



Stage II Recertification Review for Low Impact Hydropower Institute's (LIHI) Middlebury Lower Project #99

1 BACKGROUND

The Middlebury Lower Hydroelectric Project (Project), Federal Energy Regulatory Commission (FERC) No. 2737, is owned and operated by the Green Mountain Power Corporation (GMP). On August 1, 2001, FERC issued a new 30-year license to Central Vermont Public Service Corporation (CVPSC)¹. The existing license terminates on August 1, 2031. On September 13, 2012, FERC issued an order approving transfer of licenses from CVPSC to GMP for the Project.²

The Project's current LIHI certification #99 originally expired on February 6, 2017. GMP submitted an application for recertification of the Project in April of 2017. On May 16, 2017, LIHI notified GMP that the first stage recertification review for the Project was complete. Given that the review was processed under the new 2nd Edition LIHI Certification Handbook, the need for a Stage II recertification review was necessary.

On May 17, 2017, the Project was granted a certification extension until August 6, 2017 to allow for completion of the Stage II recertification review. However, no submittals from the applicant occurred during this period. On August 31, 2017, LIHI granted the Project another certification extension to March 31, 2018 and on June 11, 2018, an extension through December 31, 2018. On November 12, 2018, the LIHI certification was again extended a fourth time until March 31, 2019.

On December 28, 2018, Kleinschmidt Associates (KA) submitted GMP's Stage II Recertification Application.³ GMP's contact is Mr. John Greenan⁴. LIHI assigned Gary Franc⁵ to perform the Stage II Recertification review.

2 OTTER CREEK BASIN

The Middlebury Lower Project is located on the Lower Falls of Otter Creek at river mile (RM) 24.7 and situated within the towns of Middlebury and Weybridge, Addison County, Vermont (latitude 44.0258, longitude -73.1778). The Project is the fifth most downstream of eight dams located on Otter Creek (See Figures 1 and 2).

¹<https://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=6006243>

² <http://elibrary.ferc.gov/IDMWS/common/opennat.asp?fileID=13064046>

³ LIHI Application Contact - Andy Qua and Katie Sellers, Kleinschmidt Associates, Phone 207-416-1246; 207-416-1218, Email Address Andrew.Qua@KleinschmidtGroup.com, Katie.Sellers@KleinschmidtGroup.com, Address - P.O. Box 650, Pittsfield, Maine 04967.

⁴ John Greenan, Environmental Engineer, GMP – 802-770-3213 - John.Greenan@greenmountainpower.com - 2152 Post Road, Rutland, Vermont 05701

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Otter Creek flows in a northwesterly direction and drains 936 square miles (SQMI) into Lake Champlain. Lake Champlain is a natural freshwater lake mainly within the borders of the United States between the states of New York and Vermont but partially situated across the Canada–U.S. border, in the Canadian province of Quebec. Lake Champlain drains northward through the 106 mile-long Richelieu River into the St. Lawrence River at Sorel-Tracy, Quebec. (See Figure 1).



Figure 1 -Location Map

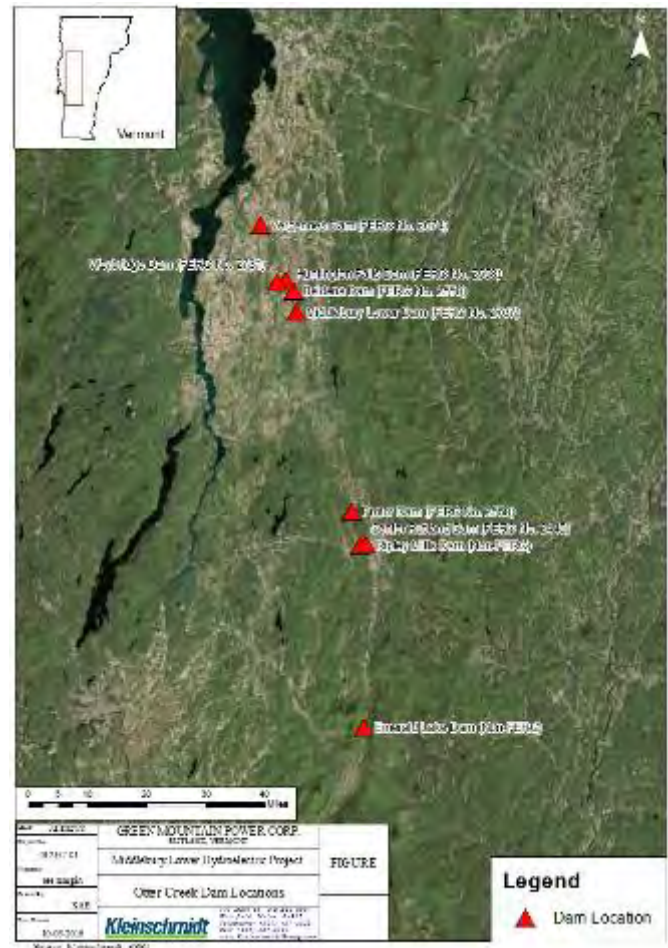


Figure 2 - Otter Creek Dams

There are four dams upstream of the Project (See Figure 2). Upstream dams include:

- Emerald Lake Dam, a non-power facility, located at RM 100;
- Ripley Mills Dam, a non-power facility, located at RM 72;
- Center Rutland Project (FERC No. 2445) owned by GMP, located at RM 71, and;
- Proctor Development, part of the GMP's Otter Creek Hydroelectric Project (OCHP) - FERC No. 2558, located at RM 64.2.

