 1	November 1	November 16, 2020

Atlantic salmon MSW = multi sea winter (≥ 63 cm fork length); grilse = one sea winter (< 63 cm fork length)
River herring counts = combined count of alewife and blueback herring

Appendix B

Follow-up Communications with Stakeholders and the Applicant

Bonny Eagle Revised LIHI Application Review Questions & Answers

Background

1. *Please provide documentation that FERC approved the inflatable dam project and a copy of the MEDEP permit noted to be required. Also, a July 18, 2011 letter to FERC states that the normal operating pond level with the rubber dam is 216.3, not 215.3 as noted in the LIHI application. Please confirm the correct elevation.*

   Brookfield Response:
   The normal operating pond level is 216.3, the LIHI application stated an erroneous elevation in table 1-1 but states the correct elevation within its discussion in all other sections. Attached is a copy of the 2010 approval letter from FERC on June 2, 2010, as well as the MEDEP permit dated May 5, 2010 and the SRCC permit dated April 6, 2010.

2. *Please discuss how the concerns raised by the USF&WS and MIF&W on the rubber dam installation were resolved.*

   Brookfield Response:
   Agency questions and concerns were raised during the pre-application meeting held on January 19, 2020 with the USFWS, National Marine Fisheries Service, Maine Department of Marine Resources, Maine Department of Environmental Protection, and MDIFW.

   MDIFW raised concerns regarding the drawdown and refill and minimum flows. As discussed at the meeting, these concerns were addressed through condition 6 of the MDEP permit, issued May 5, 2010.

   USFWS had concerns with the depth of water in the tailrace when the rubber dam is dropped and fish pass via spill, as well as concerns for future eel passage. Downstream passage of fish, including any operational or structural modifications to Projects made in response to agency requests, is reported on annually in the Saco River Annual Diadromous Fish Passage reports. The upstream eel passage facility, installed in 2018, was designed in full consultation with the USFWS and sited, as appropriate, considering the location of the existing rubber dam.

3. *Please provide FERC approval and any other permits associated with the 2019-unit replacement project as well as any agency concerns, if they existed, with the Project. When did this unit become operational?*

   Brookfield Response:
   Bonny Eagle unit #6 was taken out of service on March 30, 2016, see attached FERC submittal dated July 1, 2016. No FERC approval nor permits are required for unit repairs/replacement provided that there is no change to the authorized installed capacity or hydraulic capacity of the Project. The unit replacement became operational on June 5, 2020.

4. *Please provide your best estimate of the acreage of lands owned by Brookfield within the Project boundary.*

   Brookfield Response:
   There are approximately 45 acres of land within the FERC Project Boundary at Bonny Eagle.

5. *Please identify when Brookfield purchased BWPH.*

   Brookfield Response:
   In 2013, Brookfield acquired the Bonny Eagle Hydroelectric Project.

6. *Please confirm that Table 2 is saying that Bar Mills does have downstream anadromous passage and upstream eel passage.*

   Brookfield Response:
   Bar Mills does have FERC approved downstream passage and upstream eel passage. BWPH is currently working with the agencies on a Decommissioning Plan and Surrender Application for the Bar Mills Project; the Project is currently inoperable and downstream fish passage is augmented by the fact that the Project spills.

<u>Ecological Flows</u>

1. *Please provide an estimate of the typical annual % of time when only the minimum flows (or inflow if less) is released to the bypass reach and the annual % of time with flows near or are in excess of 4,500 cfs are passed into the bypass.*

   Brookfield Response:
   Due to the operational constraints of the Obermeyer, flows in excess of the 25 cfs minimum flow are always passed into the bypass reach. As such, the estimated typical annual % of time when only minimum flows (or inflow if less) is released to bypass is 0% of the time.

   The estimated typical annual % of time with flows near or are in excess of 4,500 cfs are passed into bypass is approximately 42 days per year, or 11.5% of the time per year.

2. *Please confirm if the Bonny Eagle flow monitoring system is managed via 24/7 staff onsite at Bonny Eagle or if that monitoring is done offsite.*

Brookfield Response:
The Project is monitored and operated 24/7 by staff offsite at Brookfield's National System Control Center located in Marlborough, Massachusetts. Onsite staff monitoring is also conducted daily Monday-Friday and on call, as needed, during non-business hours.

Fish Passage

1. *Please provide the status of the fisheries studies required by the license Article 406, sections D, E and F. The application identifies the requirements but is silent on what was done. As a Project seeking its initial LIHI certification, compliance with such requirements must be demonstrated.*

Brookfield Response:

Article 406 has been amended by the following attached amendments.

- July 18, 2007 Order modifying and approving fish passage assessment report and recommendations for fish passage and fisheries management
- March 4, 2013 Order Amending Downstream Fish Passage Facilities Study Plan and Interim Downstream Fish Passage Study Plan
- July 17, 2019 Order approving revised fish passage assessment and fish passage installation schedule

Pursuant to license requirements, downstream Atlantic salmon smolt studies were conducted at the Project in 1997 (1998 report attached). Downstream Atlantic salmon smolt studies determined that 91% and 93% of Atlantic salmon smolts utilized the current downstream passage. With modifications to the current gate to pass flows as an overflow/top drop gate, it would further improve passage. The FERC agreed with the recommendations and approved the recommendations and gate replacement.

Also, in accordance with the Project license, the licensee was required to file annual status reports with the Commission by March 31 that contain recommendations regarding what, if any, downstream fish passage studies for juvenile and adult American shad and river herring and adult Atlantic salmon could be undertaken in the coming year. By Order dated March 4, 2013, FERC eliminated this requirement in deference to the downstream passage provisions and study requirements of the 2007 Saco River Fish Passage Settlement Agreement, which was incorporated into the Project license by Order dated July 18, 2007.

Specifically, the 2007 Order incorporated the terms of the 2007 Settlement Agreement and required "a plan for a three-year study of Atlantic salmon kelts to determine/examine downstream passage routes at select Saco River sites" (Ordering Paragraph D) and a two-year semi-quantitative study of downstream passage effectiveness for clupeids (using, for example, standardized observations, video cameras, and rotary screw traps, or similar methods) (Ordering Paragraph E).

On June 29, 2010, FPL Energy filed its Saco River Kelt Passage Evaluation Plan with FERC and FERC subsequently issued an order approving the plan on August 18, 2010. The final Phase 1 of the Saco River Kelt Passage Evaluation was filed with the FERC on January 27, 2011. Phase 2 requires a radio-telemetry study of post-spawned Atlantic salmon kelts at the Skelton Project (FERC No. 2527) and the Bar Mills Project (FERC No. 2194), pending availability of test fish. The final study plan, including agency comments, was filed with FERC on July 27, 2011. The FERC issued an order approving the Saco River Phase 2 Kelt Passage Evaluation Plan on November 3, 2011.

