

Peter Drown
Cleantech Analytics
6717 Cub Run Court
Centreville, VA 20121

January 9, 2019

Maryalice Fischer
Certification Program Director
Low Impact Hydropower Institute

Subject: Recertification Recommendation for the Silver Lake Hydroelectric Facility (FERC # 11478, LIHI #91)

Ms. Fischer,

This letter contains my recommendation for Recertification of the Silver Lake Hydroelectric Facility (the "Facility"). I complete a thorough review of the application materials and the public record for this Facility, and am recommending recertification for one new, five-year term, subject to the following conditions:

1. The facility Owner shall submit to LIHI copies of all correspondence with VDEC regarding their ongoing review of the operations records within 60 days of receipt. LIHI reserves the right to include any recommendation that may result from that review as a condition of re-certification.
2. The facility Owner shall provide to LIHI copies of all correspondence related to the water quality monitoring requirement to confirm effectiveness of the baffle structure if, and when the appropriate drought conditions occur over the term of LIHI certification and shall submit either a statement that no monitoring was required or the monitoring results and any agency comments on those results with annual compliance submittals. LIHI reserves the right to include any recommendation that may result from that review as a condition of re-certification.

Please contact me if you have any questions.

Sincerely,

A handwritten signature in black ink, appearing to read "Peter Drown", is written over a faint, illegible printed name.

Peter Drown, President
Cleantech Analytics LLC

I. Background:

The 2.2 MW Silver Lake Hydroelectric Facility (“Facility” or “Project”) is located in the Green Mountain National Forest in the towns of Goshen and Salisbury, Vermont. Project works include two storage reservoirs – the 74-acre Sugar Hill Reservoir impounded by a 60-foot-high, 680-foot-long earthen dam and the 110-acre Silver Lake, impounded by a 30-foot-high, 257-foot-long buttressed concrete wall with an earth backfill dam. The single powerhouse is located approximately 5,200 feet downstream from the Silver Lake dam, and includes one 2.2-MW turbine generator unit. The Project then discharges into a 450-foot-long tailrace into Sucker Brook, which then empties into Lake Dunmore. There is a 11,700-foot-long bypassed reach from the Sucker Brook diversion dam into the tailrace of the powerhouse. See Figure 1 below for a schematic of the Project and impacted zones of effect.

The Facility was initially constructed between 1916 and 1923 to develop a high-head, low-flow hydropower facility for electrical generation. The current owner and operator, Green Mountain Power (GMP), operates the Facility under the terms and conditions contained in the most recent FERC License issued 2009, and the associated water quality certificate from Vermont. The Facility was originally certified as “Low Impact” on September 5, 2012 and the expiration date of the initial certification (September 5, 2017) was extended several times to March 31, 2019 to allow GMP to provide additional data and receive input from resource agencies. On November 5, 2018, the Owner submitted a timely application for recertification. This application review for recertification was conducted using the 2nd edition Handbook that was published March 2016.

II. Recertification Standards

In October 2016, LIHI notified the applicant of upcoming expiration of the Low Impact Hydropower Institute certification for the Facility. The notification included an explanation of procedures to apply for an additional term of certification under the 2nd Edition LIHI Handbook, including the new 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?

If the answer to any question is “Yes,” the Application must proceed through a second phase, which consists of a more thorough review of the application using the LIHI criteria in effect at the time of the recertification application. The letter noted that because the new Handbook involves new criteria and a new process, all projects scheduled to renew in 2017 and beyond will be an automatic ‘YES.’ Therefore, all certificates applying for renewal in 2017 will be required to proceed through both phase one and phase two of the recertification application reviews.

The Owner submitted an initial (phase one) application for re-certification on August 9, 2017. I conducted the phase one review and noted several issues and deficiencies to address in the subsequent Phase II application. This Report comprises the Phase II review.

III. Adequacy of the Recertification Package

The Applicant provided an updated Recertification Application on November 5, 2018, which included additional supporting information. I have reviewed the application package, supporting comments and documentation and public records on FERC e-library posted since the original certification report (McIlvaine, 2012.) I also independently verified the submitted criteria were appropriate given the changes in the 2nd edition LIHI

handbook.

