REVIEW OF APPLICATION FOR RE-CERTIFICATION BY THE LOW IMPACT HYDROPOWER INSTITUTE OF THE CLEMENT HYDROELECTRIC FACILITY, LIHI #117

Prepared by Patricia McIlvaine
February 5, 2020

I. INTRODUCTION

This report summarizes the review findings of the application submitted by Clement Dam Hydroelectric (Clement LLC or Applicant), to the Low Impact Hydropower Institute (LIHI) for re-certification of the Clement Hydroelectric Project (Clement Project) (FERC P-2966) LIHI #117. Clement LLC is a wholly-owned subsidiary of Eagle Creek Renewable Energy (Eagle Creek). The Clement Project is a 2.4 MW facility located on the Winnipesaukee River in the town of Tilton, Belknap County, in central New Hampshire. The Project was initially certified by LIHI as Low Impact for a five-year term, effective December 31, 2014, expiring December 31, 2019 and was extended to February 28, 2020. This re-certification review was conducted in compliance with LIHI's 2016 Handbook, 2nd Edition, Revision 2.03: December 20, 2018.

The Project's 2014 re-certification had four conditions; all were satisfied as summarized below:

Condition 1: Facility owner shall complete the agreed upon water quality sampling in 2015, receive satisfactory determination from New Hampshire Department of Environmental Service (NHDES) that facility does not impact water quality, and provide the results to LIHI by December 31, 2015.

Water quality sampling was completed in 2017 after two years of delays due to several reasons, and the results were submitted the to NHDES. In a November 2018 letter, NHDES confirmed that the results of the water quality monitoring and sampling demonstrated that the River in the Project vicinity meets state water quality standards.

Condition 2: Facility owner will comply with updated fish passage installation plans in 2015 as specified in the Memorandum of Agreement (MOA) with the US Fish and Wildlife Service (USFWS), obtain written approval of design by USFWS, and report results to LIHI by December 31, 2015.

In Fall 2015, USFWS and New Hampshire Fish and Game (NHFG) reviewed and accepted final conceptual drawings resulting from consultations between all parties during the summer of 2015. Following receipts of required permits in spring 2016, construction of the downstream fish passage facility was completed in August 2016.

Condition 3: Facility owner will complete minimum flow review in 2015 as prescribed in the MOA with USFWS, obtain written approval by USFWS, and provide results to LIHI by December 31, 2015.

Minimum flows were reviewed with USFWS and NHFG in July 2015, and existing minimum flows were determined to be adequate.

Condition 4: Facility owner will complete the Operations and Flow Monitoring Plan as required by the MOA, obtain written approval of plan by USFWS, and provide results to LIHI by December 31, 2015.

After the construction of the downstream fish passage facilities was completed, Eagle Creek submitted a draft of the Operations and Flow Monitoring Plan to the USFWS for review and comment. Comments were incorporated and the USFWS approved the plan in August 2017. The Operations and Flow Monitoring Plan is a living document and continues to be updated in cooperation with the USFWS.

II. RECERTIFICATION PROCESS AND MATERIAL CHANGE REVIEW

Under the 2016 LIHI Handbook (rev 2.03, December 20, 2018), reviews are a two-phase process starting with a limited review of a completed LIHI application, focused on three questions:

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

In accordance with the Recertification Standards, if the only issue is that there is some missing information, a Stage II review may not be required. These standards also state that "material changes" mean non-compliance and/or new or renewed issues of concern that are relevant to LIHI's criteria. If the answer to either question (2) or (3) is “Yes”, a more thorough review of the application using the LIHI criteria in effect at the time of the recertification application, and development of a complete Stage II Report, is required. As a result, all Projects currently applying for renewal must go through a full review unless their most recent certification was completed using the 2016 Handbook.

A review of the initial application, dated October 2019, resulted in a Stage I or Intake Report, dated November 13, 2019. This Stage I assessment indicated there were “material changes” at the Project, which included installation of downstream fish passage and release of extra flow to the bypass during passage season of river herring and American eel. Both have positive effects on the environment. The response to the Stage I Report was provided in the form of supplemental information on December 4, 2019. The initial application was complete enough to be posted for public comment on November 27, 2019 since only a limited amount of data was missing.

This Stage II assessment included review of the application package, supplemental information and public records in FERC’s eLibrary since LIHI certification in 2014, outreach to several agencies, communication with the Applicant, and review of the annual compliance statements received by LIHI during the past term of Certification.

III. PROJECT'S GEOGRAPHIC LOCATION

The Clement Project is located on the Winnipesaukee River, at River Mile (RM) 5, in the town of Tilton, Belknap County, in central New Hampshire. The Winnipesaukee River is a 10.5-mile river that connects Lake Winnipesaukee, the largest lake in New Hampshire, with the Pemigewasset and Merrimack Rivers in Franklin, New Hampshire.

There are three hydropower projects upstream of the Clement Project:

- Lakeport Dam, owned by NHDES, FERC Project No. 6440, at RM 16.5,
- Avery Dam, owned by Avery Hydro, LLC, FERC Project No. 6752, at RM 15, and
- Lochmere Dam, owned by the NHDES, FERC Project No. 3128, located approximately 5 miles upstream of the Clement dam, at RM 10.

Downstream dams include:

- Stevens Mill Dam, FERC Project No. 3760, at river mile 1.5, located approximately 3.5 miles downstream, and
- Franklin Falls Dam, owned by Franklin Falls Hydro Electric Co, FERC Project No. 6950, at RM 0.5.

While the Lakeport and Lochmere dams are owned by the state, Eagle Creek owns and operates power facilities at them. Franklin Power LLC, owner of the Stevens Mills Project, is also a subsidiary of Eagle Creek. The Stevens Mill Project holds LIHI Certificate #123. Figure 1 illustrates the location of the dams on the Winnipesaukee River.