On March 26, 2015, BWPH filed a final study plan to conduct Downstream Passage Evaluation for Juvenile Clupeids at the Bar Mills (FERG No. 2194), Bonny Eagle (FERG No. 2529), and West Buxton (FERG No. 2531) Projects. FERC approved the proposed study plan on April 30, 2015. In accordance with the approved study plan, BWPH fish passage staff conducted visual observations twice per week at all three projects from approximately August 15 through October 15 during each year of the study (2015 - 2017). Relative abundance and behavior of juvenile clupeids in the areas of the forebay in the vicinity of the downstream fishway were noted. A report was filed with the Commission on March 26, 2019 summarizing the observations. The report filing also requested FERC allow BWPH to discontinue downstream passage observation studies until such time as upstream passage is constructed at the Projects, including Bonney Eagle. By letter dated April 24, 2019, FERC suspended downstream monitoring at the Projects until such time as upstream passage facilities are completed.

On May 8, 2019, BWPH filed an amendment to the 2007 Saco River Fish Passage Settlement Agreement, which was approved by the FERC on July 17, 2019, that revised the operational date for upstream fish passage at the Bonny Eagle Project to May 1, 2029.

Downstream passage activities are discussed in the annual Saco River Diadromous Fish Passage Reports. BWPH submitted the 2019 River Diadromous Fish Passage Report on March 26, 2020 (see attached).

2. *Please identify the typical period operational period for the 1) upstream eel passage and 2) downstream fish passage bypass.*

Brookfield Response:
Upstream eel passage is typically operational June 1 through September 30. Downstream fish passage is typically open from April 1 through December 31 as conditions allow.

3. *Please provide a copy of the referenced FERC July 2019 Order approving the discontinuation of the downstream fish monitoring, as well as documentation of fishery agency (ies) agreement with this approach. The Order could not be found in FERC eLibrary and was not linked in the Application. The agency emails contained in the March 21, 2019 letter to FERC on this subject only identify agency agreement on changes in the normal operation of the fish passage facilities, and do not mention agreement on monitoring discontinuation.*

Brookfield Response:

See attached April 24, 2019 FERC letter suspending the requirement for observation until upstream passage facilities are installed. Agency correspondence and consultation regarding this request is discussed in BWPH's March 26, 2019 filing of the Downstream Passage Evaluation for Juvenile Clupeids, which included the request to suspend continued monitoring.

4. *Please identify what actions were taken to address the downstream passage recommendation issued by NOAA Fisheries as a result of their 2016 inspection and report.*

Brookfield Response:

> "*The upstream fishway entrance conditions can be improved by replacing the upward opening gate with another gate type that does not produce hydraulic conditions that deter fish from committing to the bypass. Upward opening gates produce rapid acceleration of the sluiced water which triggers an avoidance response in fish (Haro et al, 1997). A downward opening slide gate, a bottom hinge gate, or just keeping the gate fully open at all times will result in more conducive hydraulic conditions for downstream passage." (NOAA 2016)*

A bottom hinge gate at the Bonny Eagle downstream bypass was already in place at the time of the inspection. The bottom opening slide gate in front of the hinge gate was removed from the water surface after the agency inspection so that water would flow over the hinge gate as suggested by NOAA.

5. Please provide 1) a discussion of the anadromous fish stocking activities during the past five years, and 2) a discussion of typical riverine species in the Project waters.

Brookfield Response:
1). Adult river herring (at approximately 5 to 7 fish per surface acre) are transported from the Cataract East Channel fish lift and stocked above the Bonny Eagle Project as discussed in the March 26, 2019 Downstream Passage Evaluation for Juvenile Clupeids report and the FERC letter dated April 24, 2019.

Stocking records for river herring in the Saco River above the Bonny Eagle project are described and the table below:

YEAR	TOTAL ADULT RIVER HERRING STOCKED
2015	1500
2016	0 (Due to low Herring Run)
2017	1627
2018	1582
2019	1060
2020	1500

6. *Please provide a summary of the monitoring done for upstream eel passage, since License Articles 407 does not seem to be limited to anadromous species.*

   Brookfield Response:
   Upstream eel monitoring efforts consists of trap checks three times per week where fish numbers, size and weight are recorded and reported in the annual Saco River Diadromous report to FERC and all fisheries agencies for review and comment

7. *Briefly describe the what the eel passage ladder is made of.*

   Brookfield Response:
   The Bonny Eagle upstream eel passage consists of a standard aluminum ramp and associated attraction water. The ramp empties into a collection tank at the top where eels are collected, and biological data is taken three times per week for duration of monitoring efforts. The design was agency approved prior to construction and agency inspected once complete.

8. *Provide a description of the downstream anadromous fish passage feature as well as a summary of the monitoring studies conducted up to 2019 when FERC approved temporary cessation of these monitoring activities.*

   Brookfield Response:
   The downstream anadromous fish bypass consists of a top-drop gate passing 200 cfs. from April 1 through December 31 as conditions allow. Summary of study provided in attachment and discussed above.

9. *Please provide a discussion of the funding requirement of the Saco Fish Passage Agreement and describe its funding over the past five years, at a minimum.*

   Brookfield Response:
   The funding requirement in section 4 of the 2007 Saco Fish Passage Agreement discusses in detail the required funds to support the fisheries management and restoration. It states the licensee will provide funding up to $40,000.00 by 2010 and an additional $10,000.00 annually for an additional 6 years. The agreement outlines support to the Saco River Salmon Club as a one-time grant of $25,000.00 and the establishment of the Saco River Salmon Enhancement Fund is discussed in detail in section 4.3 of the agreement. The agreement also outlines funds to support public education as follows, the licensee agrees to provide up to $5,000.00 per year to develop and implement a public education program.

   The funding provisions of the Settlement Agreement were amended with the 2019 Saco River Fish Passage Settlement Agreement Amendment. Specifically, Sections 4.1, 4.2 and 4.4 were replaced in their entirety with:

   4.1 Funds to Support Inland Fisheries Habitat Restoration, Stream Connectivity and Management - Licensee agrees to support various fisheries management projects which may include but are

not limited to: enhancing and restoring inland fisheries habitat and habitat connectivity; assessing inland fisheries populations; and/or the implementation of inland fisheries management activities within the Saco River Basin. Licensee agrees to fund such activities up to an aggregate of $10,000 per year for eleven years (2019- 2029), for a total of $110,000.

The MDIFW shall, with input and consideration from MDMR, develop inland fisheries management activities funded under this section. For any activities located partially or wholly within Licensee's FERC Project boundaries, MDIFW and Licensee shall, with input and consideration from MDMR, develop management activities funded under this section. Such agreement shall not be unreasonably withheld. Unless MDIFW and Licensee agree to a planned alternative schedule of activities and funding, Licensee will fund activities by $10,000 per year for eleven years beginning in 2019, with an ability to accrue funding in escrow to cover larger planned projects. In no case shall Licensee be required to exceed the total funding required under this section.