There are four dams downstream of the Project. Downstream dams include:

- Beldens Development, part of the GMP's OCHP, located at RM 23.0;
- Huntington Falls Development, part of the GMP's OCHP, located at RM 21.0;
- Weybridge Hydroelectric Project (FERC No. 2731) owned by GMP, located at RM 19.5 and;



- Vergennes Hydroelectric Project (FERC No. 2674) owned by GMP, located at RM 7.4.

The drainage area of Otter Creek upstream of the Project is approximately 629 SQMI. The average annual flow (AAF) at the Project is estimated using the U.S. Geological Survey (USGS) Gage 04282500 Otter Creek at Middlebury, VT, located approximately 1.1 river miles upstream of the Project. The drainage area at the gaging station is 628 square miles. A drainage area ratio (DAR) of (629/628) is used to calculate flow at the Project. The highest peak flow at Otter Creek at Middlebury, VT gage was 13,600 CFS on November 4, 1927. The Creek rose approximately 3.2 feet from normal pond level to an elevation of approximately 317.70 feet. The period of record⁶ (POR) Project inflow is 1,041 CFS or about 1.66 CFS per SQMI.

3 REGULATORY SUMMARY

On August 1, 2001, FERC issued a license to CVPSC for a period of 30 years⁷. On September 13, 2012, FERC issued an order approving transfer of licenses from CVPSC to GMP for the Project.⁸

3.1 Summary of Project Compliance

The following Project compliance related activities related to the LIHI criteria have occurred during the previous LIHI certification period:

- On June 28, 2012, CVPSC and GMP filed a joint application to FERC for approval to transfer licenses for thirteen hydroelectric projects from CVPS to GMP, including the Project. On September 13, 2012, FERC issued an Order approving the transfer of the Project license to GMP⁹.
- On September 18, 2013¹⁰, GMP notified FERC of license article 401¹¹ and 402¹² deviations occurring on September 7-8, 2013. On November 6, 2013¹³, FERC responded to GMP's September 18, 2013 notification stating the incident will not be deemed a violation of the Project license Articles 401 and 402.
- On October 31, 2013, GMP submitted the annual Cultural Resources Management Plan (CRMP) Report for the Project¹⁴.
- On August 1, 2014, GMP submitted the annual Historical Properties Management Plan (HPMP) Report for the Project¹⁵.
- On August 28, 2014¹⁶, GMP notified FERC of deviations in operating the Project according to license articles 401 and 402. On September 30, 2014¹⁷, FERC responded to GMP's August 28, 2014

⁶ April 1, 1903 through January 13, 2019.

⁷ <https://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=6006243>

⁸ <http://elibrary.ferc.gov/IDMWS/common/opennat.asp?fileID=13064046>

⁹ <http://elibrary.ferc.gov/IDMWS/common/OpenNat.asp?fileID=13064046>

¹⁰ <https://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=13351122>

¹¹ Article 401 of the FERC license requires that the Project be operated in strict run-of-river (ROR) mode. Article 401 requires that GMP "maintain a reservoir surface elevation of 314.74 feet (+/- 1 inch) during normal operations, and shall at all times act to minimize the fluctuation of the reservoir surface elevation so that, at any point in time, flows, as measured immediately downstream from the project tailrace, shall equal instantaneous flow to the project."

¹² Article 402 of the FERC License requires "a continuous minimum flow of 157 cubic feet per second released as a veiling flow over the crest of the dam."

¹³ <https://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=13389539>

¹⁴ <https://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=13385150>

¹⁵ <https://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=13606884>

¹⁶ <https://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=13625044>

¹⁷ <https://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=13646471>



notification stating the incident will not be deemed a violation of the Project license Articles 401 and 402.

- On April 1, 2015, GMP filed the Form 80 for the Project¹⁸.
- On July 29, 2016, GMP submitted the annual HPMP Report for the Project¹⁹.
- On August 1, 2017, GMP submitted the annual HPMP Report for the Project²⁰.
- On November 2, 2017, GMP submitted the annual Generation Report for the Project²¹.
- On August 1, 2018, GMP submitted the annual HPMP Report for the Project²².

3.2 Compliance Issues

The current LIHI Certification does not include any Facility-specific conditions.

As listed in Section 3.1, two FERC license deviations occurred since the start of the current LIHI certification on February 6, 2012.

On September 18, 2013²³, GMP notified FERC of deviations in operating the Project in a run-of-river (ROR) mode and for under-supplying minimum flow releases occurring on September 7-8, 2013. The cause of the deviation was found to be a supervisory control and data acquisition (SCADA) system malfunction where radio signal transmission failed resulting in the erroneous recording of head pond water levels.

On November 6, 2013²⁴, FERC responded stating the deviations were the result of an equipment failure beyond GMP's control. No evidence was found indicating that termination of flow from the Project had adverse downstream impacts. To prevent similar future events, GMP installed a new radio, improved the position of the antenna, and modified the automatic operating system to shut down generation upon loss of radio contact with the headpond sensor. Therefore, FERC stated the incident would not be deemed a violation of license Articles 401 and 402.

On August 28, 2014²⁵, GMP notified FERC of deviations in operating the Project according to license articles 401 and 402. The notification stated on August 18, 2014, at 2:30 PM, the traveling operator noticed the impoundment water level near dam crest elevation with little spill noted in a few areas and with Unit 2 running. After contacting the Control Center, Unit 2 load was reduced to start refilling the impoundment, and the water level transducer at the dam was inspected as functional, but providing erratic elevation signals to the programmable logic controller (PLC). As a temporary measure, the Control Center disabled the transducer signal at the dam and utilized the water level transducer located behind the intake structure trashracks as a surrogate impoundment water level reading. At approximately 6 PM, the impoundment recovered to its target elevation of 314.80 feet mean sea level (FTMSL) and normal ROR operations resumed. On August 20, 2014, the water level transducer at the dam was

¹⁸ <https://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=13826498>

¹⁹ <http://elibrary.ferc.gov/IDMWS/common/opennat.asp?fileID=14319721>

²⁰ <https://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=14650723>

²¹ <https://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=14745900>

²² <https://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=14990208>

²³ <https://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=14319708>

²⁴ <https://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=13389539>

²⁵ <https://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=13625044>



replaced with a new water level pressure transducer that was calibrated and tested for proper function. The replacement transducer was acquired from a different manufacturer, which GMP found to be more durable and reliable for use in this type of application and environment.