The Winnipesaukee River traditionally supported industrial activity in the towns that line its banks from Lake Winnipesaukee to its confluence with the Merrimack River. The river is located in the Lakes Region of central New Hampshire. The total drainage area of the river is approximately 488 square miles. Flows on the Winnipesaukee River are highly regulated by releases from the Lakeport Dam located on the outlet of Lake Winnipesaukee, which controls 45% of the watershed. Flows from the Lakeport Dam are directed by the State of New Hampshire to control water levels on the lake and balance recreational, environmental and commercial uses.

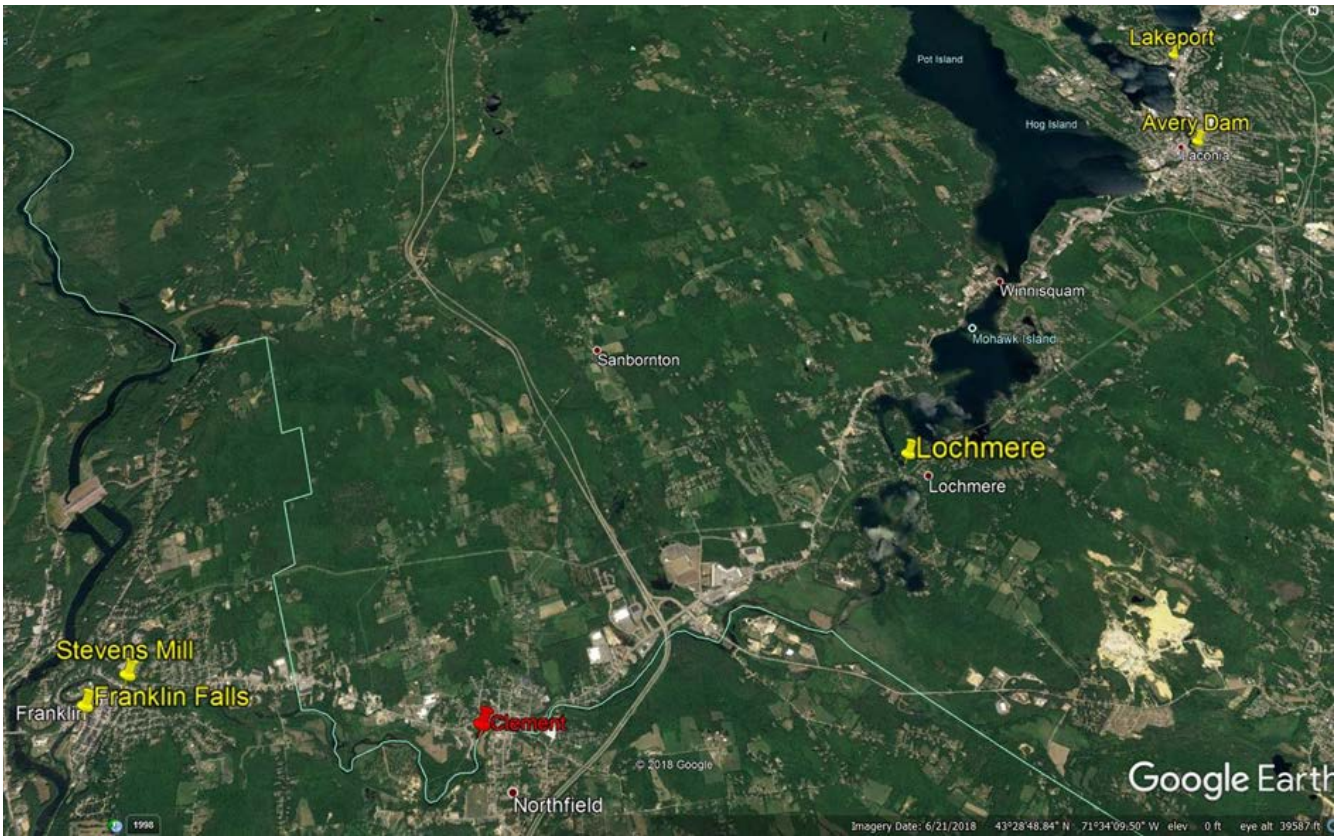

Figure 1 – Projects on the Winnipesaukee River Near the Clement Project

IV. PROJECT AND IMMEDIATE SITE CHARACTERISTICS

The Clement Project was constructed as a hydroelectric site in the early 1900's. The original structure was breached in 1943 and replaced by a concrete dam circa 1982. The current Project began commercial operation in 1984 and is operated as a run-of-river facility. The dam, approximately 120 feet long, consists of a 16.5-foot high concrete spillway section topped with 3-foot high wooden flashboards and a gated spillway/sluiceway section that includes 5 gates (one waste gate, downward opening and 4 spillway gates, upward opening). The impoundment has minimal storage at the normal water surface elevation of 442.4 feet mean sea level (MSL). The intake, located on river right (looking downstream), leads to a 12-foot diameter steel penstock which extends from the intake, under a blockhouse, to the powerhouse, a distance of approximately 325 feet. The bypass joins the tailrace approximately 600 feet downstream of the dam, returning flow to the Winnipesaukee River. Key Project features are shown in Figure 2.

The powerhouse, which is located on the right side of the bypass channel, contains one horizontal Kaplan turbine-generator with a rated capacity of 2,400 kilowatts, and appurtenant facilities. Maximum and minimum turbine hydraulic capacity values are 1,200 cubic feet per second (cfs) and 150 cfs, respectively. The application noted that 10,952 MWh were generated annually from April 1, 2002 to June 30, 2014, excluding outages, and 9,856 MWh was generated from July 1, 2014 to June 30, 2019, excluding outages.