4.2 Funds to Support Saco Salmon Restoration Alliance - Licensee agrees to pay a one-time grant of $36,000 for upgrades to the hatchery of the Saco Salmon Restoration Alliance ("SSRA"). Such funds will be expended by the SSRA for continued rearing and stocking of Atlantic salmon as part of the overall restoration goals for the Saco River Watershed." 4.4 Funds to Support Public Education - Licensee agrees to provide total funding of $10,000 to the MC-ASF for the Fish Friends program expansion exclusive to schools within the Saco River Watershed. Funding will be used expressly to provide necessary aquarium equipment and aquarium maintenance equipment for the addition of ten schools, or to replace faulty equipment at participating schools currently obtaining eggs from the SSRA hatchery. The intent of the education program will be to promote the cooperative fisheries management and fisheries restoration efforts on the Saco River. The Parties agree that the funding will be provided in $2,000 installments so that equipment purchases can be made by October of each year, beginning in 2018. Exceptions to the above schedule to delay a single year's funding by up to one year or to combine it with the funds for the following year may be requested by consensus of the Parties, which request will not be unreasonably denied by Licensee. However, in no case shall such request require the total funding by Licensee under this section to be increased beyond $10,000. MC-ASF will manage this fund as an account at an accredited financial institution. If this account bears interest, that interest shall be part of the fund and treated no differently than funds deposited by Licensee. SSRA agrees to provide MC-ASF with one (1) itemized invoice annually for equipment purchases. The Parties agree that account debits will not be unreasonably denied or withheld. SSRA will be asked to provide an annual report to both Licensee and MC-ASF for all eligible purchases until such time that the funds are fully expended. MC-ASF agrees to provide SSRA and Licensee with annual, year-end statements from the accredited financial institution. The Parties agree that residual funds will remain in the aforementioned account until such time as they are fully expended for the purposes stated above.

Notwithstanding the above, Licensee will not be required to expend funds under this section beyond the year 2024. The Parties agree that the expansion of the Fish Friends program will be a cooperative joint effort by the MC-ASF, SSRA and Licensee.

2020 and 2019 funds included the following:

- Brookfield provided the SRSA a check for $51,684.88 in January 2020
- Brookfield provided $2,000 for the Fish Friends program in 2019 and 2020
- MDIFW has typically received $10,000 annually pursuant to the Agreement for brown trout studies, Saco impediment survey, etc. but has deferred funding for 2019 to build up enough money for a larger project in future years. These funds shall accumulate until MDIFW is ready.
- Brookfield provided funding to the SRSA and the USFWS in the amount of $50,000 in 2019

FEDERAL ENERGY REGULATORY COMMISSION
Office of Energy Projects
Division of Dam Safety and Inspections – New York Regional Office
19 West 34th Street, Suite 400
New York, NY 10001

Telephone No. (212) 273-5900

Fax No. (212) 631-8124

In reply refer to:

P-2529-ME
NATDAM # - ME83031
Bonny Eagle Project

Inflatable-Bladder Installation

June 2, 2010

Mr. Christopher Allen
General Manager-Maine Generation
NextEra Energy Maine Operating Services, LLC
26 Katherine Drive
Hallowell, ME 04347

Dear Mr. Allen:

We have received and reviewed the pre-construction filings of March 2010 for the referenced work. They consisted of construction plans and specifications, a quality control and construction inspection program, erosion and sediment control plan, and temporary construction emergency action plan. Our review of these submittals did not reveal any significant deficiencies or errors that would affect the safety of the project structures, or adequacy of the project works to perform their intended functions. As such, these submittals were found to satisfy our pre-construction filing requirements.

You will also be responsible for necessary environmental coordination with the resource agencies and the procurement of any Federal, State, or local permits required by the conditions and articles in your license. The environmental coordination should include the applicable agencies responsible for issues under the Endangered Species Act and the National Historic Preservation Act, as well as any necessary tribal consultation. If any issues are identified, you should contact this office for guidance on how to proceed as

federal consultation may be needed. Construction may proceed once all necessary permits are issued. Please notify us when the permits are issued.

Since the proposed construction will not result in any change to the authorized headpond elevation, crest elevation of the current dam, or operating procedures of the project, an amendment to the license will not be required.

An informal Potential Failure Mode Analysis (PFMA) of the proposed construction during the design phase is encouraged, but since the subject project is low hazard and merely involves the replacement of flashboards, the PFMA is optional.

Section 12.4 of the Commission's Regulations (18 CFR 12.4) authorizes the New York Regional Engineer to inspect and monitor any construction activity. We prefer to time our periodic construction inspections to coincide with significant phases in project construction. Your **monthly construction progress reports**, prepared in accordance with the enclosed outline **(See Attachment 1)**, should keep us informed as to when significant phases of construction are likely to occur.

After construction is completed please file revised as-built exhibits with the Secretary within 90 days. You should also file a letter with the following certifications (notarized in accordance with 18CFR Part 12, Paragraph 12.13 of the Commission's Regulations):

- A certification by the Design Engineer that the project was constructed in accordance with the design intent.
- A certification by the Quality Control Manager that the results of the inspection and testing program results in a conclusion that the project was constructed in accordance with the plans and specifications.
- A certification from the Licensee that the construction fulfills the design intent and was constructed in accordance with the plans and specifications reviewed by FERC.

If during the design and construction process the plans and specifications are revised it is your responsibility to assure these changes are properly coordinated between the design engineer, the QCIP manager, FERC and yourself. Also, if any changes are made that requires a change in the operation of the project it is your responsibility to assure these changes are properly coordinated with FERC. You are reminded that no changes to operation of the project can made to the project until it is authorized by FERC.

For any questions, please contact Mr. William Atlas of my staff at (212) 273-5912 or by e-mail at william.atlas@ferc.gov.

Your cooperation is appreciated.

Sincerely,

Peter R. Valeri

Peter R. Valeri
Regional Engineer

Attachment: as noted

CONSTRUCTION REPORTS FROM LICENSEES

When mobilization for construction commences, we will require monthly reports to provide timely information on construction progress. Each report should contain, as a minimum, the information described below. If certain sections are not yet applicable on the date of a particular report, so indicate. It is important to supplement each report with pertinent photographs. We would like to receive the reports, in duplicate, including all attachments, not later than the middle of the month following the month for which the report is written.

We will inspect the project construction approximately monthly. Whenever possible, we prefer to time our inspections to conform with important phases of construction. It would be appreciated if you would notify us in advance of such phases of construction.