On September 30, 2014²⁶, FERC responded stating that GMP took quick action to remedy the problem caused by the transducer malfunction. The event resulted in no visibly observable effects on water quality conditions in the bypass reach or downstream areas based on staff observations. There was no evidence that any part of downstream river reach was significantly dewatered as a result, nor were there any reports or observations of adverse effects to aquatic biota resident to the affected reach. FERC ruled that the incident would not be deemed a violation of the Project license Articles 401 and 402.

4 PROJECT DESCRIPTION

A plan view of the Project that identifies the dam, spillway, power canal, bypass reach and powerhouse is shown in Figure 3.

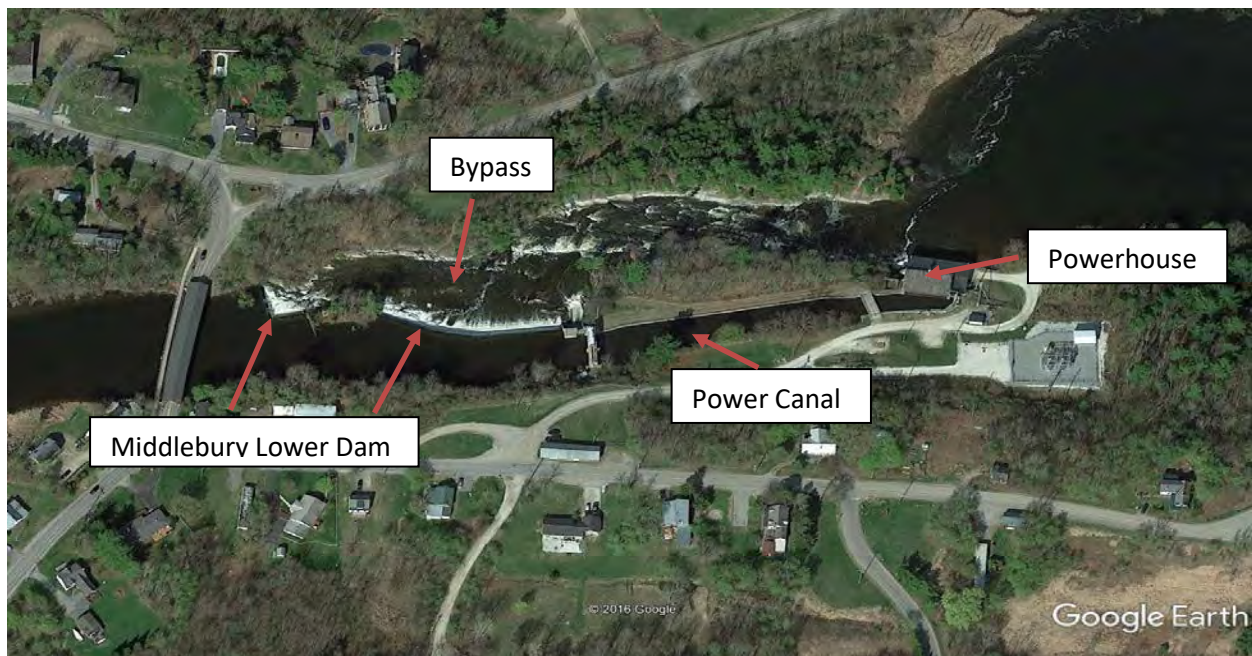


Figure 3 – Project Plan View

The Project's concrete gravity dam is 30 feet high, 478 feet long, and consists of two ogee spillway sections, including a 123-foot-long western spillway section and a 260-foot-long eastern spillway section. Both spillway sections were reconstructed in 1989.

The Project impounds a 16-acre reservoir that extends approximately 1 mile upstream, at a water surface elevation at 314.50 FTMSL. At full pool of 314.74 FTMSL, the Project has a gross storage capacity of approximately 46 acre-feet (ACFT). The bypassed reach is 750 feet long. The Project operates as a ROR

²⁶ <https://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=13646471>



facility to preserve water quality, aquatic and riparian habitats, and aesthetic and recreational flows of Otter Creek.

The impoundment elevation fluctuates no more than 1 inch from the crest elevation of 314.74 FTMSL during normal operation. GMP provides a minimum instantaneous flow of 157 cubic feet per second (CFS), or instantaneous inflow if less, spilled along the full spillway crest at all times, with all flows spilled at the dam when the Project is not generating (See Figure 4).



Figure 4 - 157 CFS Veiling Flow over Spillway

In 1917, the original powerhouse collapsed during the initial watering of the turbines, and it was rebuilt and placed in service in 1920. A 400-foot-long, 40-foot-wide intake canal, controlled by a gate structure containing two 23-foot-wide, 13-foot-high gates, takes water from the impoundment to the powerhouse.