The application was public noticed and received no public comments. I did solicit specific comments from the Vermont Department of Environmental Conservation (VDEC,) and these are incorporated into this report.

IV. There have not been any “material changes” at the facility that would affect recertification

In accordance with the Recertification Standards, "material changes" mean non-compliance and/or new or renewed issues of concern that are relevant to LIHI's criteria. Based on my review of materials provided, review of FERC's public records, and consultation with the noted individuals, I found that there are no areas of noncompliance or new or renewed issues of concern. The previous LIHI Governing Board's vote to certify the Silver Lake Project was unanimous for a term of 5 years with no conditions.

V. LIHI certification criteria are satisfied in all zones

In my opinion, the Applicant properly selected five zones of effect for the Facility (Figure 1). The Applicant defined the following zones:

- Zone 1) Impoundment #1 = Sugar Hill Storage Reservoir;
- Zone 2) Upstream = Goshen Dam to Sucker Brook Diversion Dam;
- Zone 3) Bypassed Reach = Sucker Brook Diversion Dam to Silver Lake Powerhouse;
- Zone 4) Impoundment #2 = Silver Lake;
- Zone 5) Downstream = Silver Lake Powerhouse to Lake Dunmore.

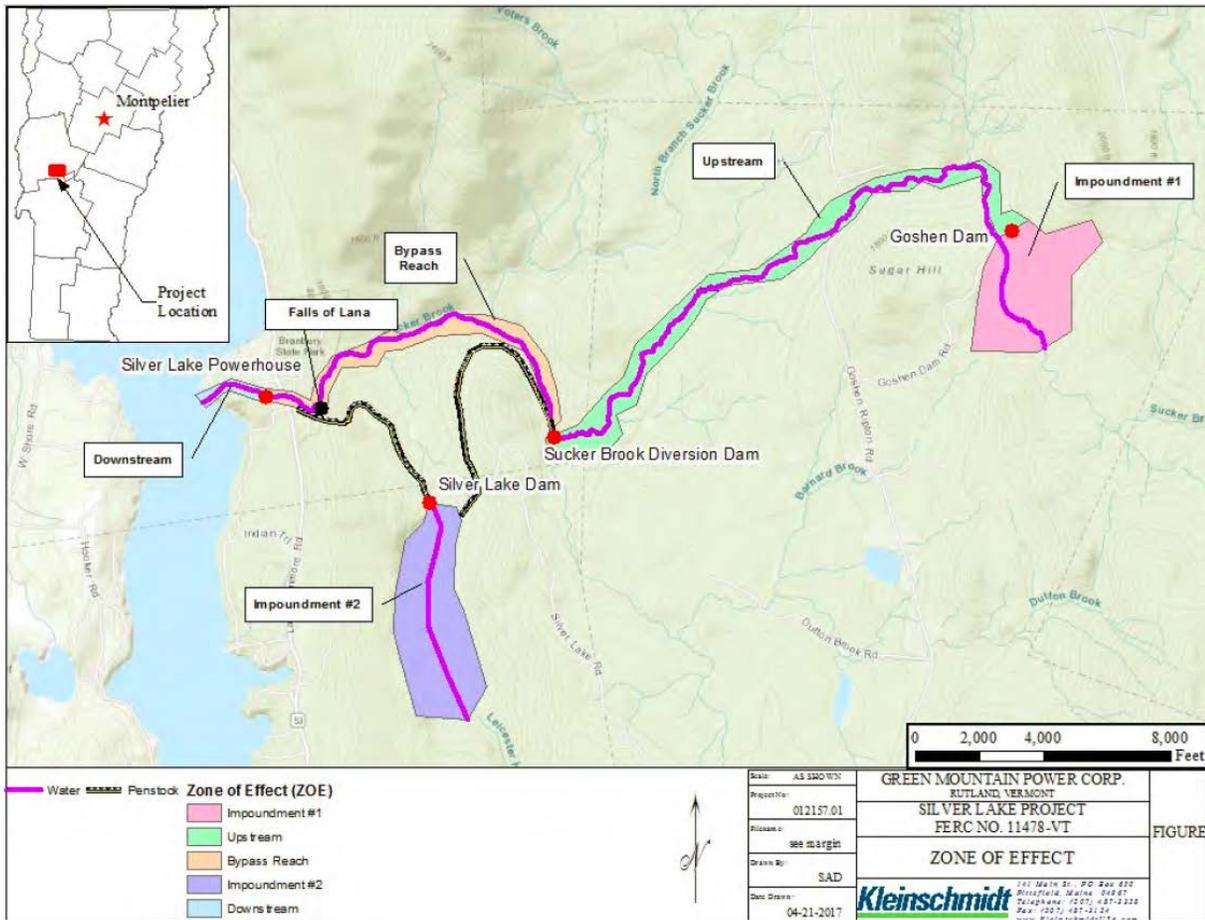


Figure 1 - Zones of Effect Map

A. Ecological Flow Regimes

The Owner selected Standard 1, Not Applicable/De Minimis for both impoundment zones, and Standard 2, Agency Recommendation for the remaining zones. LIHI allows Standard 1 to be selected for all impoundment zones, with an accompanying description of how impoundment levels are managed. The Owner provided an adequate description, which is summarized below along with the scientific and technical basis for meeting LIHI’s standards for agency recommendations for the remaining zones:

Silver Lake – The impoundment at Silver Lake is managed according to Condition B in the Vermont water quality certificate. The Condition prioritized a stable reservoir level during recreational use periods in the summer, and to enhance conditions for resident brook and rainbow trout. Condition E of the water quality certificate provides a rule curve for Silver Lake to follow during smelt spawning season, and tailrace monitoring equipment (Figure 2) assists with data collection and monitoring.

Sugar Hill Reservoir – Sugar Hill Storage Reservoir is operated as a seasonal storage reservoir in accordance with the rule curve for water surface elevation in the 2010 Operations Plan. A pond level sensor at Goshen Dam relays elevation data to GMP’s control center in Rutland, Vermont, and the Owner is able to make adjustments if necessary to comply with the rule curve. The Operations Plan was developed based off historical and forecasted data to arrive at the rule curve is designed to protect smelt spawning, improve hibernacula, and account for springtime precipitation.