The following items shall be included in monthly (or other periodic) construction reports to be submitted by the Licensee. In those cases where there is nothing to report under a specific heading, a statement of non-applicability will suffice. Some items require a one-time report. In these cases make reference to the report where the data was provided.

1. Progress of Work. Provide a brief narrative description of construction activities and related events during the reporting period. Report major items of work which reflect overall progress, rather than detailed statistical information.

2. Status of Construction. Describe the status of progress, as related to the original schedule and quantity estimates of items such as: (1) excavation for tunnels, structures, and roadways; (2) embankment, concrete, and other materials placed; (3) installation of machinery and equipment; (4) reservoir clearing; (5) necessary relocations; and (6) installation or construction of recreation, fish, and wildlife facilities. Furnish construction schedules and progress charts. Report the status of construction in terms of percent physically complete and percent of contract time elapsed. Provide an appraisal as to whether work is proceeding at such a rate as to indicate completion within the specified contract time. If not, give the reasons why and estimate a revised completion date.

3. Construction Difficulties. Describe unanticipated construction difficulties which could significantly increase project costs and/or affect job progress such as latent conditions, serious job accidents, floods, labor difficulties, quantity overruns, material shortages, and similar events.

4. Contract Status. Identify principal contractors and subcontractors engaged on the work. Describe any special expertise or equipment possessed by contractors.

5. Critical Events and Dates. Report important items and events such as dates of river diversion, start and completion of construction, tunnel closure, initial unit testing, and date of initial commercial generation for each unit.

6. Reservoir Filling. Prior to filling, provide the anticipated schedule and procedures for filling. During filling, note the date of initiation of reservoir filling, filling progress, and the performance of instrumentation installed to reflect structural conditions as affected by reservoir level, such as weir measurements of seepage and flows from wet spots. Report the date maximum normal reservoir level is attained.

7. Foundations. Report specifically on foundation conditions, foundation preparations, the type of material and conditions of placement. Include photographs and descriptions of the foundation areas that have been uncovered. Uncovering of foundation areas may reveal faults, cracks, and other conditions which require special treatment. In such cases, comment on the corrective measures utilized. Include with the construction report copies of any special reports on the foundations or treatment thereof. During excavation for major structures such as dams, powerhouses and tunnels, foundations shall be mapped for record purposes by the Licensee. Submit a copy of this map to the Regional Director.

8. Sources of Major Construction Materials. Provide information on the sources from which major construction materials and equipment are being obtained. Include all materials and equipment that may have an important bearing on the safety and efficiency of the project works, such as: aggregate cement, hydraulic control equipment, turbines and generators, etc. A plan of the project area showing the location of borrow areas and/or quarries shall be included.

9. Materials Testing and Results. Include periodic summaries of tests on concrete specimens and results of all tests. Field control tests that fail to meet specifications and as a result of which an area was reworked, shall be reported. Tests will be referenced to ASTM or other applicable standards.

10. Instrumentation. When instrumentation of the structures is required by the license or the Regional Director, the report shall include the schedule for installation and the program for reading the instrumentation during construction. Before filling the reservoir, the Licensee shall develop and furnish a schedule for monitoring the instrumentation.

11. Photographs. At the outset of construction, establish several photographic vantage points from which periodic progress photographs can be taken to document progress. These photographs shall be supplemented by an appropriate number of detailed photographs to record significant elements of the work. All photographs shall be dated, captioned, and identified as to the report they accompany.

12 Erosion Control and Other Environmental Measures. The report shall include a discussion of erosion control and other measures and their effectiveness. The report should also include a discussion of any instances where sediments or other construction discharges entered the stream(s), the extent of the discharges, an assessment of any damage to the stream(s) and corrective actions taken, including measures to prevent further problems.

13. Other Items of Interest. Note here events not reported elsewhere in the inspection report. Typical items are meeting of boards of consultants, matters requiring continuing or follow-up action, public relations, job safety, important visitors, changes in job management, environmental problems, abnormal weather events, etc.

Report significant events involving relationships with interested government agencies such as the U. S. Forest Service, Fish and Wildlife Service, Corps of Engineers, State and county highway and health authorities, State and Federal industrial safety enforcement organizations, and recreational and conservationist groups.

FINAL CONSTRUCTION REPORTS FROM LICENSEES

The Licensee should submit a final construction report within 90 days from the completion of work. This report should include all information pertinent to the dam safety in a concise form, should be included by the Licensee in the project file and it should be given to the independent consultant for his safety inspection and analyses, if applicable.

As such, the report should contain a summary of information in each of the applicable sections indicated below (the information was previously presented in the monthly reports). Tabular form for test result presentation with indication of applicable standard is recommended for conciseness. If certain sections are not applicable, skip them. Include construction difficulties under sections where it applies.

1. General. Briefly present the reason for construction and description of work with dates of beginning and end of construction. Include reservoir drawdown and filing dates, any findings regarding the original structure.

2. Foundations. Present specifically condition of foundation (faults, etc.) When uncovered, and foundation treatment. Attach foundation mapping.

3. Embankments. Describe the equipment, type of materials used in filters and fills, attach gradation and compaction requirements and all test results.

4. Concrete work. Describe equipment and materials, include all concrete and grout test results, describe surface treatments.

5. Anchors. Present summary of drilling operation including boring logs; results of water pressure tests; anchor design calculations, design loads, specification; results of grout test; results of proof and performance tests; and summary of acceptance criteria.

6. Instrumentation. Present plots of existing instrumentation readings during the construction, if the readings are affected. Include details, compete schedule, plan of calibration/reading of all new instrumentation.

7. Drawings. Attach as-built drawings reduced in size to 8.5"x11" or 11"x17". The drawings should include plan, section and details of the structure affected by the new work. Any new instrumentation should be shown on plan and sections.

STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

JOHN ELIAS BALDACCI
GOVERNOR

DAVID P. LITTELL
COMMISSIONER

VIA ELECTRONIC MAIL

May 5, 2010

Paul Plante
Senior Project Manager
FPL Energy Maine Hydro LLC
26 Katherine Drive
Hallowell, ME 04347

RE: Inflatable Gate Installation
Bonny Eagle Hydro Project
DEP Order #L-20154-34-B-N

Dear Pal:

Attached is a copy of the final Department Order approving the installation of an inflatable flashboard system at the Bonny Eagle Hydro Project, New River Channel Dam.

Please note the permit conditions on pages 4 and 5 of the attached Order.

Please note that any person aggrieved by the DEP's decision in this matter may appeal that decision to the Board of Environmental Protection or to Maine Superior Court following the procedures set forth in the applicable State law and DEP rules. These procedures are described in the DEP Information Sheet entitled "Appealing a Commissioner's Licensing Decision," which is enclosed with the Order.