The intake contains steel trashracks with a 1.75-inch clear spacing. The powerhouse is licensed for a maximum installed capacity of 2.25 megawatts (MWs) (See Figure 5). The powerhouse contains three horizontal Francis-type turbine units:

- Unit 1 maximum turbine output is 0.56 MW, with a minimum hydraulic capacity of 100 CFS and a maximum hydraulic capacity of 270 CFS;
- Unit 2 maximum turbine output is 0.56 MW, with a minimum hydraulic capacity of 100 CFS and a maximum hydraulic capacity of 270 CFS , and;
- Unit 3 maximum turbine output is 0.92 MW, with a minimum hydraulic capacity of 100 CFS and a maximum hydraulic capacity of 405 CFS.



Each turbine is coupled to a General Electric (GE) 0.75 MW generator. The total turbine output capacity for the plant is 2.04 MW. The total generator output of all generators is 2.25 MW. The 2.04 megawatts (MW) produces an average annual generation (AAG) estimated at 8,300 megawatt-hours (MWh). This corresponds to an annual plant factor of 46.4%.



Figure 5 - View of Three Francis Turbines/Generators

The powerhouse includes appropriate generator leads and transformers used to connect the powerhouse to the interconnected transmission/distribution system located at the switchyard 100 feet east of the powerhouse (See Figure 6).



Figure 6 - Switchgear

During the current LIHI certification term no major equipment upgrades occurred and no major operational changes occurred at the Project. GMP states that no major facility upgrades are planned in the near future.

5 ZONES OF EFFECT (ZOE)

The applicant has defined three ZOE for the Project as depicted in Figure 7. The zones of effect are:

- ZOE 1 – Impoundment – Otter Creek from RM 25 (upstream non-FERC dam) to RM 24.7 (Middlebury Lower Project);
- ZOE 2 - Bypassed reach - Approximately 750 feet from the dam to the confluence with the tailrace, and;
- ZOE 3 - Downstream – from the confluence of the bypass reach and tailrace downstream to the Beldens Dam at RM 23.

The ZOE alternative standards are shown in Figure 8.

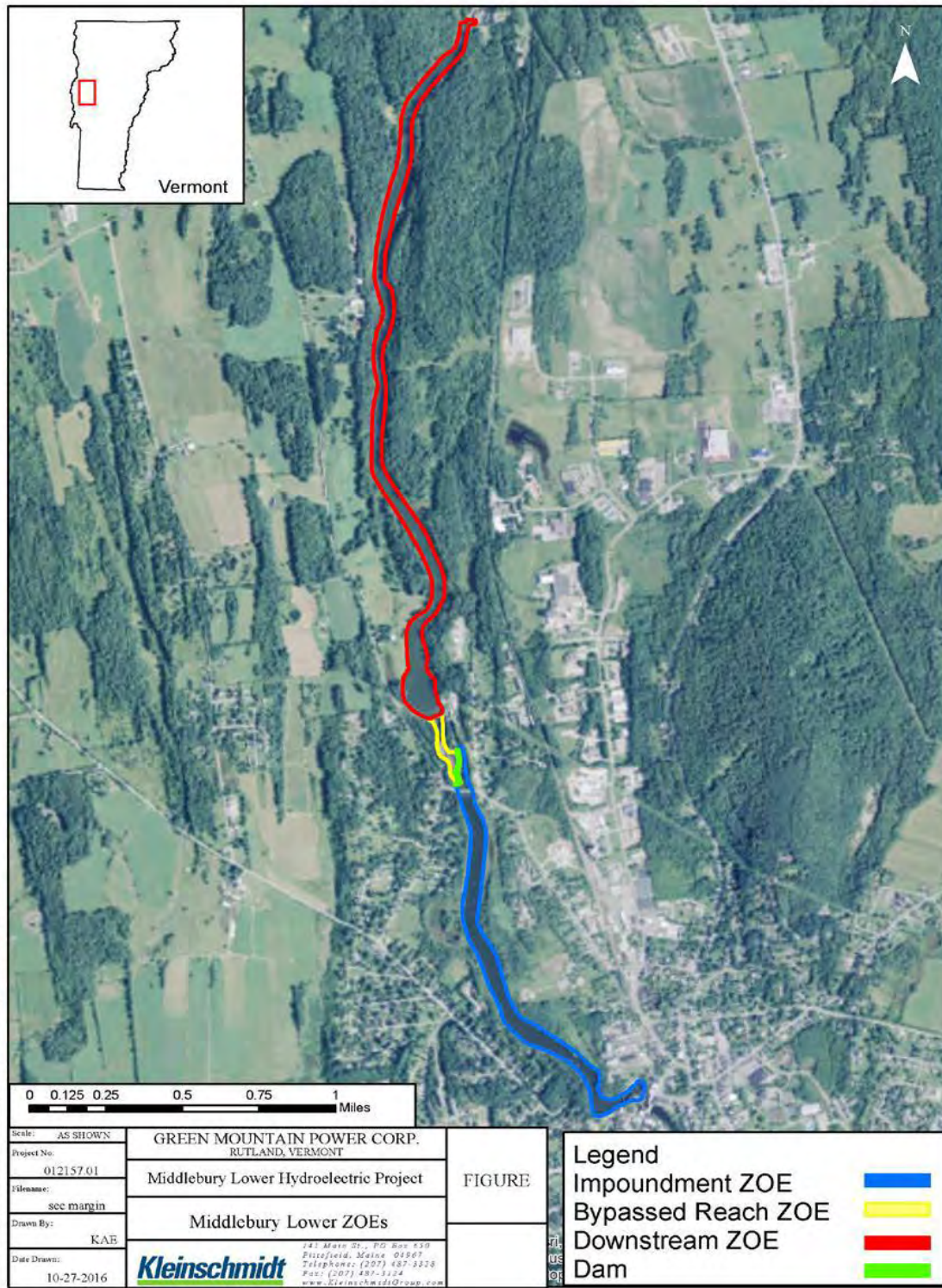


Figure 7- Zones of Effect



IMPOUNDMENT ZOE

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 Resources Protection		X			
H Recreational Resources		X			

BYPASSED REACH ZOE

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 Resources Protection		X			
H Recreational Resources		X			

DOWNSTREAM ZOE

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 Resources Protection		X			
H Recreational Resources		X			

Figure 8 - ZOE Alternative Standards Matrix

6 LIHI RE-CERTIFICATION PROCESS

On May 17, 2017, LIHI notified GMP that the first stage recertification review for the Project was complete. Given that the review was processed under the new, second Edition LIHI Certification Handbook, the need for a Stage II review was necessary. Public comment on this revised application terminated on July 16, 2017. No public comments were received.