Sucker Brook (open channel and bypassed reach)– A minimum flow of 2.5 cfs is maintained in the stretch of Sucker Brook that runs between the Goshen Dam and Sucker Brook diversion dam, and the bypassed reach from the diversion dam to the Falls of Lana. This requirement was developed through a visual assessment conducted by fishery biologists from USFWS and VDEC on flows ranging from 2.5 cfs to 12 cfs in the fall of 2004. The 2.5 cfs was found to provide some center channel habitat for young trout.

Downstream Reach – The Owner follows a ramping plan for the Silver Lake tailrace, that gradually down-ramps the Facility to prevent stranding of downstream aquatic organisms. This plan was developed in consultation with Vermont Department of Fish and Wildlife and US Fish and Wildlife Service in 1995, who evaluated the state of habitat change impacted by the Facility’s operations.



Figure 2 - Silver Lake Tailrace monitoring equipment



Figure 3 – Sucker Brook Diversion Dam Release Structure

The Owner provided operations records to the VDEC on October 30, 2018 to verify compliance with flow requirements. VDEC confirmed that they completed an initial review of that data and sent some follow-up questions to the Owner on December 21st. VDEC noted that they may have minor comments or recommendations based on the response but would support re-certification in general. The Owner’s response to VDEC’s follow-up questions has not been received by LIHI as of the date of this report, and the public comment period has passed, so I am including a condition that the Owner copy LIHI on future communications with VDEC regarding their review of the operations records, and that LIHI reserves the right to include any recommendation that may result from that review as a condition of re-certification.

B. *Water Quality*

The Owner selected Standard 2, Agency Recommendation, for all zones at the Project. There is a water quality monitoring station in the northern bay of the Sugar Hill Reservoir and in the middle of Silver Lake. The Owner provided data showing that the reservoir meets criteria for Vermont Class B cold water fish habitat standards, with only minor exceptions¹. The 2016 list of impaired waters for Vermont does not list any areas impacted by the Facility as “impaired.” The Owner provided correspondence from 2017 with the VDEC that confirms impairments to the downstream Leicester River are due to flow modifications from a different hydroelectric project. The Silver Lake Project received a Water Quality Certificate on December 5, 2008, which is just past the definition of “recent” according to LIHI’s standards. However, two of the requirements of the WQC are ongoing monitoring and reporting requirements that were developed with agency consultation in subsequent years, and these are discussed here:

¹ Several dissolved oxygen recordings at deeper lake depths in Silver Lake did not meet Class B standards.

