

Appendix B-2

Letter from New Hampshire DES Re: Water Quality Status
Dtd November 6, 2014



The State of New Hampshire
DEPARTMENT OF ENVIRONMENTAL SERVICES



Thomas S. Burack, Commissioner

November 6, 2014

Dr. Michael J. Sale, Executive Director
Low Impact Hydropower Institute
34 Providence Street
Portland, Maine 04103

RE: Water Quality Status of the Winnepesaukee River for Low Impact Hydropower Institute Certification of the Clement Dam Hydroelectric Project (FERC No. P-1066), Winnepesaukee River

Dear Dr. Sale:

Essex Hydro Associates (EHA) has applied on behalf of Eagle Creek Renewables, LLC (ERC) for Low Impact Hydropower Certification from the Low Impact Hydropower Institute (LIHI) for the Clement Dam Hydroelectric Project (FERC No. P-1066) on the Winnepesaukee River in Tilton, NH. We understand that to receive LIHI certification, you require a statement from the New Hampshire Department of Environmental Services (DES) stating that the project is not causing or contributing to violations of state water quality standards. On August 12, 2013, DES sent EHA a letter outlining what would be needed to determine if the Winnepesaukee River in the vicinity of the Clement Dam Hydroelectric Project was or was not attaining water quality standards. In specific, the following was stated: "In order for DES to determine if the subject hydroelectric project is causing or contributing to water quality standard violations, additional monitoring and information is needed. In general, data / information is needed to address the following water quality concerns that are typically associated with hydropower projects:

1. Impact on ambient water quality criteria and thresholds;
2. Impact of pond fluctuations on aquatic habitat;
3. Maintenance of adequate minimum flows to protect downstream aquatic life; and
4. Adequate upstream and downstream fish passage."

The purpose of this letter is to provide you with our assessment of the data and information received from EHA in response to our letter of August 12, 2013 and, our conclusions as to whether or not the Clement Dam Hydroelectric Project is causing or contributing to New Hampshire surface water quality standard violations in the Winnepesaukee River.

Water quality data was collected for dissolved oxygen, water temperature, total phosphorus, and chlorophyll-a. Monitoring locations in the impoundment (05T-WIN), the bypass reach (05K-WIN) and in the downstream section of the river (05-WIN) were monitored continuously for a 10 day period in September 2103 for water temperature and dissolved oxygen using multi-parameter dataloggers. DES specified that the multi-parameter continuous water quality data should be collected under critical low flow ($< 3 \times 7Q_{10}$) and higher water temperature conditions ($> 23^\circ \text{F}$). There is a USGS stream gage on the Winnepesaukee River approximately a half mile upstream of the Clement Dam Hydroelectric Project which DES assigned as a surrogate to estimate low flow conditions in the vicinity of the project. The continuous water quality data submitted by EHA was collected when the Winnepesaukee River was flowing above the target low flow conditions. During the datalogger deployment flows ranged from 4.4 (750 cfs) to 5.7 (1000 cfs) $\times 7Q_{10}$ conditions of 176 cfs. Under no time during the datalogger deployment did the flows reach the low flow target of $< 3 \times 7Q_{10}$. During the collection of the continuous water quality data, daily average water temperatures in the Winnepesaukee River exceeded 23°F . EHA has stated that during the collection of the continuous water quality data the Clement Dam Hydroelectric Project was operating under normal operating procedures. During the period of datalogger deployment

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stated that during the collection of the continuous water quality data the Clement Dam Hydroelectric Project was operating under normal operating procedures. During the period of datalogger deployment (September 2 – 11, 2013) the dissolved oxygen concentration and percent saturation was above the Class B NH water quality standard on all occasions.

Instantaneous measurements were taken in the impoundment (05T-WIN) for water temperature and dissolved oxygen at one foot depth intervals. This data confirmed that the approximately three foot deep impoundment at the sampling station is not stratified during the summer months. In addition, between July and September 2013, ten samples from stations 05T-WIN and 05-WIN were collected and tested for total phosphorus and chlorophyll-a.