As part of my review, a FERC e-library search was conducted to verify claims in the recertification application. My review concentrated on the period from the start of the previous LIHI Certification, February 6, 2012 through the latest entry on October 31, 2018, for FERC docket numbers P-2737.

Additionally, on January 13, 2019, this reviewer emailed the agencies listed in the Project's LIHI application: (VDEC)²⁷, Vermont Fish and Wildlife Department (VFWD)²⁸ and the US Fish and Wildlife Service (USFWS)²⁹.

In my email I stated, *"I am the LIHI reviewer tasked with determining whether Green Mountain Power (GMP)'s Middlebury Lower Hydroelectric Project (FERC No. 2737) should be LIHI recertified. I am emailing you today because you have been identified in the application by the owner as resource agency contacts familiar with the project. I would appreciate your perspective regarding the project's proposed operation with regard to satisfying its environmental obligations (FERC articles, MOUs, etc.). Without your input my review can only be based on the documents found in the application and FERC docket. Thank you for your time in this matter. The LIHI application can be found at this web address – <https://lowimpacthydro.org/lihi-certificate-99-middlebury-lower-middlebury-and-weybridge-vermont>."*

Agency responses follow:

On January 16, 2019, I received an email from Eric Davis of VDEC stating, *"... Thank you for reaching out regarding the Middlebury Lower project. In conjunction with this review, GMP provided the Agency with operations data on January 2, 2019. VDEC will be coordinating Agency feedback and providing a unified response"*

On February 26, 2019 VDEC sent another email stating: *"The Agency provided input by e-mail dated April 3, 2017 on rare, threatened and endangered species. In addition to the list originally provided, newer information includes the discovery of RTE mussel species...Given the presence of state-listed mussels...there is an opportunity to refine the operations plan for the Middlebury Lower Hydroelectric Project".* VDEC recommended adding a condition to the recertification.

²⁷ VDEC - Eric Davis, River Ecologist - 802-490-6180 - eric.davis@vermont.gov

²⁸ VFWD - Bob Popp, Department Botanist - 802-476-0127 - bob.popp@vermont.gov; Mark Ferguson, Natural Heritage Zoologist - 802-279-3422 - mark.ferguson@vermont.gov; Chet Mackenzie, Fisheries Program Manager - 802.786.3864 - chet.mackenzie@vermont.gov

²⁹ USFWS -Melissa Grader, Federal Activities - 413-548-8002 -Melissa_Grader@fws.gov;



7 RE-CERTIFICATION REVIEW

This section contains my Stage II recertification review of the Project with regard to LIHI's certification criteria.

7.1 LIHI Criterion A-Flows

The goal of this criterion is to support habitat and other conditions that are suitable for healthy fish and wildlife resources in riverine reaches that are affected by the facility. The application states that the Project satisfies the flows criterion in ZOE 1 and ZOE 3 by meeting alternative standard A-1³⁰ and in ZOE 2 by meeting alternative standard A-2³¹.

In accordance with license article 401, GMP monitors ROR operation through remote observation of the reservoir surface and maintains the reservoir elevation at 314.74 FTMSL. A pressure transducer, located in a stilling well attached to the intake canal wall, senses reservoir water elevation. The Project's SCADA system records the elevation data every 15 minutes and transmits the data to a PLC. The data documents the Project's ROR compliance. The PLC uses reservoir elevation data to trigger increases or decreases in generation to maintain a consistent reservoir elevation.

Article 402 requires GMP to maintain a 157 CFS minimum flow as a veiling flow over the crest of the dam to provide habitat flow within the bypass reach by maintaining the pond at a minimum of 314.74 FTMSL, as approved by FERC Order dated December 23, 2004³². The 157 CFS flow, which corresponds to the 7Q10³³ flow, was established in a VDEC Instream Flow Incremental Methodology (IFIM) flow study that evaluated habitat conditions at tested bypass reach flows of 77, 157, 236 and 314 CFS.

As discussed in Section 3.2, articles 401 and 402 operational requirements were in non-compliance on two occasions during the current LIHI certification due to remote sensing equipment failures. GMP proactively filed timely notices with FERC and completed equipment enhancements to help minimize similar non-compliance issues in the future. It is my recommendation that the Project continues to satisfy the LIHI flow criterion subject to the following recommended condition based on VDEC's input discussed in Section 6:

The Facility owner shall refine the Project's operations plan in consultation with VDEC to seek to minimize the effects of Project shutdown on head pond fluctuation and spill rates, and shall develop drawdown rate procedures for water level and flow management during maintenance and repair activities for the protection of state-listed freshwater mussel species. The revised operations plan shall be submitted to LIHI within 60 days of approval. If consultation and plan refinement are not completed by December 31, 2019, the Facility owner shall provide a status update in annual compliance submittals to LIHI.

³⁰ Not applicable.