1. **Dissolved Oxygen and Temperature Monitoring Report** – this report was required by the Water Quality Certificate and an initial report was filed by the Owner on December 1, 2009. The Owner has an ongoing requirement to conduct DO and temperature monitoring when drought conditions are encountered, but since the requirement these conditions have not been encountered. The Owner has submitted letters to FERC annually stating that the monitoring was not conducted because drought conditions did not occur.
2. **Reaeration baffle** – the Owner is required to install a reaeration baffle at the outflow of the Goshen Dam control structure to enhance water quality conditions. The Owner stated they install the baffle structure on July 1 and remove the structure on September 30 each year. The above DO report is required to confirm the effectiveness of the baffle structure, and has not yet been required to be completed.

The Owner provided operations records to the VDEC on October 30, 2018 to verify compliance with water quality requirements. VDEC confirmed that they completed an initial review of that data, and sent some follow-up questions to the Owner on December 21st. VDEC noted that they may have minor comments or recommendations based on the response, but would support re-certification in general. A response has not been received as of the date of this report, and the public comment period has passed. However, the Owner has a pending requirement to conduct water quality monitoring to confirm effectiveness of the baffle structure during drought conditions. In the most recent 2018 report, the Owner stated “*GMP is prepared to conduct water quality monitoring in the summer of 2019, if conditions warrant, to confirm the effectiveness of the baffle structure. If monitoring is conducted a report will be provided to the Commission by December 1, 2019.*” This is a requirement that directly impacts LIHI’s water quality criteria, so I am including a condition that the Owner copy LIHI on this correspondence and that LIHI reserves the right to include any recommendation that may result from that review as a condition of re-certification.

C. *Upstream Fish Passage*

The Owner selected Standard 1, Not Applicable/De Minimis for all zones at the Project except for the downstream zone, for which they selected Standard 2, Agency Recommendation. The Owner stated there are “no current or historical records of anadromous or catadromous species in the Impoundment #1, Upstream, or Impoundment #2 ZOE.” The Falls of Lana represent a natural fish barrier for upstream and downstream fish passage, with the exception of American Eels. However, VDEC confirmed that no eels have been documented in the vicinity of the Facility. The Owner also selected Standard 1 for the bypassed reach zones, while acknowledging that Atlantic Salmon and other fish species do access this riverine habitat for spawning from Lake Dunmore. Although there are measures taken by GMP that impact this reach, those are more relevant for the downstream zone, and are considered separately below.

Figure 4 below provides a closer view of this downstream zone that is important for safe fish passage. The area from the Project tailrace to Sucker Brook’s confluence with Lake Dunmore provides a short riverine stretch where landlocked Atlantic Salmon, brook trout, rainbow trout, and lake trout can access spawning habitat. There is a small section between the natural barrier of the Falls of Lana and the Silver Lake Powerhouse tailrace that species can also access, and landlocked salmon have occasionally been observed in this reach by GMP staff. To prevent fish from moving past the tailrace and entering the Silver Lake powerhouse, GMP maintains a vertical fish exclusion rack and screen device at the tailrace. Furthermore, GMP is required to operate the turbine in that powerhouse at a reduced capacity or offline completely during smelt spawning season in the spring. When the turbine is brought offline, GMP is required to maintain an incremental ramping sequence to prevent stranded species and allow safe species egress during the down-ramping period. These requirements are all required as conditions in the Water Quality Certificate, and meet LIHI’s definition of Agency Recommendation. The Owner adequately demonstrated compliance with agency recommendations for the downstream zone.