DES has assessed the water quality data collected in 2013, and based on this assessment concludes that the water quality in the impoundment, bypass reach, and downstream section of the Winnepesaukee River, under the dam's current operating conditions and under the flow conditions during which the data was collected, does not appear to be violating existing water quality criteria or thresholds for dissolved oxygen, total phosphorus and chlorophyll-a. In the August 12, 2013 letter DES provided the assessment status for the parameters of concern for the reaches of the Winnepesaukee River upstream and downstream of the Clement Dam Hydroelectric Project. Table 1 provides an update to the current assessment status of the river reaches in question for the parameters collected in 2013. The assessments are based on the methodology described in the DES Consolidated Assessment and Listing Methodology (CALM)¹. This information will be used in the next Section 305(b)/303(d) Water Quality Assessment report which is expected to be issued by DES in early 2016. Please note that the assessment status listed in Table 1 could change if water quality criteria or thresholds change and/or if additional data collected between now and the 2016 report indicate water quality violations. For example, data collected at lower flows and/or higher temperatures might result in a different assessment.

Table 1. Assessment Status for Water Quality Monitoring Parameters – Clement Dam Hydroelectric Project

Assessment Unit and Monitoring Station	Location	Parameter	Designated Use	Assessment Status based upon summer 2013 sampling
NHIMP700020203-05 05T-WIN	Clement Dam Hydroelectric Project Impoundment	Dissolved Oxygen (mg/L)	Aquatic Life	Fully Supporting
		Dissolved Oxygen (% Sat.)	Aquatic Life	Fully Supporting
		Chlorophyll-a	Primary Contact Recreation	Fully Supporting
			Aquatic Life	Indeterminate ^A
		Total Phosphorus	Aquatic Life	Indeterminate ^A
Water Temperature	Aquatic Life	No numeric criteria ^C		
NHRIV700020203-13 05K-WIN	Downstream of Clement Hydroelectric Dam – Bypass Reach	Dissolved Oxygen (mg/L)	Aquatic Life	Fully Supporting
		Dissolved Oxygen (% Saturation)	Aquatic Life	Fully Supporting
		Water Temperature	Aquatic Life	No numeric criteria ^C
NHRIV700020203-13 05-WIN	Downstream of Clement Dam Hydroelectric Project Bypass Reach – Tailrace	Dissolved Oxygen (mg/L)	Aquatic Life	Fully Supporting
		Dissolved Oxygen (% Sat.)	Aquatic Life	Fully Supporting
		Chlorophyll-a	Primary Contact Recreation	Fully Supporting
		Total Phosphorus	Aquatic Life	No numeric criteria ^B
		Water Temperature	Aquatic Life	No numeric criteria ^C

^A DES does not have numeric water quality thresholds for the aquatic life designated use for total phosphorus and chlorophyll-a in lakes/ponds and impoundments with characteristics similar to lakes/ponds but it can only be applied to waterbodies where the trophic class is known. For waterbodies where the trophic class is known the median total phosphorus and chlorophyll-a value is used to make the threshold comparison. The aquatic life designated use nutrient and chlorophyll-a thresholds are depicted below with the median values for each parameter for the data collected at station 05T-WIN in assessment unit NHIMP700020203-05 and station 05-WIN in assessment unit NHRIV700020203-13 during the summer of 2013.

	TP (ug/L)	Chl-a (ug/L)
Median 05T-WIN (2013)	8.8	1.4
Median 05-WIN (2013)	10.8	1.4
Oligotrophic	< 8	< 3.3
Mesotrophic	≤ 12	≤ 5
Eutrophic	≤ 28	≤ 11

^B DES does not have numeric water quality criteria for nutrients in rivers or streams. The narrative criteria states that "Class B waters shall contain no phosphorus or nitrogen in such concentrations that would impair any existing or designated uses, unless naturally occurring."

^C Although there is currently no numerical water quality criteria for water temperature, NHDES is in the process of collecting biological and water temperature data that will contribute to the development of a procedure for assessing rivers and stream based on water temperature and its corresponding impact to the biological integrity of the waterbody.