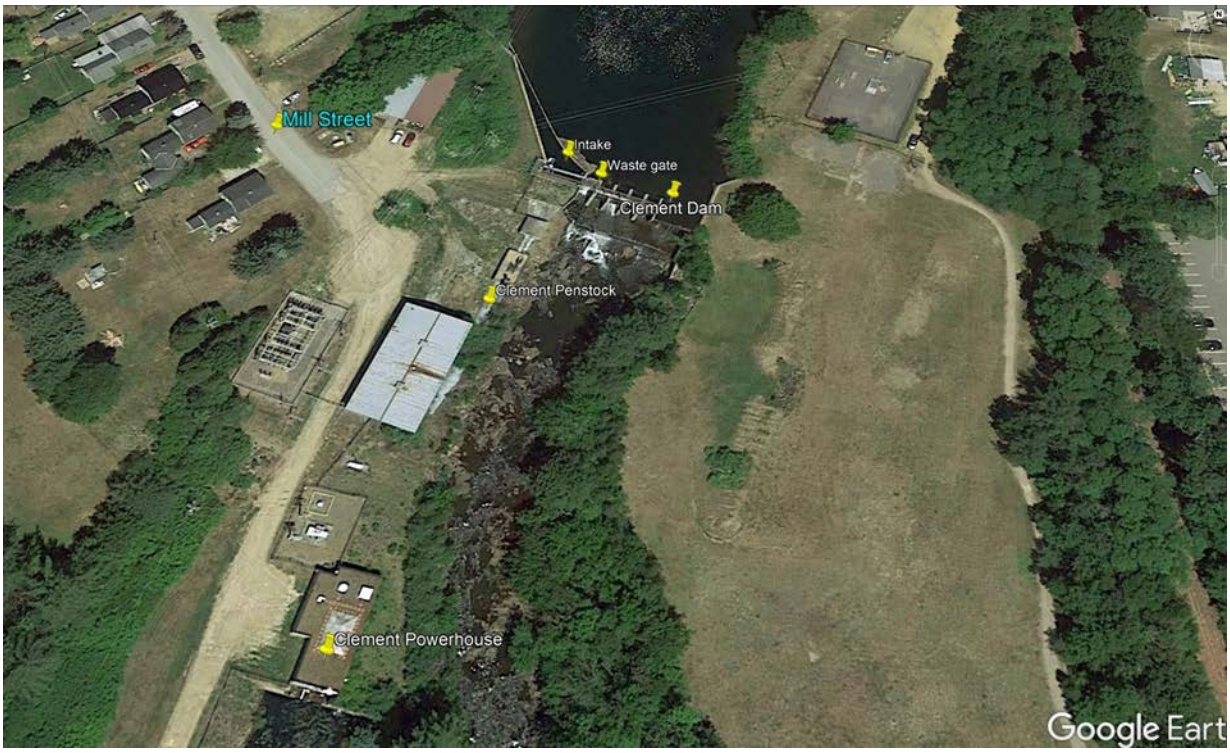

Figure 2 - Key Features of the Clement Project

The normal reservoir elevation is 442.4 ft mean sea level (MSL), with a surface area of about 2.5 acres and with only limited storage. The drainage area at the Clement dam is approximately 471 square miles. The reservoir has a volume of 27,200 acre-feet. In follow-up data, the Applicant reported that the area occupied by non-reservoir facilities at Clement totals about five acres.

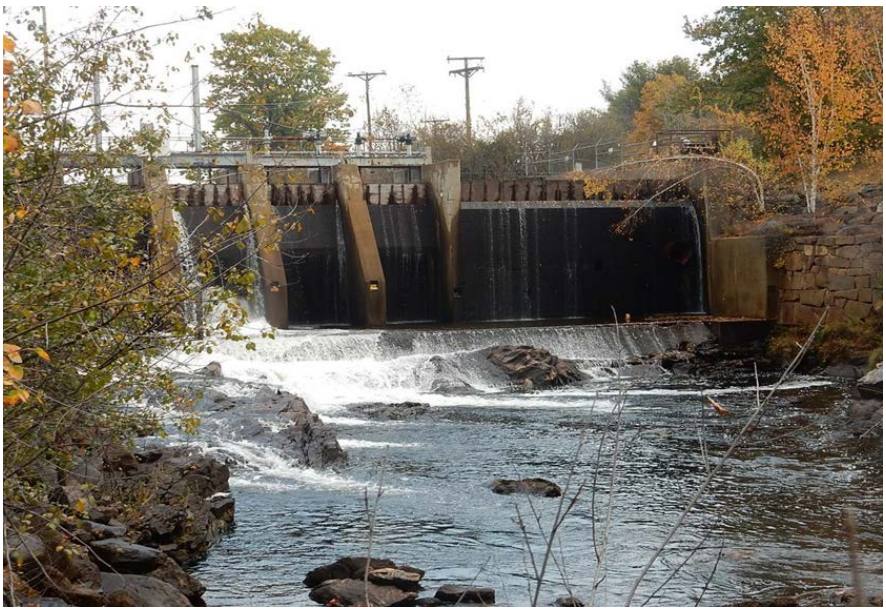

Figure 3 – Clement Project Dam and Spillway

Figure 4 – Clement Powerhouse

V. ZONES OF EFFECT AND STANDARDS SELECTED

Three Zones of Effect (ZOE) were appropriately designated by the Applicant. They are illustrated on Figure 5 and in photographs in Figures 6 through 8.

- ZOE #1 – Impoundment (turquoise); RM 5.5 to RM 5
- ZOE #2 – Bypass Reach (purple); RM 5 to RM 4.87
- ZOE #3 – Tailrace / Downstream Reach (green); RM 4.9 to RM 4.8

Figure 5 – Project Zones of Effect

Figure 6 – Impoundment

Figure 7 – Tailrace / Downstream Reach

Figure 8 – Bypass Reach

The following Tables show the selected Standards, which I believe are appropriate except that I believe Standard C-2 for Upstream Passage is more fitting for the Bypass and Tailrace/Downstream Reaches as there is a Memorandum of Agreement with USFWS to review the need for upstream passage in 2020 for selected target species and to implement what is found to be appropriate. Details of compliance with the criteria are presented in Section IX.