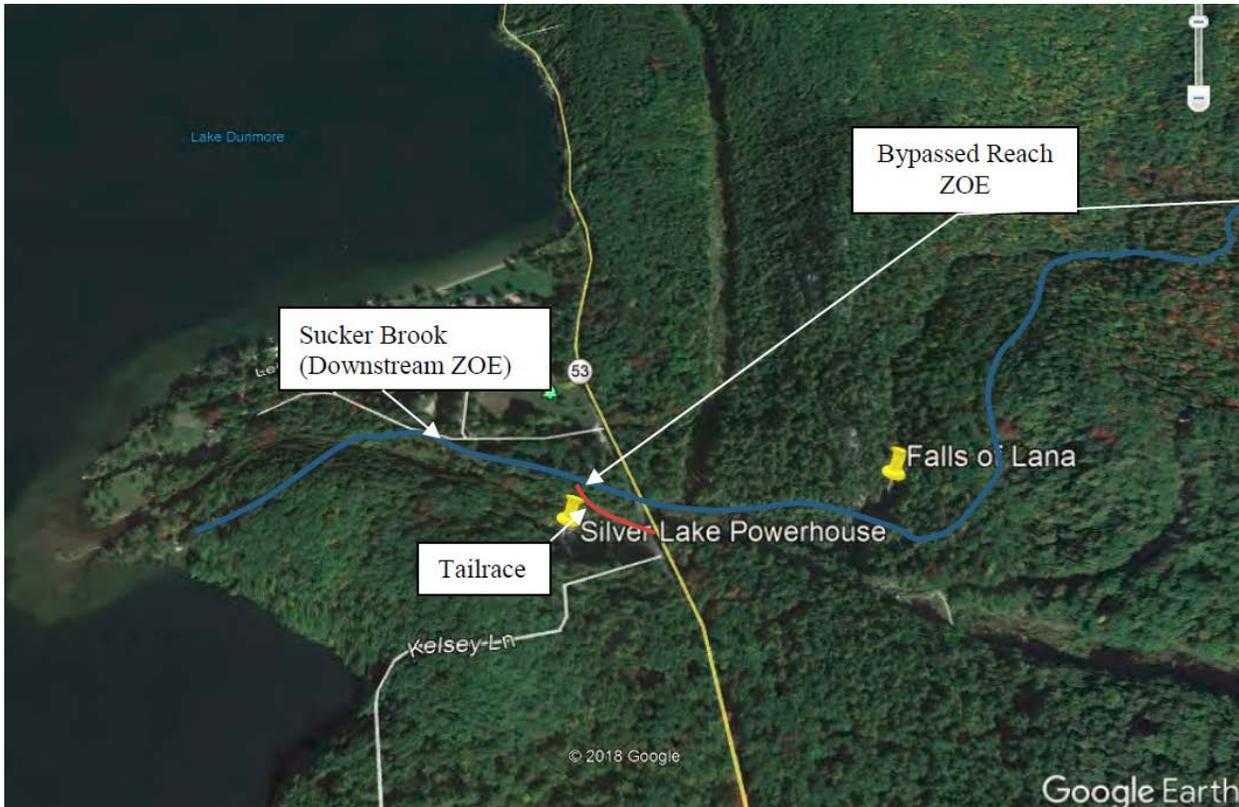


Figure 4 - Downstream Zones of Effect

D. Downstream Fish Passage

The Owner selected Standard 1, Not Applicable/De Minimis for all zones at the Project except for the downstream zone, for which they selected Standard 2, Agency Recommendation. As stated above, there are no historical records of anadromous or catadromous species in the Project vicinity, including American eels. Therefore, the only relevant LIHI standard is the impact of the Facility on riverine fish. All zones of the Project include brook trout, brown trout, and rainbow trout, in addition to other non-game species such as sunfish, rock bass and minnows. Although there is no formal downstream passage, and no requirement ever specified by a resource agency, the Owner provided an adequate description of how the Facility does not hinder the free movements of trout for successful completion of their lifecycles. Starting upstream, the Sugar Hill reservoir outlet includes 3" clear spacing trashracks, which would not prevent the species from entering Sucker Brook² as there is no generating unit at Sugar Hill which could pose a threat to the trout. Species residing in Sucker Brook would then be able to pass either over the Sucker Brook Diversion Dam spillway (when adequate flows are provided,) or through the 4.5" trashracks (again, no generating unit is present which could harm the fish.) The Silver Lake Project intake currently includes 2" trashracks, but License Article 401 requires those to be replaced with 1.5" trashracks when the racks are scheduled for replacement. These narrower trashracks will be able to better prevent fish entrainment at this downstream location. The 2015 Environmental Inspection determined that no follow-up was needed on this requirement. Downstream of the Silver Lake Powerhouse, the Owner follows an approved down-ramping plan to avoid negative impacts to aquatic species. That plan is described in Criteria

² This would be a rare occurrence, because the trout would have to be swimming 12 feet below normal pond elevation which is rather deep in the water column for the small species documented in the reservoir.