Sincerely,

Dana Paul Murch
Dams & Hydropower Supervisor

cc: Holly MacKenzie, KA
Shawn Mahaney, COE
Norm Dube, DMR
Gail Wippelhauser, DMR
Steve Timpano, DIFW
Francis Brautigam, DIFW-Region A
Peter Newkirk, DEP-DEA
Sean McDermott, NMFS
Fred Seavey, USFWS

STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION
17 STATE HOUSE STATION
AUGUSTA, ME 04333

DEPARTMENT ORDER

IN THE MATTER OF

FPL ENERGY MAINE HYDRO LLC	)	MAINE WATERWAY DEVELOPMENT AND
Standish	)	CONSERVATION ACT AND
Cumberland County	)	WATER QUALITY CERTIFICATION
BONNY EAGLE HYDRO PROJECT	)	
INFLATABLE GATE INSTALLATION	)	FINDINGS OF FACT AND ORDER
#L-20154-34-B-N (Approval)	)	NEW PERMIT

Pursuant to the provisions of the *Water Classification Program*, 38 M.R.S.A. §§ 464–470, the *Maine Waterway Development and Conservation Act*, 38 M.R.S.A. §§ 630–637, the *Administrative Rules For Hydropower Projects*, 06-096 CMR 450 (effective September 1, 1987), and Section 401 of the Federal Water Pollution Control Act (a.k.a. Clean Water Act), the Department of Environmental Protection has considered the application of FPL ENERGY MAINE HYDRO LLC with its supportive data, agency review, and other related materials on file, and FINDS THE FOLLOWING FACTS:

1. APPLICATION SUMMARY

a. Application. The applicant proposes to install an inflatable gate system at the New River Channel Dam, part of the Bonny Hydro Project, located on the Saco River in the Town of Standish, Cumberland County, Maine. The applicant also proposes to add additional concrete to the dam to meet dam stability requirements. The Bonny Eagle Project is licensed as a hydroelectric generating facility under the terms of FERC License No. 2528.

b. Summary of Proposal. The applicant proposes to replace the existing 4.3-foot-high wooden flashboards along the entire 339-foot-long main spillway section of the New River Channel Dam with an inflatable flashboard system (commonly called a rubber dam), which will divide the spillway into two sections. The purpose of this maintenance and repair activity is to eliminate safety hazards associated with the installation and replacement of flashboards and to provide more efficient project operation and control of flows and water levels.

In addition, the applicant proposes to place three feet of new concrete along the entire downstream face of the New River Channel Dam. This will result in the filling of approximately 1,200 square feet of river bed along the downstream toe of the dam. The purpose of this maintenance and repair activity is to meet FERC dam stability requirements for a 100-year flood event.

The proposed maintenance and repair activities will involve:

- Using an existing gravel access road to the south abutment of the dam or, at the contractor's discretion, constructing a temporary gravel access road to the north abutment of the dam;

- Temporarily reducing the impoundment level to facilitate replacing the existing flashboards with new pins and a temporary bulkhead that will serve as an upstream cofferdam;

- Reconfiguring the existing concrete dam abutments into piers and installing a new concrete center pier to support the new inflatable flashboard system;

- Removing a portion of the existing dam crest to accommodate the new flashboard system without changing the crest elevation of the dam;

- Resurfacing and adding additional concrete to the downstream face of the dam, with sandbags used as needed as a temporary cofferdam ; and

- Installing a new inflatable spillway gate system and appurtenant equipment.

A total of about 361 cubic yards of concrete will be added to the existing dam structure.

The majority of the work will take place using access from a barge anchored along the upstream face of the dam.

The proposed maintenance and repair activities are scheduled to commence immediately upon permit approval and to be completed under low flow conditions during the summer of 2010.

The total estimated cost of the proposed maintenance activities is $2 million.

2. EROSION AND SEDIMENTATION

Erosion and sedimentation caused by in-stream construction activities can degrade water quality and aquatic habitat unless adequately controlled. The applicant states that the proposed construction activities are not expected to require any excavation or disturbance of soils. Erosion control measures, including silt fencing, geoextile fabric, and haybale dikes, are proposed for the project staging area and any temporary access road.

3. SPOILS DISPOSAL

Construction and demolition spoils can cause environmental degradation unless disposed of properly. Unless contaminated during use or removal, all project spoils not reused on site are expected to qualify for disposal as inert fill.

4. FRESH CONCRETE

"Fresh" concrete can be toxic to aquatic life unless properly cured prior to coming into contact with surface water. Therefore, all concrete must be cured prior to contact with surface waters. In addition, to prevent an undiluted high pH discharge to the bypass channel below the dam after the concrete has cured, sufficient water should be discharged over the dam to flush the new concrete surface.

5. IMPOUNDMENT LEVELS AND FLOW RELEASES

Aquatic habitat can be adversely affected unless impoundment water levels and flow releases are maintained during the proposed maintenance and repair activities.

The Department's August 22, 1997 water quality certification for the Bonny Eagle Project stipulates seasonally-varied limits on impoundment fluctuations and a year-round minimum flow of 25 cfs from the New River Channel Dam.

The required impoundment levels and minimum flow releases should be maintained at all times during the proposed maintenance and repair activities, except as lower impoundment levels are temporarily necessary to facilitate bulkhead and inflatable flashboard system installation.

6. OTHER ISSUES

No other significant issues involving compliance with any statutory criteria of the Maine Waterway Development and Conservation Act or any applicable water quality standards have been identified.

No objections to the proposed maintenance activity have been raised by any review agency or the affected municipalities.

BASED on the above Findings of Fact, and the evidence contained in the application and supporting documents, and subject to the Conditions listed below, the Department makes the following CONCLUSIONS:

1. The applicant has the financial capacity and technical ability to undertake the project.

2. The applicant has made adequate provision for protection of public safety.

3. The project will result in significant economic benefits to the public.

4. The applicant has made adequate provision for traffic movement.

5. The proposed activity is not located within the jurisdiction of the Land Use Regulation Commission.

6. The applicant has made reasonable provisions to realize the environmental benefits and to mitigate the adverse environmental impacts of the project provided that:

    a. All necessary measures are taken to control erosion and sedimentation as a result of the approved maintenance and repair activities;

    b. All construction and demolition spoils are reused or otherwise disposed of in accordance with existing rules;

    c. Fresh concrete does not come into contact with surface water;

    d. After curing, the new concrete shall be flushed by releasing at least two inches of water over the dam for a minimum of three minutes; and

    e. Existing impoundment level and minimum flow requirements are maintained except as lower impoundment levels are temporarily necessary to facilitate bulkhead and inflatable flashboard system installation.

7. The advantages of the project are greater than the direct and cumulative adverse impacts over the life of the project provided that the project is undertaken in accordance with the provisions of Conclusion #6 above.