ZOE #1 – Impoundment

Criterion		Alternative Standards				
		1	2	3	4	Plus
A.	Ecological Flow Regimes	x				
B.	Water Quality			x		
C.	Upstream Fish Passage	x				
D.	Downstream Fish Passage		x			
E.	Watershed and Shoreline Protection	x				
F.	Threatened and Endangered Species Protection	x				
G.	Cultural and Historic Resource Protection	x				
H.	Recreational Resources			x		

ZOE #2 – Bypass Reach

Criterion		Alternative Standards				
		1	2	3	4	Plus
A.	Ecological Flow Regimes		x			
B.	Water Quality			x		
C.	Upstream Fish Passage	~~x~~	x			
D.	Downstream Fish Passage		x			
E.	Watershed and Shoreline Protection	x				
F.	Threatened and Endangered Species Protection	x				
G.	Cultural and Historic Resource Protection	x				
H.	Recreational Resources			x		

ZOE #3 – Tailrace / Downstream Reach

Criterion		Alternative Standards				
		1	2	3	4	Plus
A.	Ecological Flow Regimes		x			
B.	Water Quality			x		
C.	Upstream Fish Passage	~~x~~	x			
D.	Downstream Fish Passage	x				
E.	Watershed and Shoreline Protection	x				
F.	Threatened and Endangered Species Protection	x				
G.	Cultural and Historic Resource Protection	x				
H.	Recreational Resources			x		

V. REGULATORY AND COMPLIANCE STATUS

FERC issued a minor license (#2966) to James Katsekas and Zoes J. Dimos for construction and operation of the Clement Hydroelectric Project on May 17, 1982. On March 18, 1983, FERC amended the license to authorize upgrades to the Project, including an increase in the dam height and installation of three-foot high flashboards which raised the reservoir elevation by 11 feet, and installation of appurtenant structures and a turbine-generator unit having a rated capacity of 2,400 kW instead of the original capacity between 1,200 kW and 1,400 kW. The license was changed from a minor to major license under 5 MW. On August 22, 1999, the Project was purchased by the Algonquin Power Fund, and on June 20, 2014, was purchased by the current owner, Eagle Creek. The current FERC license expires on April 30, 2032. Clement LLC, is the Licensee of the Project. No other amendments have been issued.

The application states that a Water Quality Certificate (WQC) was issued by the New Hampshire Water Supply and Pollution Control Commission (now the NHDES) on May 18, 1982. As part of their LIHI application, Clement LLC contacted NHDES to obtain a copy of this WQC. The documents provided by NHDES (and included in the LIHI application) appear to have been issued for construction, although the FERC 1983 license references details from a 1982 WQC that appears to be operational related, and that information is not included in the attached documents. NHDES stated that no file copy with the particular language noted in the FERC license is available.

In August 2014, USFWS and Eagle Creek entered into a MOA[1], the purpose of which was to establish a plan and schedule to address fish passage and minimum flows at Eagle Creek's hydroelectric projects in New Hampshire. The MOA was executed with a 5-year term and an option for the Parties to extend the term by mutual agreement. There is an interim extension through March 2020 to allow USFWS and NHFG to conduct site reviews of downstream fish passage facilities and minimum flows with the purpose of extending the MOA for an additional 5-year term. NHFG is actively involved in review of activities associated with the MOA although

[1] [1] https://lowimpacthydro.org/wp-content/uploads/2015/02/Clement-Dam_Appendix-C-1_2014-08-14-ECREM- USFWS-MOA.pdf

they are not a signatory to the MOA. The interim extension was provided in Appendix A of the application.

Only one incident of a non-adherence to FERC license notifications was found during the review of FERC eLibrary from December 31, 2014 through December 8, 2019. A scheduled 20-foot impoundment drawdown to conduct Project repairs on April 20, 2016, resulted in a public safety incident. Confidential documentation provided by Clement LLC showed that while the drawdown was coordinated with the NHDES, FERC approval was not sought. After notice of the public safety event, FERC reminded Clement LLC of their reporting requirements, but did not identify the incident as a license violation. My review also confirmed that material changes have occurred since last certified by LIHI, including installation of trashracks for fish passage protection, installation of downstream fish passage, and a related increase in flows to the bypass during passage season for river herring and American eel. However, all of these changes resulted in enhancements for environmental resources important to LIHI.

VI. PUBLIC COMMENT RECEIVED OR SOLICITED BY LIHI

The deadline for submission of comments on the LIHI certification application was January 26, 2020. No comments were received directly by LIHI.

Outreach was made to the following two agency representatives seeking their opinion on the effectiveness of the downstream passage facilities and working with Eagle Creek in general on environmental issues. Their responses are incorporated into the fish passage criteria discussions and a copy of their emails contained in Appendix A.

- USFWS - Julianne Rosset, Fish & Wildlife Biologist
- NHFG - Matt Carpenter, Biologist II

VII. DETAILED CRITERIA REVIEW

A. ECOLOGICAL FLOW REGIMES

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

Assessment of Criterion Passage

The Applicant appropriately selected **Standard A-1, Not Applicable/De Minimis Effect** for the Impoundment and **Standard A-2, Agency Recommendation** for the Bypass and Tailrace/Downstream Reach. Standard A-1 is appropriate for the impoundment as noted on Table B-2 of the LIHI Handbook, even though the approved Operations and Flow Monitoring Plan identifies general guidelines on drawdown rates. There have been no changes in requirements or in the mode of operation of the Facility since it was last certified by LIHI.