C, above. The Owner should have applied Standard 2 to all zones at the Project due the presence of resident fish species in these zones. But based on the information provided, the Owner appears to be in compliance with all Agency Recommendations that impact downstream fish passage at the Facility.

E. Watershed and Shoreline Protection

The Owner selected Standard 1 for all zones at the Project except for the upstream zone and the Silver Lake impoundment zone, for which they selected Standard 2, Agency Recommendation. The Facility is located within the Green Mountain National Forest, and landcover consists of a mix of deciduous forest, mixed forest, and evergreen forest habitat, with several small areas of developed open space. There are campsites and hiking trails surrounding the Project, although these are more relevant for the recreation criterion. There are several specific features in the adjacent watershed and shoreline that require consideration under this criterion:

- Zone 1 – a 3.5-acre wetland at the south bay of Sugar Hill Reservoir where Sucker Brook enters. The wetland is dominated by low diversity annual plant species. Pursuant to Condition B of the Water Quality Certificate, the Owner delays winter drawdown until January which helps mitigate impacts to this wetland.
- Zone 2 – a 1.8-acre emergent wetland upstream of the diversion dam and various wetlands along Sucker Brook. The 2.5-cfs conservation flow requirement (described in the water quality criterion above) and reservoir management practices include several measures to minimize the amount of time the wetlands are inundated. These are adequately described in the application.

On the most recent Dam Safety Inspection (September 18, 2018) the inspector identified several deficiencies, including weedy vegetation on Sugar Hill diversion and erosion on the upstream slope of Silver Lake dam. These are primarily dam safety concerns, and the Owner is required to comply with these actions. There is no shoreline and management plan required for the Project. Based on this evidence, the Owner appears to be in compliance with this criterion.