³¹ Agency recommendations - Identify the proceeding and source, date, and specifics of the agency recommendation. Explain the scientific or technical basis for the agency recommendation, including methods and data used. Explain how the recommendation relates to agency management goals and objectives for fish and wildlife. Explain how the recommendation provides fish and wildlife protection, mitigation and enhancement.

³² <http://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=10254588>

³³ 7Q10 is based on an annual frequency analysis that uses seven day rolling average flows as the frequency parameter. A non-exceedance annual frequency curve is developed such that the 7Q10 is the flow that is not met 10 percent of the time or conversely, exceeded 90 percent of the time.



7.2 LIHI Criterion B-Water Quality

The goal of this criterion is to ensure water quality is protected in water bodies directly affected by the facility, including downstream reaches, bypassed reaches, and impoundments above dams and diversions. The application states that the Project satisfies the LIHI water quality criterion in all ZOE's by meeting alternative standard B-2³⁴.

Otter Creek in the vicinity of the Project has been designated by the Vermont Water Resources Board (VWRB) as Class B waters. Class B reaches are managed to achieve and maintain a high level of quality compatible with certain beneficial values and uses³⁵. Values are high quality habitat for aquatic biota, fish and wildlife and water quality that consistently exhibits good aesthetic value. Uses are public water supply with filtration and disinfection, irrigation and other agricultural uses, swimming, and recreation.

In the latest Section 303(d)³⁶ of the Federal Clean Water Act, issued by the VDEC, on the bottom of page 4 and top of page 5, Otter Creek was listed as “impaired” within specific portions of the creek having different pollutants:

- Lower Otter Creek, below Vergennes Waste Water Treatment Facility for e. Coli (downstream of Project);
- Otter Creek in vicinity of Rutland Waste Water Treatment Facility for e. Coli (upstream of Project);
- Little Otter Creek RM 15.4 to RM 16.4 for agricultural nutrients and sediments (downstream of Project);
- Lake Champlain (Ferrisburg) for elevated levels of PCBs in lake trout (downstream of Project).

In an email dated March 22, 2017 (Appendix A, page A-2), the VDEC confirmed that operations of the Project do not contribute to the impairment of the river reach.

The Project's water quality certification (WQC) was issued on June 2, 1999³⁷. Project operations data was additionally provided to VDEC on December 28, 2018 for verification of Project WQC compliance and VDEC responded to me on February 26, 2019 (Appendix A, pages A-3 through A-6), stating “*The operations data provided...indicate that the operations generally comply with Condition B of the WQC...however there also appears to be opportunity for improvement, in particular in minimizing headpond fluctuation and codifying procedures for maintenance/repair related drawdowns...*”

The agency's response was based on new information about the presence of state-listed freshwater mussel species that had not been available at the time of the LIHI recertification application (see Section 7.6 below). The agency recommended a certification condition to protect these species such that, the Facility owner should refine the Project's operations plan in consultation with VDEC to minimize the

³⁴ Agency recommendation - If facility is located on a Water Quality Limited river reach, provide an agency letter stating that the facility is not a cause of such limitation. Provide a copy of the most recent Water Quality Certificate, including the date of issuance. Identify any other agency recommendations related to water quality and explain their scientific or technical basis. Describe all compliance activities related to the water quality related agency recommendations for the facility, including on-going monitoring, and how those are integrated into facility operations

³⁵ http://dec.vermont.gov/sites/dec/files/documents/WSMD_WaterQualityStandards_2014.pdf

³⁶ https://dec.vermont.gov/sites/dec/files/documents/mp_PriorityWatersList_PartA_303d_2018.pdf

³⁷ <http://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=140203>.



effects of Project shutdown on head pond fluctuation and spill rates and develop drawdown rate procedures for water level and flow management during maintenance and repair activities.

My review of the FERC docket for the prior LIHI certification period, found no article deviations or excursions pertaining to WQC issues. GMP proactively complied with all licensing requirements. No new issues have arisen other than related to mussels. It is therefore my recommendation that the Project continues to satisfy the LIHI water quality criterion.

7.3 LIHI Criterion C-Upstream Fish Passage

The goal of this criterion is to ensure safe, timely and effective upstream passage of migratory fish so that the migratory species can successfully complete their life cycles and maintain healthy, sustainable fish and wildlife resources in areas affected by the facility. The application states that the Project satisfies the LIHI upstream fish passage criterion in all ZOE's by meeting alternative standard C-1³⁸.

Otter Creek is managed to support both cold-water and warm-water fish. Otter Creek upstream of the town of Middlebury has extensive and productive wild trout populations. Fishes found above and below the Project include northern pike, smallmouth bass, largemouth bass, brown trout, rainbow trout, perch, white sucker, brown bullhead, sunfish species and various minnow species which furnish a forage base for many predatory species. Both brown and rainbow trout are stocked in the impoundment above the dam. The VFWD stocks landlocked Atlantic salmon and walleye downstream of the Vergennes Project, the most downstream facility on Otter Creek. Walleye is a non-native species specifically stocked for recreational angling.

Historically, migratory fish from Lake Champlain ascended many of its tributaries to access spawning waters. Landlocked Atlantic salmon are naturally occurring potamodromous³⁹ species that historically existed within the Lake Champlain Basin. Natural populations of Atlantic salmon were extirpated from the Lake Champlain Basin approximately 150 years ago. Today landlocked Atlantic salmon are stocked in the lower Otter Creek below the downstream Vergennes Project by the VFWD and USFWS.

Otter Creek is classified as a historic spawning area for Lake Sturgeon, which in Vermont, is classified as an endangered species. The extent to which the species enters Otter Creek from Lake Champlain and occur below the downstream Vergennes Project is unclear.