8. There is a reasonable assurance that the project will not violate applicable State water quality standards.

THEREFORE, the Department APPROVES the above noted application of FPL ENERGY MAINE HYDRO LLC to install an inflatable flashboard system at the Bonny Eagle Hydro Project, New River Channel Dam, as described above, SUBJECT TO THE ATTACHED CONDITIONS, and all applicable standards and regulations:

1. STANDARD CONDITIONS

    The Standard Conditions of Approval for projects under the Maine Waterway Development and Conservation Act, a copy attached.

2. EROSION CONTROL

    In addition to any specific erosion and sedimentation control measures proposed by the applicant and/or set forth in this Order, the applicant and its agents shall take all necessary measures to ensure that their activities do not result in measurable erosion or sedimentation during or following the approved maintenance and repair work.

3. SPOILS DISPOSAL

All spoils removed from the construction area shall be reused or otherwise disposed of in accordance with the Maine Solid Waste Management Regulations.

4. CONCRETE CURING

Concrete shall be precast and cured at least three weeks before placing in the water, or where necessary, shall be placed in forms and shall cure at least one week prior to contact with surface water. No washing of tools, forms, etc. shall occur in or adjacent to the waterway.

5. CONCRETE FLUSHING

After the new concrete surface on the New River Channel Dam has cured, the surface shall be flushed by releasing at least two inches of water over the dam for a minimum of three minutes

6. IMPOUNDMENT LEVELS AND FLOW RELEASES

The impoundment levels and minimum flow releases stipulated in the water quality certification for the Bonny Eagle Hydro Project (Department Order #L-17650-33-F-N dated August 22, 1997) shall be maintained during the maintenance and repair activities, except that any drawdowns needed to facilitate the safe and efficient installation of the temporary construction bulkheads and the inflatable flashboard system shall be limited in extent and duration to the maximum extent possible.

PLEASE NOTE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES

Date of initial receipt of application: 03/04/2010
Date application accepted for processing: 03/10/2010

This Order prepared by Dana Murch, Bureau of Land and Water Quality.

MAINE WATERWAY DEVELOPMENT AND CONSERVATION ACT

STANDARD CONDITIONS OF APPROVAL APPLICABLE TO ALL PERMITS

1. Limits of Approval. This approval is limited to and includes the proposals and plans contained in the application and supporting documents submitted and affirmed to by the applicant. All variances from the plans and proposals contained in said documents are subject to the review and approval of the Department of Environmental Protection prior to implementation.

2. Noncompliance. Should the project be found, at any time, not to be in compliance with any of the conditions of this approval, or should the permittee construct or operate this project in any way other than specified in the application or supporting documents, as modified by the conditions of this approval, then the terms of this approval shall be considered to have been violated.

3. Compliance with all Applicable Laws. The permittee shall secure and appropriately comply with all applicable federal, state and local licenses, permits, authorizations, conditions, agreements, and orders prior to or during construction and operation.

4. Inspection and Compliance. Authorized representatives of the Department of Environmental Protection or the Attorney General shall be granted access to the premises of the permittee at any reasonable time for the purpose of inspecting the construction or operation of the project and assuring compliance by the permittee with the conditions of this approval.

5. Initiation and Completion of Construction. If construction is not commenced within 3 years and completed within 7 years from the date of issuance of this permit, this approval shall lapse, unless a request for an extension of these deadlines has been approved by the Department of Environmental Protection.

6. Construction Schedule. Prior to construction, the permittee shall submit a final construction schedule for the project to the Department of Environmental Protection.

7. Approval Included in Contract Bids. A copy of this approval must be included in or attached to contract bid specifications for the project.

8. Approval Shown to Contractor. Work done by a contractor pursuant to this approval shall not begin before a copy of this approval has been shown to the contractor by the permittee.

9. Notification of Project Operation. The permittee shall notify the Department of Environmental Protection of the commencement of commercial operation of the project within 10 days prior to such commencement.

10. Assignment or Transfer of Approval. This approval shall expire upon the assignment or transfer of the property covered by this approval unless written consent to transfer this approval is obtained from the Department of Environmental Protection. A "transfer" is defined as the sale or lease of property which is the subject of this approval, or the sale of 50 percent or more of the stock of or interest in a corporation or a change in a general partner of a partnership which owns the property subject to this approval.

Effective date: September 1, 1987

DEPLW149

DEP INFORMATION SHEET

Appealing a Commissioner's Licensing Decision

Dated: May 2004 **Contact: (207) 287-2811**

SUMMARY

There are two methods available to an aggrieved person seeking to appeal a licensing decision made by the Department of Environmental Protection's (DEP) Commissioner: (1) in an administrative process before the Board of Environmental Protection (Board); or (2) in a judicial process before Maine's Superior Court. This INFORMATION SHEET, in conjunction with consulting statutory and regulatory provisions referred to herein, can help aggrieved persons with understanding their rights and obligations in filing an administrative or judicial appeal.

I. ADMINISTRATIVE APPEALS TO THE BOARD

LEGAL REFERENCES

DEP's *General Laws*, 38 M.R.S.A. § 341-D(4), and its *Rules Concerning the Processing of Applications and Other Administrative Matters* (Chapter 2), 06-096 CMR 2.24 (April 1, 2003).

HOW LONG YOU HAVE TO SUBMIT AN APPEAL TO THE BOARD

The Board must receive a written notice of appeal within 30 calendar days of the date on which the Commissioner's decision was filed with the Board. Appeals filed after 30 calendar days will be rejected.

HOW TO SUBMIT AN APPEAL TO THE BOARD

Signed original appeal documents must be sent to: Chair, Board of Environmental Protection, c/o Department of Environmental Protection, 17 State House Station, Augusta, ME 04333-0017; faxes are acceptable for purposes of meeting the deadline when followed by receipt of mailed original documents within five (5) working days. Receipt on a particular day must be by 5:00 PM at DEP's offices in Augusta; materials received after 5:00 PM are not considered received until the following day. The person appealing a licensing decision must also send the DEP's Commissioner and the applicant a copy of the documents. All the information listed in the next section must be submitted at the time the appeal is filed. Only the extraordinary circumstances described at the end of that section will justify evidence not in the DEP's record at the time of decision being added to the record for consideration by the Board as part of an appeal.

WHAT YOUR APPEAL PAPERWORK MUST CONTAIN

The materials constituting an appeal must contain the following information at the time submitted:

1. *Aggrieved Status*. Standing to maintain an appeal requires the appellant to show they are particularly injured by the Commissioner's decision.
2. *The findings, conclusions or conditions objected to or believed to be in error.* Specific references and facts regarding the appellant's issues with the decision must be provided in the notice of appeal.
3. *The basis of the objections or challenge.* If possible, specific regulations, statutes or other facts should be referenced. This may include citing omissions of relevant requirements, and errors believed to have been made in interpretations, conclusions, and relevant requirements.
4. *The remedy sought.* This can range from reversal of the Commissioner's decision on the license or permit to changes in specific permit conditions.