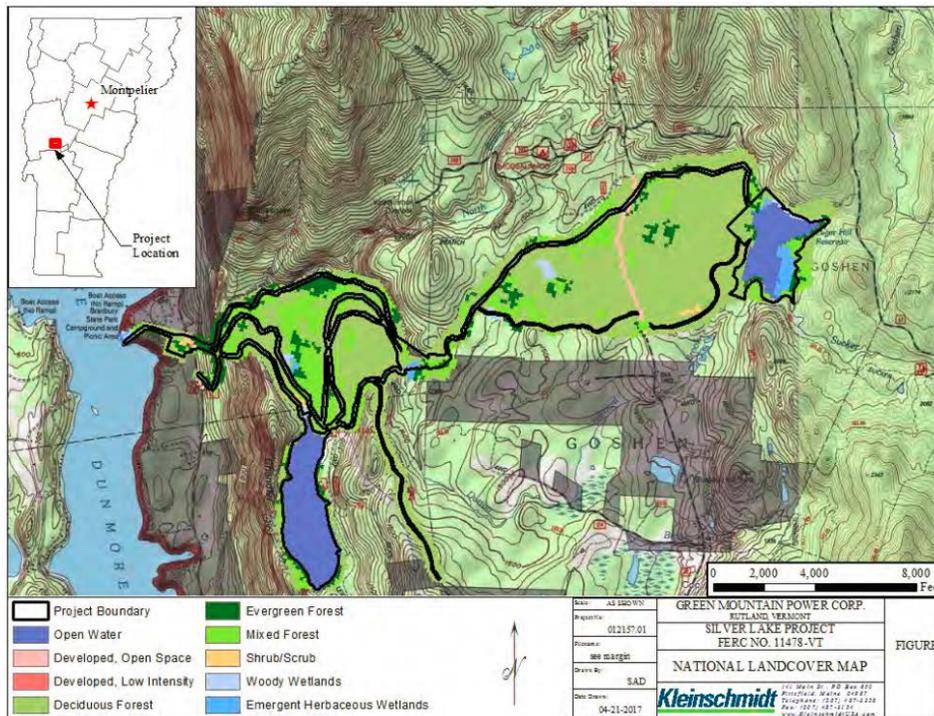


Figure 5 - Silver Lake Project Boundary Landcover Map

F. Threatened and Endangered Species

The Owner selected Standard 2 Agency Recommendation for all zones at the Project. The Owner generated a U.S. Fish and Wildlife Information Planning and Conservation (IPaC) Trust Resources report to identify federal threatened and endangered species and consulted the Vermont Agency of Natural Resources (VANR) to identify state-listed species. The identified species included four species of bats, two on the federal list (Indiana and Northern Long-eared) and two on the state list (Tri-colored and Eastern small-footed.) The VANR stated that impacts to the state-listed species should be minimal if the Facility continues to operate according to the terms and conditions in the Water Quality Certificate. These terms include adherence to tree cutting and removal restrictions. License Article 405 also includes these restrictions and includes survey and reporting requirements for tree-clearing activities to identify any bat roosting locations and prevent removal of certain trees. These requirements are designed to also protect Indiana bats. The 2015 Environmental Inspection Report determined no follow-up items were needed with regard to Article 405. Based on this evidence, the Owner appears to be in compliance with this criterion.

G. Cultural and Historic Resources Protection

The Owner selected Standard 2, Agency Recommendations, for all zones. As part of the 2009 License, the Owner was required to submit a Historic Properties Management Plan (HPMP), which they did on February 25, 2010. The HPMP incorporated comments from the Forest Service³, and was approved by FERC on May 3, 2011. This plan includes the agency recommendations and is sufficient to meet LIHI criteria for this standard. The HPMP describes the potential area of effects, includes management actions to avoid adverse effects on historic properties, requirements for consultation with the State Historic Preservation Office (SHPO), procedures for handling and disposing human remains and other requirements. The 2015 Environmental Inspection Report determined no follow-up items were needed with regard to cultural resource protection. Based on this evidence, the Owner appears to be in compliance with this criterion.

H. Recreation

The Owner selected Standard 2 Agency Recommendation for all zones at the Project. The Facility's recreational assets include a boat ramp, parking area with handicapped spaces, a handicapped-accessible trail to the boat ramp, a fishing access landing (handicapped-accessible), trailer turn around, directional and interpretative signage and overlook access to the Falls of Lana (Figures 3 and 4). The Owner adequately documented all necessary Recreation Facility Design Plans and as-built drawings, which incorporate agency recommendations impacting this criterion, including:

- Recreation Facility Design Plans and associated Erosion Control Plans, as needed
- Recreation Facility Plan Filed: 08/22/2011
- Order Approving Recreation Facility Plan: 09/29/2011
- Recreational Facility As-Built Filed: 09/17/2012
- Order Approving Recreational Facility As-Built: 04/27/2015

The 2015 Environmental Inspection Report determined that all necessary plans had been submitted to FERC and no follow-up items were needed with regard to recreational resources at the Facility. The Report noted the following:

³ The State Historic Preservation Office was given opportunity to comment, and no comments were received.

“Recreation features have been installed in accordance with approved plans, and appear to be in good condition. The project facilities are attractive and well-maintained and provide adequate opportunities for the level of recreational use for the region. The licensee appears to be in compliance with its requirements with regard to recreation resources.”

The most recent dam safety inspection conducted on September 18, 2018 identified several minor modifications to promote safe access, including removal of vegetation and fixing an eroded trail. Based on the evidence provided and obtained through FERC e-library, the Owner appears to be in compliance with this criterion.