To meet the goals of the bi-state plan for the development of Lake Champlain's salmonid fishery⁴⁰, upstream and downstream passage provisions are being investigated at dams on certain Lake tributaries. In Vermont, the Winooski River and the Lamoille River are included in this effort; however, this initiative has not been extended to Otter Creek as the other tributaries present a better opportunity for cold water fish spawning.

In FERC's Environmental Assessment⁴¹ (FEA), it states that there are no migratory species in Otter Creek above the Vergennes Hydroelectric Project and agencies have no active plans to introduce such

³⁸ Not applicable - The facility does not create a barrier to upstream passage, or there are no migratory fish in the vicinity of the facility and the facility is nor the cause of extirpation of such species if they had been present historically.

³⁹ Migrates within fresh water only.

⁴⁰ Strategic Plan for Development of Salmonid Fisheries in Lake Champlain, NYS Department of Environmental Conservation, October 4, 1977.

⁴¹ <https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=8033634>



species. Although there is no federal mandatory prescription for the upstream passage of fish at the Project, License Article 404 reserves future authority to order such upstream fishways if prescribed by the Department of the Interior (DOI).

Throughout the prior LIHI certification period, GMP has not received notice from agencies of a need for upstream passage. No new issues have arisen. It is my recommendation that the Project continues to satisfy LIHI's upstream fish passage criterion.

7.4 LIHI Criterion D-Downstream Fish Passage

To goal of this criterion is to ensure safe, timely and effective downstream passage of migratory fish and for riverine fish such that the facility minimizes loss of fish from reservoirs and upstream river reaches affected by facility operations. The application states that the Project satisfies the LIHI downstream fish passage criterion in all ZOE's by meeting alternative standard D-1⁴².

As discussed in Section 7.3, Otter Creek is managed to support both cold-water and warm-water fish. Otter Creek upstream of the town of Middlebury has extensive and highly productive wild trout populations. Fishes found above and below the Project include northern pike, smallmouth bass, largemouth bass, brown trout, rainbow trout, perch, white sucker, brown bullhead, sunfish species and various minnow species which furnish a forage base for many predatory species. Both brown and rainbow trout are stocked in the impoundment above the dam.

The Project does not create a barrier for migratory downstream fish passage. Downstream fish passage is facilitated primarily by use of the 157 CFS veiling flow passed over the spillway into the bypassed reach (See Figure 4). Some downstream fish passage can occur through the power canal, power intake containing steel trashracks with 1.75-inch clear spacing and the turbines.

In the FEA, FERC reported that there are no migratory species in Otter Creek above the most downstream Vergennes dam and resource agencies have no active plans to introduce such species. This policy is still in effect as evidenced within the OCHP's recent relicensing process. No recent fisheries studies have been conducted within Otter Creek and no downstream fishway prescriptions were filed under Section 18 of the FPA in OCHP's 2014 License.

Although there is no federal mandatory prescription for the downstream passage of fish at the Project, License Article 404 reserves future authority to order such fishways.

Throughout the prior LIHI certification period, GMP has not received notice from agencies of a need for downstream passage. No new issues have arisen. It is my recommendation that the Project continues to satisfy LIHI's downstream fish passages criterion.

⁴² Not applicable - Explain why the facility does not impose a barrier to downstream fish passage in the designated zone, considering both physical obstruction and increased mortality relative to natural downstream movement. For riverine fish populations that are known to move downstream, explain why the facility does not contribute adversely to the sustainability of these populations or to their access to habitat necessary for successful completion of their life cycles. Document available fish distribution data and the lack of migratory fish species in the vicinity. If migratory fish species have been extirpated from the area, explain why the facility is or was not the cause of this.



7.5 LIHI Criterion E-Shoreline and Watershed Protection

The Watershed Protection criterion is designed to ensure that sufficient action has been taken to protect, mitigate and enhance environmental conditions on shoreline and watershed lands associated with the facility. The application states that the Project satisfies the LIHI Watershed Protection criterion in all ZOE by meeting alternative standard E-1⁴³.

The area surrounding the Impoundment, Bypass Reach, and Downstream ZOE consists of stretches of forest along both sides of the river, with patches of wooded and emergent wetlands along the river's edge. Industrial and commercial buildings and rural residential housing are located on both sides of the river and increase in density upstream to the City of Middlebury.

There are no requirements for a buffer zone, shoreline management plan or similar protection requirements for the Project. Land cover units with non-significant ecological value identified within the vicinity of the Project can be found in Table 1⁴⁴.

Throughout the prior LIHI certification period, no new issues have arisen. It is my recommendation that the Project continues to satisfy LIHI's shoreline and watershed protection criterion.

Table 1 - Project Area Land Cover As Classified By The National Land Cover Database 2011	
Classification	Description
11	Open Water- areas of open water, generally with less than 25% cover of vegetation or soil
21	Developed, Open Space- areas with a mixture of some constructed materials, but mostly vegetation in the form of lawn grasses. Impervious surfaces account for less than 20% of total cover. These areas most commonly include large-lot single-family housing units, parks, golf courses, and vegetation planted in developed settings for recreation, erosion control, or aesthetic purposes.
22	Developed, Low Intensity- areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 20% to 49% percent of total cover. These areas most commonly include single-family housing units.
23	Developed, Medium Intensity -areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 50% to 79% of the total cover. These areas most commonly include single-family housing units.
41	Deciduous Forest- areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. More than 75% of the tree species shed foliage simultaneously in response to seasonal change.
42	Evergreen Forest- areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. More than 75% of the tree species maintain their leaves all year. Canopy is never without green foliage.
43	Mixed Forest- areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. Neither deciduous nor evergreen species are greater than 75% of total tree cover.
81	Pasture/Hay-areas of grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of seed or hay crops, typically on a perennial cycle. Pasture/hay vegetation accounts for greater than 20% of total vegetation.
90	Woody Wetlands- areas where forest or shrub land vegetation accounts for greater than 20% of vegetative cover and the soil or substrate is periodically saturated with or covered with water.