The Project is operated as run-of-river where inflow to the impoundment generally matches outflow from a combination of generation and bypass flow. Generation is controlled from a PLC, located in the powerhouse, and is automatically adjusted to maintain the head pond elevation based on a pond level sensor located at the dam. If inflow is less than the minimum hydraulic capacity of the unit, the unit is shut down manually and inflow passes the dam through spillway gates that

are automatically modulated to maintain head pond elevation. If inflow is greater than the capacity of the unit, the balance of flow is passed over the dam with the modulating gates. If the generating unit is taken out of service for maintenance or the unit trips, the head pond rises, and the modulating gate(s) adjust to maintain pond level.

Clement LLC coordinates with NHDES to conduct annual drawdowns at Clement when releases into the Winnipesaukee River from Lakeport Dam are decreased for a period of up two weeks after Columbus Day. During this timeframe, releases from Lake Winnipesaukee (Lakeport Dam) are reduced by NHDES, to allow dam and hydro owners to perform maintenance on their facilities. The NHDES posts the drawdowns on their website. The Applicant noted this is a long-standing practice, and applicable resource agencies are involved in the program.

During impoundment drawdown conditions, run-of-river is provided through a combination of generation and / or operation of the four upward opening spillway gates to maintain the headpond at the target drawdown elevation. The general guideline identified in the Operations and Flow Monitoring Plan (O&FMP) for drawdowns is a rate of 1 foot per hour. As a general guideline, typical refilling rate is passage of 70% inflow and retention of 30% inflow until normal head pond elevation is achieved. Once the normal elevation has been restored, normal operations are resumed. The O&FMP is a requirement of the MOA and not the FERC license nor WQC. Thus, it has not been submitted to FERC or the NHDES for approval.

The amended FERC license requires a continuous flow of 235 cfs below the tailrace/powerhouse, or inflow to the reservoir, whichever is less, for the purpose of protecting and enhancing aquatic resources. A portion of this, 30 cfs, is released at the dam as a minimum flow to the bypass reach, for the purpose of protecting aquatic resources in the reach. This minimum flow value was recommended by the US Department of the Interior (DOI) and the US Environmental Protection Agency (EPA) and adopted as the Article 33 of the amended FERC license. The Applicant could not produce underlying documentation providing the basis for this value; however, an October 8, 1982 letter from EPA to FERC indicates that the 30 cfs bypass flow was the unregulated 7Q10 flow.[2] The original certification report[3] states "the MOA contains the latest guidance relating to flows for the project. The USFWS requires ECREM to 1) provide continuous minimum flows to the bypass reaches of the Project as established in consultation with and approved by the Service in 2015, and 2) file an Operations and Flow Monitoring Plan within 6 months of MOA signing for monitoring run-of-river operation and bypassed reach flow releases from the Project."

With regard to the base flow below the Project, the application states that the drainage area at the dam is approximately 471 square miles, based on the USGS stream gage located about 0.5 miles upstream. Therefore, the 235 cfs base flow is equivalent to 0.5 cfs/square mile which is the USFWS New England Aquatic Base Flow (ABF) summer default value.
Under the terms of the MOA, minimum flows and bypass flows were reviewed in 2015.
Although the site evaluation did not include a quantitative review with measurements, it did include a visual qualitative review of the wetted perimeter, substrate cover, pools, water depth, and other factors. The USFWS agreed, based on the field observations, that the minimum bypass flow required by the FERC license was acceptable. Based on the MOA, the minimum flow to

[2] https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=13424237
[3] https://lowimpacthydro.org/wp-content/uploads/2015/02/Clement-Full-App-Review_REVISED.pdf

the bypass is increased to 50 cfs during the downstream fish passage season, generally from mid-August to mid-December. This is incorporated into the required 235 cfs base flow to the river.

Based on the application and review of FERC's eLibrary, there have been no deviations from the required run of river requirements nor the minimum flows to the bypass established by the FERC license (30 cfs) and increased during fish passage season by the MOA (50 cfs). Drawdown guidelines have been met during the annual drawdowns. In response to my inquiry, Eagle Creek reported they will be communicating with FERC about whether or not these NHDES initiated drawdowns require notification to FERC, as identified in FERC's letter dated August 15, 2016. This letter was issued to Clement LLC specific to the drawdown event in 2016 that resulted in a public safety event. To date they have not made such notifications since the drawdowns are not initiated by Eagle Creek.

Based on this review, I believe the Project continues to satisfy this criterion. Eagle Creek has committed to update their protocols should FERC notifications also be required for the annual drawdowns.

This Project 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-3, Site-Specific Studies** to pass this criterion for all ZOEs. In response to LIHI Condition #1, water quality sampling was completed in 2017 and the results were submitted to NHDES. In a November 2018 letter, included with the LIHI application, NHDES confirmed that the results of the 2017 water quality sampling, as well as some conducted in 2013, demonstrated that the river in the Project vicinity meets state water quality standards for dissolved oxygen and chlorophyll-a, two of the four parameters requested to be tested by the NHDES. While temperature and total phosphorus were also requested and sampled, the NHDES noted there are no numerical standards for either parameter so the NHDES could not state that standards are met for these. However, they likewise did not express concerns with the sampling results.

The 2018 State of New Hampshire 303(d) List of Impaired Waters does not identify the waters in the Project area as being impaired.

Based on this information, I believe the Project continues to satisfy this criterion.

This 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, sustainable fish and wildlife resources in areas affected by the facility.

Assessment of Criterion Passage

The Applicant selected **Standard C-1, Not Applicable/De Minimis Effect** for all ZOEs, although I believe that **Standard C-2, Agency Recommendation** is more appropriate for the Bypass Reach and Tailrace/Downstream Reach as the MOA includes the possibility of needing upstream passage, to be reviewed in 2020.