Figure 3 - Sugar Hill Reservoir Boat Ramp/Fishing Access



Figure 4 - Interpretive Signs

VI. Conclusion

In my opinion, the materials provided and referenced above are sufficient to make a recertification recommendation, and no further application review is needed. In conclusion, I recommend recertification of the Silver Lake Hydroelectric Facility to one new, five-year term, with the following conditions:

1. The facility Owner shall submit to LIHI copies of all correspondence with VDEC regarding their ongoing review of the operations records within 60 days of receipt. LIHI reserves the right to include any recommendation that may result from that review as a condition of re-certification.
2. The facility Owner shall provide to LIHI copies of all correspondence related to the water quality monitoring requirement to confirm effectiveness of the baffle structure if, and when the appropriate drought conditions occur over the term of LIHI certification and shall submit either a statement that no monitoring was required or the monitoring results and any agency comments on those results with annual compliance submittals. LIHI reserves the right to include any recommendation that may result from that review as a condition of re-certification.

Please contact me if you have any questions.

Sincerely,

A handwritten signature in black ink, appearing to read 'Peter R. Drown', written in a cursive style.

Peter R. Drown, President
Cleantech Analytics LLC

Attachment 1
Agency and Applicant Communications

Date: January 4, 2018

Contact Person: Eric Davis, River Ecologist

Agency: Vermont Department of Environmental Conservation

Davis, Eric

Fri, Jan 4, 12:01
PM

to Peter

Hello Peter,

Happy New Year. My holidays were very enjoyable as I was able take a nice bit of time off with the family. I hope your holidays were enjoyable as well.

Thanks for the reminder on the close of public comments for Silver Lake, and in general for seeking resource agency comments and incorporating them into your review. We have completed our initial review of the operations data and sent follow up correspondence to Kleinschmidt/GMP on December 21 to ask a few clarifying questions regarding the data. Receipt of those comments were confirmed, but we haven't heard back, yet. Given our initial review, I feel confident the Agency would support re-certification in general, but we may have minor comments or recommendations based on the applicant's responses.

Secondly, to follow up on your previous e-mail regarding eels, I suspect that if eels were present in Sucker Brook, the falls may not represent a true barrier, however the falls here are located much higher in the watershed and to our knowledge American eel have not been documented in the vicinity of the project.

I'm happy to follow up as soon as we hear back on our inquiry.

Thanks,
Eric

Eric Davis, River Ecologist

1 National Life Drive, Main 2
Montpelier, VT 05620-3522
802-490-6180 / eric.davis@vermont.gov
<http://www.watershedmanagement.vt.gov/rivers>

See what we're up to on our [Blog](#). [Flow](#).

Date: November 28, 2018
Contact Person: John Greenan, Green Mountain Power
Agency: Federal Energy Regulatory Commission

(original version modified to fit page)



Filed Electronically

November 28, 2018

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
Mail Code DLC, HL-II.2
888 1st Street NE, Room IA
Washington, DC 20426

Re:

Silver Lake Hydroelectric Project, FERC Project No. 11478 2018 Dissolved
Oxygen and Temperature Monitoring

Dear Secretary Bose:

The Silver Lake Hydroelectric Project (Project No. 11478) was issued an original FERC license on February 26, 2009. The Project is located on Sucker Brook in Addison County, Vermont and is owned and operated by Green Mountain Power Corporation (GMP). In accordance with the Commission's March 11, 2010 Order (130 FERC ¶ 62,213) on the Dissolved Oxygen (DO) and Temperature Monitoring Report, Article 401 (B) of the FERC license, and Condition I of the Vermont Water Quality Certification, GMP reports that no water quality monitoring was conducted in 2018.

In the 2009 water quality report, submitted to the Commission on December 1, 2009, GMP proposed to conduct DO and temperature monitoring when the next summer drought conditions are encountered as described in the approved QA/QC plan. These conditions are defined as when the licensee is required to match outflows to inflows to the Sugar Hill Reservoir after drawing the reservoir to elevation 8.0 feet below full pool pursuant to the summer operating rule curve.

The drought conditions defined above were not experienced at the Project between July and September 2018 and therefore water quality monitoring was not conducted. GMP is prepared to conduct water quality monitoring in the summer of 2019, if conditions warrant, to confirm the effectiveness of the baffle structure. If monitoring is conducted a report will be provided to the Commission by December 1, 2019.

Please contact me if you have any questions. Thank you.

Sincerely,

John Greenan, P.E.
Engineer

Electronic cc:
J. Crocker, VTDEC
M. Grader, USFW
M. Hall, LIHI
M. Stevens, GMP
P. Collins, GMP
K. Sellers, KA