5. *All the matters to be contested.* The Board will limit its consideration to those arguments specifically raised in the written notice of appeal.

6. *Request for hearing.* The Board will hear presentations on appeals at its regularly scheduled meetings, unless a public hearing is requested and granted. A request for public hearing on an appeal must be filed as part of the notice of appeal.

7. *New or additional evidence to be offered.* The Board may allow new or additional evidence as part of an appeal only when the person seeking to add information to the record can show due diligence in bringing the evidence to the DEP's attention at the earliest possible time in the licensing process or show that the evidence itself is newly discovered and could not have been presented earlier in the process. Specific requirements for additional evidence are found in Chapter 2, Section 24(B)(5).

OTHER CONSIDERATIONS IN APPEALING A DECISION TO THE BOARD

1. *Be familiar with all relevant material in the DEP record.* A license file is public information made easily accessible by DEP. Upon request, the DEP will make the material available during normal working hours, provide space to review the file, and provide opportunity for photocopying materials. There is a charge for copies or copying services.

2. *Be familiar with the regulations and laws under which the application was processed, and the procedural rules governing your appeal.* DEP staff will provide this information on request and answer questions regarding applicable requirements.

3. *The filing of an appeal does not operate as a stay to any decision.* An applicant proceeding with a project pending the outcome of an appeal runs the risk of the decision being reversed or modified as a result of the appeal.

WHAT TO EXPECT ONCE YOU FILE A TIMELY APPEAL WITH THE BOARD

The Board will formally acknowledge initiation of the appeals procedure, including the name of the DEP project manager assigned to the specific appeal, within 15 days of receiving a timely filing. The notice of appeal, all materials accepted by the Board Chair as additional evidence, and any materials submitted in response to the appeal will be sent to Board members along with a briefing and recommendation from DEP staff. Parties filing appeals and interested persons are notified in advance of the final date set for Board consideration of an appeal or request for public hearing. With or without holding a public hearing, the Board may affirm, amend, or reverse a Commissioner decision. The Board will notify parties to an appeal and interested persons of its decision.

II. APPEALS TO MAINE SUPERIOR COURT

Maine law allows aggrieved persons to appeal final Commissioner licensing decisions to Maine's Superior Court, see 38 M.R.S.A. § 346(1); 06-096 CMR 2.26; 5 M.R.S.A. § 11001; & MRCivP 80C. Parties to the licensing decision must file a petition for review within 30 days after receipt of notice of the Commissioner's written decision. A petition for review by any other person aggrieved must be filed within 40-days from the date the written decision is rendered. The laws cited in this paragraph and other legal procedures govern the contents and processing of a Superior Court appeal.

ADDITIONAL INFORMATION

If you have questions or need additional information on the appeal process, contact the DEP's Director of Procedures and Enforcement at (207) 287-2811.

Note: The DEP provides this INFORMATION SHEET for general guidance only; it is not intended for use as a legal reference. Maine law governs an appellant's rights.

SACO RIVER CORRIDOR COMMISSION
P.O. BOX 283 - 81 MAPLE STREET
CORNISH, MAINE 04020-0283
TELEPHONE (207)625-8123 ~ FAX (207)625-7050
WWW.SRCC-MAINE.ORG

FACSIMILE TRANSMITTAL SHEET

TO: Holly Mackenzie	FROM: Joy Chasse
COMPANY: Kleinschmidt	DATE: 4/28/2010
FAX NUMBER: 207-487-3124	TOTAL NO. OF PAGES INCLUDING COVER: 2
PHONE NUMBER:	SENDER'S REFERENCE NUMBER:
RE:	YOUR REFERENCE NUMBER:

URGENT ☐ FOR REVIEW ☐ PLEASE COMMENT ☐ PLEASE REPLY ☐ PLEASE RECYCLE

NOTES/COMMENTS:

Saco River Corridor Commission

"Communities Working Together To Protect Our Rivers"

April 6, 2010

Paul Plante, NextEra Energy
FPL Energy Maine Hydro, LLC
150 Main Street
Lewiston, ME 04240

Holly MacKenzie
Kleinschmidt
141 Main Street
P.O. Box 650
Pittsfield, ME 04967

Dear Mr. Plante and Ms. MacKenzie:

Enclosed is Permit #09-080, which was approved by the Saco River Corridor Commission during it's meeting on March 24 2010. Copies of this permit have been sent to the parties listed below.

Please read the enclosed document carefully, particularly the conditions to it, which are as follows:

- Standard Conditions of Approval (copy enclosed).
- Erosion control measures shall be in place during the entire project.
- Other conditions as decided by a vote of the Commission at a duly noticed Commission Meeting.

Upon completion of the project covered by this approval, you must notify the Commission. When you have finished the development allowed by this permit, complete the enclosed Notice of Completion form and send it to us. The Commission staff will then check your site to determine if you have complied with your permit.

Thank you for your cooperation with this Commission. If you have any additional questions, please don't hesitate to contact us.

Sincerely,

Joy A. Chasse
Administrative Assistant

Enclosure
cc: Standish Code Enforcement Officer

Saco River Corridor Commission

"Communities Working Together To Protect Our Rivers"

COMMISSION ORDER
IN THE MATTER OF

FPL ENERGY MAINE HYDRO, LLC 150 MAIN STREET LEWISTON, ME 04240 APPLICATION #09-080	SACO RIVER CORRIDOR ACT FINDINGS OF FACT AND ORDER

The Saco River Corridor Commission, created by the Maine State Legislature in the Saco River Corridor Act, Title 38 M.R.S.A. Section 951 et. seq., hereinafter referred to as the "Act", at a meeting held on March 24, 2010 at Porter, Maine, and after a review of the application and supporting documents, makes the following findings of fact:

PROJECT DESCRIPTION

1. The applicant requests a permit to install inflatable flashboard system (rubber dam) with a bladder of 4 feet and approximately 339 feet long in the Saco River, and to double the size of an existing control building 12 x 7 to 24 x 12 feet to house the controls at 65 feet from the normal high water line at the New River Channel dam.

SITE LOCATION/DESCRIPTION

2. Location: Bonny Eagle Road, Map #3, Lots #14A, Standish, Maine.

3. The dam is located in the Saco River, but is attached to the shoreline.

LAND USE DISTRICT

4. The site of the proposed activity is in the Limited Residential District.

BASED ON THE ABOVE FINDINGS, as determined at a duly noticed Commission Meeting, the Commission draws the following conclusions:

1. The applicant has shown the proposed design to be necessary within the meaning of the Act.

2. The proposed use will not unreasonably involve any of the factors enumerated in Section 959-A.1.A. through K of the Act.