The application noted that historically, most of the native migratory fish species were present in the watershed (Atlantic salmon, American eel, alewife, blueback herring, American shad, and sea lamprey.[4] As noted in a 2015 LIHI Certification Review Report for the downstream Stevens Mills Project, the Pemigewasset River basin served as the principal source of salmon production, while shad and river herring (alewives and blueback herring) more likely utilized the Winnipesaukee River, the Merrimack River mainstem and other Merrimack tributaries[5]. In 1847, the Essex Dam in Lawrence, Massachusetts was constructed at River Mile 30 on the Merrimack River, blocking anadromous fish runs to critical upstream habitat. Atlantic salmon became extirpated, while shad and river herring maintained diminished populations by using available habitat downstream of Essex Dam. Currently, river herring are present in the Winnipesaukee River due to upstream stocking. American eel, has an indigenous population that persists in the watershed.

Based on Applicant consultation with NHFG, the following resident freshwater species have been documented in the Winnipesaukee River: common white sucker, fallfish, common shiner, blacknose dace, longnose dace, brown bullhead, yellow bullhead, yellow perch, Eastern chain pickerel, rock bass, bluegill, pumpkinseed sunfish, redbreast sunfish, largemouth bass, smallmouth bass, and margined madtom (a type of catfish). Additionally, hatchery stocked fish such as brook trout, rainbow trout, and Atlantic salmon are present in the Winnipesaukee River.

The application notes that currently, neither of the two dams downstream of Clement Project on the Winnipesaukee River, have upstream fish passage. The one closest to the Clement Project, the Stevens Mill Project, also owned by Eagle Creek, is included in the MOA with the USFWS and is also slated for a review of upstream passage needs in 2020. River herring and American eel are noted in the MOA as the likely target species for potential future upstream passage requirements.

Standard Article 15 of the 1983 FERC license amendment provides for the construction and operation of fish passage facilities if required in the future. This amendment also notes that by a letter dated October 5, 1982, the USFWS requested that the "*licensees provide fish passage*

[4] Noon, J. 2003. Fishing in New Hampshire: A History. Moose Country Press. Warner, NH
[5] https://lowimpacthydro.org/wp-content/uploads/2015/03/StevensMillCertificationReport-jrc-revised-25July2015.pdf

facilities at the project when the New Hampshire Fish and Game Department (NHFG) implements a plan to restore anadromous species throughout the project area." To date, the NHFG has not made any specific requests of Eagle Creek, other than their informal participation in the MOA between the USFWS and Eagle Creek.

I believe the Project continues to conditionally satisfy this criterion at this time. I recommend a condition to provide LIHI the results of the MOA 2020 review of upstream passage requirements to understand the potential schedule for development of such facilities. This condition also requires submission to LIHI of any changes to the MOA. To date, the Project has been in compliance with other MOA requirements, associated with flows and downstream fish passage. Thus, I believe that Clement LLC will likely adhere to any upstream passage requirements should they be established within the next five years.

This 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. All migratory species are able to successfully complete their life cycles and to maintain healthy, sustainable fish and wildlife resources in the areas affected by the Facility.

Assessment of Criterion Passage

The Applicant has appropriately selected with **Standard D-1, Not Applicable/De Minimis Effect** for ZOE #3, the Tailrace/Downstream Reach and **Standard D-2, Agency Recommendation** for the Impoundment (ZOE #1) and Bypass Reach (ZOE #2).

As noted above, river herring and American eel currently exist in the Winnipesaukee River. As such, the MOA includes a requirement for the development of downstream passage for these species. The downstream fish passage facilities were completed in 2016 prior to the downstream fish passage season (American eel, generally from 8/15 to 11/15; river herring, generally from 9/15 to 11/15) and have been successfully operated annually during the downstream migration season since being placed in service. The downstream fish passage and protection measures include:

- installation of new ¾-inch opening exclusionary racks at the intake;
- use of the existing concrete sluiceway located immediately downstream of the racks at the intake to pass 11 cfs and bypass downstream migrants past the dam;
- modifications to the existing waste gate section of the spillway for a lighted bypass that includes installation of shaped wall panels anchored to existing concrete and a shaped floor bolted to the top of the existing waste gate panel to maintain 39 cfs bypass flow and bypass downstream migrants past the dam;
- a plunge pool modified at the exit with a weir assembly and discharge chute located downstream of the waste gate spillway on the apron of the dam which conveys downstream migrants to the bypass and river; and

- a 4-foot skirted boom upstream of the intake to guide downstream migrants to the lighted waste gate.

The passage flows are released via the concrete sluiceway (11 cfs) and the waste gate (39 cfs) that flow to the plunge pool.

Field staff representatives from USFWS and NHFG routinely visit the site, working with onsite operational staff, during passage season to observe how the downstream passage appears to be working. On September 10, 2019, a more formal inspection was done by USFWS and NHFG representatives at Clement and other nearby Eagle Creek projects. The following are comments issued by USFWS for the Clement Project from this inspection:

> *"Clement:*
> - *Hydraulics of water over the surface bypass, into the plunge pool, and down into the tailrace seemed acceptable.*
>
> *Recommendations/Action Items*
> - *O&M should be updated to include communication protocol.*
> - *Matt Carpenter will do his best to work with Corey to look at the downstream reach during active downstream migration to see if fish are dead/injured."*

Both the USFWS and NHFG representatives contacted seem pleased with the passage measures to date and both stated that Eagle Creek has been attentive to the downstream passage needs. Matt Carpenter of NHFG concluded:

> *"We have not seen any issues at the project since the racks were installed. If we do observe a problem in the future, I am confident that we will be able to resolve it. Eagle Creek has been very responsive when issues have come up at other projects."*

The emails from USFWS and NHFG are contained in Appendix A.

Based on my review, I believe that the Clement Project continues to satisfy this criterion. Given the agencies' confidence in Eagle Creek to resolve any future issues should they arise, I do not believe any conditions are necessary.