EHA provided DES with a detailed description of the infrastructure of the facility. Project works consist of:

- a concrete dam approximately 120 feet long and 16.5 feet high with a spillway section surmounted by 3 foot high flashboards,
- a reservoir having minimal pondage and a normal water surface elevation of 442.4 feet,
- an intake structure near the right dam abutment,
- an enclosed concrete flume, 8 feet by 16 feet in cross-section with a length of 200 feet,
- the above flume leads to a powerhouse containing a turbine generator unity with a total rated capacity of 2,400 kw,
- a tailrace returning flow to the Winnepesaukee River approximately 600 feet downstream of the dam,
- a transmission line approximately 600 feet downstream of the dam and
- appurtenant facilities

In August of 2014, EHA provided DES with information regarding minimum flows and pond fluctuations at the Clement Dam Hydroelectric Project. EHA confirmed that the facility is operated as a run of river project and that the project does not draw down the impoundment or store water for purposes of power generation. Any pond level fluctuations are the result of operational changes by two upstream hydroelectric projects (Lockmere and Lakeport) or changes in the releases from Lake Winnepesaukee which are beyond the control of ECR.

With regard to minimum flow the project's FERC license requires a minimum flow of 235 cfs in the penstock and the bypass reach. The bypass reach is approximately 500 feet long and has existed since the dam's construction. The minimum flow of 235 cfs was required by the U.S. Fish and Wildlife Service (USFWS) and the New Hampshire Fish and Game Department (NHFG) when the project license was issued in 1983. EHA provided DES with five years of minimum flow compliance filings filed with FERC by the former project owner, Algonquin Power.

On August 14, 2014 ECR and USFWS signed a memorandum of agreement (MOA) to establish a plan and schedule for addressing minimum flow issues at the Clement Dam Hydroelectric Project that would facilitate fulfilling the requirements for LIHI certification. Per this MOA, ECR will reexamine the minimum flows to the bypass reach and in consultation with the USFWS establish a minimum bypass flow by the end of 2015. Once the USFWS has approved these new flow regimes and the facility has received LIHI certification, ECR will implement the agreed upon minimum bypass flows. The USFWS reserves the right to modify these flow requirements based upon the need to address effective operation of

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upstream fish passage facilities. ECR has committed to prepare and file for approval with the USFWS an Operations and Flow Monitoring Plan for monitoring run of river operation and bypassed flow releases from the facility. This will be completed within six months from the effective date of the agreement regarding minimum flows.

The MOA signed on August 14, 2014 also addresses the issue of fish passage at the Clement Dam Hydroelectric Project. ECR and the USFWS have agreed to a schedule for implementing downstream fish passage enhancements to specifically target American eel and river herring. The proposed enhancements will consist of exclusion and safe and effective downstream passage of river herring and American eel or seasonal project shutdown of turbines, combined with safe egress routes. The parties have agreed to review upstream fish passage issues in 2020.

Per the MOA, ECR agrees to construct, operate and maintain downstream fish bypass passage facilities for adults and juvenile river herring in all years when river herring have been stocked upstream of the project. The downstream fish passage measures for downstream river herring passage may be the same as measures implemented for American eel. The downstream passage facilities will consist of measures to protect downstream river herring from impingement and/or entrapment as well as bypass facilities to assist fish in moving safely past the projects. For all proposed structural fish passage measures, ECR will provide the USFWS with functional design drawings of the proposed changes for its review and approval.

In summary, based on the current and agreed upon changes to the operation of the facility, current water quality standards, the water quality data collected in 2013 and information provided to DES by EHA, it appears the Winnepesaukee River immediately upstream and downstream of the Clement Dam Hydroelectric Project is attaining water quality standards under the conditions during which the data was collected. DES would like to note again that the multiparameter datalogger dissolved oxygen data was collected under flow conditions that exceeded the target of 3 X 7Q10 low flow conditions. As previously noted, the above water quality assessment could change in the future should a change in water quality criteria or thresholds and/or new data indicate water quality violations. It could also change if the DES, USFWS and/or NHFG conclude in the future that the project is not in compliance with upstream or downstream fish passage requirements or minimum bypass flow requirements.

Should you have any questions or require additional information please contact me at (603)271-2083 (ted.walsh@des.nh.gov).

Sincerely,



Ted Walsh, Surface Water Monitoring Coordinator
NH DES Watershed Management Bureau

Cc (via email): Steve Hickey, Essex Hydro Associates, LLC
Carol Henderson, NHFG
John Magee, NHFG
John Warner, USFS