THEREFORE, the Commission APPROVES the application of FPL Energy Maine Hydro, LLC, #09-080, to install an inflatable flashboard system (rubber dam) on the New River Channel Dam and to expand an existing control building (12 x 7 to 24 x 14), per hardship variance, on property owned by Central Maine Power Company, provided the activity is carried out according to the application and exhibits attached thereto and UPON THE FOLLOWING CONDITIONS:

1. Standard Conditions of Approval (copy attached).

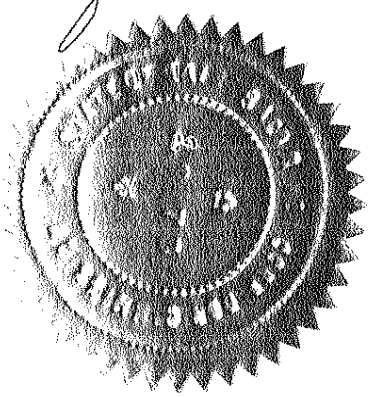
2. Other conditions as decided by a vote of the Commission at a duly noticed Commission Meeting.

Any appeals from this decision, including any of its conditions, shall be taken pursuant to Section 968 of the Act, except that no appeal pursuant to Section 968 of the Act shall be taken from a decision of the Commission which decision was made without a public hearing until a request for reconsideration has been submitted to the Commission and the Commission has made a final determination in the matter. Any person wishing to file an appeal or to request reconsideration must do so within 30 days of the Commission's written decision and order. Requests for reconsideration must be submitted in accordance with applicable Commission regulations.

DONE AND DATED AT PORTER, MAINE THIS 24th DAY OF MARCH, 2010.

BY: _____
Toni Carros, Chairperson

April 6, 2010
Dated



From:	Bernier, Kevin
To:	Kirk Mohney, MHPC; Rideout, Megan M
Cc:	Seyfried, Jason; Maloney, Kelly; Pocquette, Kayla; Mcdonough, Patrick; Swett, Michael; Rancourt, Joel
Subject:	Bonny Eagle Project, historic structure consultation
Date:	Friday, June 11, 2021 2:53:00 PM
Attachments:	image001.jpg Bonny Eagle As Left.jpg Bonny Eagle As Left 2.jpg 1993_12_09 Programmatic Agreement.pdf 20100610 Bonny Eagle flashboards.jpg Bypass Reach Rubber Dam.JPG 20100610 Bonny Eagle flashboards2.jpg

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Kirk/Megan – the attached 1993 Programmatic Agreement covering the Bonny Eagle Project (FERC No. 2529) on the Saco River and several other projects requires that the licensee (Brookfield White Pine Hydro LLC, or "BWPH") implement the following CRMP measures to avoid or mitigate adverse effects to historic project structures:

1. *Replacement will be in kind to the extent this approach is consistent with the continued use of the historic project structures as hydroelectric generating facilities.*
2. *Alteration of the historic project structures, including major repair or replacement of any elements or components of any of the historic project structures, or demolition, or project redevelopment exceeding the scope of the Secretary's Standards, will be undertaken only after consultation with the SHPO to insure that potential effects are avoided, or that appropriate plans to mitigate effects are incorporated into design, location, and construction techniques and materials.*
3. *If any historic project structures, or any components thereof, that contribute to the overall eligibility of any historic project structures, must be replaced or demolished, and feasible alternatives are not identified in consultation with the SHPO, the Licensee(s) will consult with the SHPO to identify a strategy for mitigating the loss of the historic project structure or component, including, but not limited to, recording the structure or component to be replaced or demolished according to Historic American Engineering Record standards.*

BWPH has submitted an application to the Low Impact Hydropower Institute (LIHI) for certification of the Bonny Eagle Project as a low impact hydropower facility under LIHI's standards and criteria. In reviewing the application, LIHI has requested that BWPH consult with SHPO on two projects already completed at the Bonny Eagle Project, the 2010 (pre-Brookfield) installation of a rubber dam (inflatable bladder) on the Project spillway, and the 2019 replacement of turbine components at the facility.

The purpose of the rubber dam (see attached photo) was to provide improved and more responsive flow management at the facility when Project outflow changes are required. The rubber dam replaced 4.3-foot high wooden flashboards (see attached photos) and less efficient and more time-consuming spillway gate operations by onsite personnel. In addition, the wooden flashboards were periodically lost and washed downstream during seasonal high flow events, particularly during the spring freshet (ice out), and the licensee had limited means of providing OSHA-compliant fall protection for workers when annually repairing the missing or damaged flashboards. Thus, the installation of the rubber dam also eliminated a fall hazard for workers. It is unclear whether SHPO consultation was undertaken by the previous licensee for this rubber dam installation.

Regarding the turbine replacement, BWPH considered this activity to be a routine maintenance and repair activity with in kind components that did not trigger SHPO consultation. Specifically, BWPH replaced the runner, head cover, turbine shaft, and generator shaft for the unit. All of the visible components of the turbine and generator were replaced entirely in kind, which was necessary not only to comply with the Programmatic Agreement, but also to match the new equipment with the original turbine components that were not replaced. All visible components were painted to match the original components, and photos following completion of the work are attached. This work did not affect the historic integrity of the Bonny Eagle project structures and, as such, no consultation was undertaken at the time.

Please let me know if you have any comments on these completed projects. Thank you.

Kevin Bernier
Senior Compliance Specialist

Brookfield Renewable
1024 Central Street, Millinocket, ME 04462
C 207 951 5006
kevin.bernier@brookfieldrenewable.com
www.brookfieldrenewable.com

MAINE HISTORIC PRESERVATION COMMISSION
55 CAPITOL STREET
65 STATE HOUSE STATION
AUGUSTA, MAINE
04333

JANET T. MILLS
GOVERNOR

KIRK F. MOHNEY
DIRECTOR

June 22, 2021

Mr. Kevin Bernier
Brookfield Renewable
1024 Central Street
Millinocket, ME 04462

Project: MHPC# 0231-21B Bonny Eagle Hydroelectric Project; FERC 2529
Programmatic Agreement; After-the- Fact Consultation

Town: Hollis, ME

Dear Mr. Bernier:

In response to your recent request, I have reviewed the information received June 11, 2021 to initiate consultation on the above referenced project in accordance with Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA).

Based on the information submitted, I have concluded that the proposed undertaking will have **no adverse effect** upon historic properties (architectural or archaeological), as defined by Section 106.

Please contact Megan Rideout at (207) 287-2992 or megan.m.rideout@maine.gov if we can be of further assistance in this matter.

Sincerely,

Kirk F. Mohney

Kirk F. Mohney
State Historic Preservation Officer

PHONE: (207) 287-2132 FAX: (207) 287-2335