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 has appropriately selected **Standard E-1, Not Applicable/De Minimis Effect** to pass the Shoreline and Watershed Protection criterion for all Project ZOEs.

There has been no change in the Shoreline and Watershed Protection requirement of the Facility since it was last certified by LIHI. No conservation buffer zone, watershed enhancement fund nor Shoreland Management Plan are required by the FERC License. Article 19 of FERC license requires the Licensee to take "*reasonable measures to prevent, soil erosion on lands adjacent to streams or other waters, stream sedimentation, and any form of water or air pollution.*"

During construction of the downstream fish passage facilities, an erosion control plan was submitted in the NHDES permit application and employed during construction. The Applicant states there are no ground disturbing activities currently planned at the site; however, if any were proposed, a soil erosion and sediment control plan would be developed and implemented. The run-of-river operation of the Project helps reduce the risk of erosion of shoreline banks.

The Applicant estimated the lands within the Project boundary to be about five acres, with the reservoir covering an additional 2.5 acres. As shown on Figure 9, the shoreland immediately surrounding the Project is primarily a mix of residential housing, parks, and commercial and industrial areas. There is a rail line that parallels the eastern side of the Winnipesaukee River in the vicinity of the Project. The historic downtown areas of Tilton and Northfield, an urban shopping district and Town park are immediately upstream of the Project. The area abutting the bypassed reach on river right consists primarily of buildings, some of which are associated with the hydro facility. The shoreline abutting river left of the bypass reach and downstream is forested.

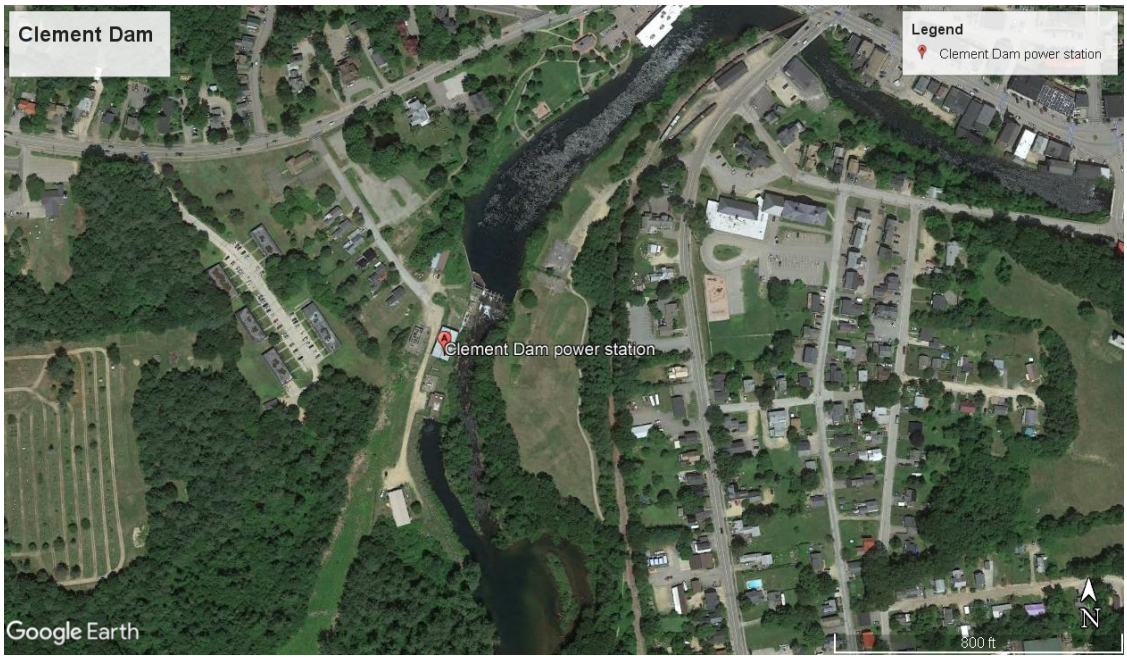

Figure 9 – Close-up Aerial of the Project Vicinity

No critical habitat for any federal or state endangered or threatened species has been mapped in the Project vicinity. Thus, it does not appear that Project lands include any areas of significant ecological value. Based on this review, I believe the Project continues to satisfy this criterion.

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

Standard F-1, Not Applicable/De Minimis Effect was appropriately selected for all ZOEs.

As part of the NHDES permit application process for the construction of the Downstream Fish Passage Project, a USFWS Information for Planning and Consultation (IPaC) report and NH Natural Heritage Bureau (NHNHB) consultation were completed in 2015 to assess protected species known to occur or potentially occur within the Project area. A new data request was also submitted, and an updated response received from both USFWS and NHNHB in October 2019. These documents were provided in the application. The NHNHB reviews identify no recorded occurrences of federal or state protected species near the Project area. The IPaC report identified the range of the Northern long eared bat, a federally threatened species, is within the Project area, but that no critical habitat has been identified for this species. It is unlikely that the Northern long eared bat would be present in the limited footprint of the Project boundary, especially with the adjacent developed urbanized environment. Additionally, the Project likely will not have any effect on the species, if present, as there are no routine tree-clearing activities or corridor maintenance activities planned, nor are there any projects currently planned which would involve tree clearing.

Based on the above information, I believe the Project will not likely have any impact to protected species and therefore continues to satisfy this criterion. Should Project upgrades involving significant land clearing activities be undertaken during the next five years, the Applicant would be required to identify it as a "change in environmental conditions affecting the Project" as part of the annual compliance report to LIHI.

The Project 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-1, Not Applicable/De Minimis Effect** to pass this criterion for the Project for all ZOEs.

There is no requirement for a Programmatic Agreement or Cultural Resource Management Plan at Clement in the FERC 1983 FERC license amendment. Article 27 of the license does however require consultation with the New Hampshire State Historic Preservation Officer (SHPO) prior to the commencement of any future construction or development of any Project works or other facilities at the Project to ensure the protection of any yet undiscovered cultural resources.

Eagle Creek consulted with the SHPO on September 9, 2013, as part of the previous LIHI application, when a Request for Project Review was submitted to the NH Division of Historical Resources (NHDHR). The NHDHR found the Project to have "No Potential to Cause Effects," and noted "*this is an unevaluated resource, if in the future plans involve alterations to the facility, surveys will be required*." In 2015, as part of the NHDES permit process for construction of the downstream fish passage facilities, Eagle Creek consulted with the US Army Corps of Engineers (ACOE) and the NHDHR. No response was received from the NHDHR to the request for a Project Review. Eagle Creek also consulted with the ACOE for a Project area determination under section 106 of the federal Historic Preservation Act. The ACOE determined there to be no impact.

The Applicant stated they have no plans for such work in the foreseeable future, but would conduct the required consultation if those plans changed. Eagle Creek's SHPO consultation in 2015 when constructing the fish passage is evidence that they recognize the importance of such coordination. Thus, I believe the Project continues to satisfy this criterion.

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 with **Standard H-1, Not Applicable/De Minimis Effect** for all Project ZOEs.

The FERC license did not require the development of any recreational facilities; however, standard Article 18 requires that the Licensee allows free access to the Project's land and waters. Boating and fishing are recreational opportunities that frequently occur in the Project waters, and the Applicant stated they maintain open access to all Project lands other than the near the forebay, dam and spillway gate structure, powerhouse and tailrace, for public safety reasons.

In 2005, the Town of Tilton was granted permission to install three fishing piers and a car top boat launch within the Project boundary as part of a public park being developed by the Town on land adjacent to the reservoir (Tilton Riverfront Park)[6]. It appears that the last FERC Environmental Inspection was conducted in 2006 at the Project to assess whether the above-noted park was sufficiently away from Project facilities to ensure public safety. No safety issues were found.

Based on my review, I believe the Project continues to meet the requirements of this criterion.

The Project Passes Criterion H – Recreational Resources

[6] https://elibrary.ferc.gov/IDMWS/common/OpenNat.asp?fileID=10476184

VIII. GENERAL CONCLUSIONS AND REVIEWER RECOMMENDATION

Based on my review, I believe that this Project conditionally meets the requirements of a Low Impact facility and recommend it be re-certified for a five-year period with the following condition:

Condition 1: In order to maintain compliance with the Upstream Fish Passage Criterion, the facility Owner shall report in its annual compliance statement to LIHI:

a) The results of the MOA 2020 evaluation of the need for upstream fish passage at the Project. This reporting shall include the anticipated schedule for implementation of any facilities deemed required. Status of this work shall be reported annually; and

b) A copy of the signed, updated MOA. Under the unlikely scenario that the USFWS and Eagle Creek do not reach agreement on extension of the MOA, the facility Owner shall continue to operate the Clement Project in accordance with the most recent version of the plans required by the MOA to maintain LIHI certification.

Appendix A – Agency Correspondence

From: "Carpenter, Matthew" <Matthew.Carpenter@wildlife.nh.gov>
To: "Rosset, Julianne" <julianne_rosset@fws.gov>, "PBMwork@maine.rr.com" <PBMwork@maine.rr.com>
Cc:
Bcc:
Priority: Normal
Date: Friday December 20 2019 8:55:57AM
RE: [EXTERNAL] Clement Project Application to LIHI

Hi Pat,
Yes, I agree with Julianne. Eagle Creek installed ¾ inch racks at the project to help prevent American eels and juvenile herring from going through the turbines as they migrate downstream. We have not seen any issues at the project since the racks were installed. If we do observe a problem in the future, I am confident that we will be able to resolve it. Eagle Creek has been very responsive when issues have come up at other projects.
Thanks,
Matt

From: Rosset, Julianne <julianne_rosset@fws.gov>
Sent: Thursday, December 19, 2019 3:06 PM
To: PBMwork@maine.rr.com
Cc: Carpenter, Matthew <Matthew.Carpenter@wildlife.nh.gov>
Subject: Re: [EXTERNAL] Clement Project Application to LIHI

EXTERNAL: Do not open attachments or click on links unless you recognize and trust the sender.

Hi Pat -

Thank you for your email.

Matt will be able to speak more to the effectiveness of downstream passage at Clement but my understanding is that it is working relatively well and, so far, we have not had any issues passing emigrating river herring or eels.

The USFWS has a good working relationship with Eagle Creek and we are currently working together to draft a new MOA to be signed some time during the beginning of the new year. We performed site inspections at Eagle Creek's facilities on the Winnipesaukee in September 2019 and anticipate that our recommendations will be implemented before the beginning of the 2020 downstream passage season - but that remains to be seen.

If you have any additional questions or would like to discuss Clement or Eagle Creek further, please feel free to call or email me.

Kind regards,
Julianne
Julianne Rosset
Fish & Wildlife Biologist
USFWS New England Field Office
70 Commercial Street, Suite 300
Concord, NH 03301
603-227-6436
julianne_rosset@fws.gov

On Tue, Dec 10, 2019 at 6:05 PM <PBMwork@maine.rr.com> wrote:

> Hi

I am the reviewer for the Low Impact Hydropower Institute for the Eagle Creek Clement Project. Your names were provided as agency contacts knowledgeable of the project. I was wondering if you can share with me your thoughts about the successfulness of the downstream passage facilities installed at Clement in 2016. Are you satisfied with the effectiveness of this passage for river herring and American eel, which I understand are the two target species?

I would also be interested in any opinions you wish to share about working with Eagle Creek on the MOA requirements, and their attention to environmental issues in general.

Thanks for your time. If you would prefer to discuss your thoughts on the phone, please tell me when it would be best to call you.

Thanks again

Pat McIlvaine