⁴³ Not applicable - If there are no lands with significant ecological value associated with the facility, document and justify. Document that there have been no Shoreline Management Plans or similar protection requirements for the facility.

⁴⁴ Source - National Land Cover Database 2011 - https://www.mrlc.gov/nlcd11_leg.php



Table 1 - Project Area Land Cover As Classified By The National Land Cover Database 2011	
Classification	Description
95	Emergent Herbaceous Wetlands- Areas where perennial herbaceous vegetation accounts for greater than 80% of vegetative cover and the soil or substrate is periodically saturated with or covered with water.

7.6 LIHI Criterion F-Threatened and Endangered Species

The threatened and endangered species protection criterion is designed to ensure that the facility does not negatively impact state or federal threatened or endangered species. The application states that the Project satisfies the LIHI threatened and endangered species protection criterion in all ZOE's by meeting alternative standard F-2⁴⁵.

Based on an official USFWS Species List dated October 27, 2016, (Appendix A, page A-7), the federally endangered Indiana bat (*Myotis sodalis*) and the federally threatened Northern long-eared bat (*Myotis septentrionalis*) may occur within the Project vicinity.

The bald eagle (*Haliaeetus leucocephalus*), protected under the federal Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act, was additionally identified within the USFWS species list as a species that may have year round presence within the Project area. Under the Vermont Endangered Species Law, the Indiana bat and Northern long-eared bat are listed as state endangered species. Although the bald eagle was removed from the federal endangered species list in 2007, the bald eagle is still listed as a state endangered species in Vermont.

Osprey (*Pandion haliaetus*) have also been observed in the vicinity of the Project, and the VFWD installed at least one-pole mounted nesting platform nearby in the town of Middlebury in 1990. Osprey is listed as a species of greatest conservation need in the Vermont Wildlife Action Plan, but that designation does not convey any legal protection.

Per email dated April 3, 2017 (Appendix A, page A-13), the VDEC verified the list of possible rare, threatened, and endangered species and determined that if the Project continued to operate in compliance with WQC conditions, then the Project is not expected to negatively affect listed species located in the vicinity of the Project. On February 26, 2019, VDEC indicated that state-listed mussel species that were not provided in 2017 are present or may occur within the Project area including the endangered fluted-shell mussel (*Lasmigona costata*) and pocketbook mussel (*Lampsilis ovata*), the threatened giant floater (*Pyganodon grandis*), and the rare creek heelsplitter (*Lasmigona compressa*).

In 1996, a plant survey completed in the Project area identified three uncommon species listed by the Vermont Nongame and Natural Heritage Program (VNNHP), including Frank's love-grass (S3⁴⁶), cuckoo flower (S2⁴⁷), and Gray's sedge (S3). Per VFWD emails dated March 16, 2017 (Appendix A, A-14) and the April 3, 2017 email from the VDEC, it was determined that the continued operation of the

⁴⁵ Finding of No Negative Effects – Need to identify all listed species in the facility area based on current data and provide documentation of a finding of no negative effect of the facility on any listed species in the area from an appropriate natural resource management agency.

⁴⁶ S3 - Uncommon (Vulnerable): Moderate risk of extinction/extermination due to restricted range, relatively few populations or occurrences (often 80 or fewer), recent and widespread declines, or other factors.

⁴⁷ S2- Rare (Imperiled): At high risk of extinction or extermination due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors.



Project will not have negative impacts on identified plants and that no further plant inventories are required.

A review of the FERC docket indicates that during the prior LIHI certification period, the Project is in compliance with both state and federal resource agencies concerns pertaining to threatened and endangered species. The new information on state-listed mussels resulted in VDEC's recommendation for a certification condition for water management (see Section 7.1 above). With that condition, the Project should continue to satisfy this criterion.

7.7 LIHI Criterion G-Cultural Resource Protection

The cultural resource protection criterion is designed to ensure that the Project does not negatively impact approved state, provincial, federal, and recognized tribal plans designed for the protection, enhancement and mitigation to cultural and historic resources. The application states that the Project satisfies the LIHI cultural and historic resources criterion in all ZOE's by meeting alternative standard G-2⁴⁸.

License Article 405 requires implementation of a Programmatic Agreement (PA) through collaboration among FERC, the Advisory Council on Historic Preservation, and the Vermont State Historic Preservation Officer (SHPO). On February 21, 2001, a PA⁴⁹ was signed by CVPSC, the FERC and the Vermont Department of Historical Preservation (VDHP) for managing historic properties.

The PA includes the development and implementation of a Cultural Resource Management Plan (CRMP) since infrastructure at the Project is considered eligible for inclusion in the National Register of Historic Places. The majority of built structures within the Project area are eligible for listing in the National Register. Therefore, a Historic Properties Management Plan (HPMP) was developed in consultation with the VDHP and filed with FERC on November 22, 2002⁵⁰. The HPMP was approved by FERC on March 11, 2004⁵¹.

As directed under the HPMP, GMP operates the Project such that the ongoing operation preserves the historic elements of the structures. The HPMP additionally addresses protective measures for the historic properties, including an evaluation of any site that will be impacted by any activity. Historic resources are evaluated during planning for any alterations to Project facilities, and in consultation with the SHPO if activities could impact those resources. Any archeological sites discovered during Project activities are also subject to the HPMP.

Throughout the prior LIHI certification period, the Project has maintained compliance of the HPMP which requires annual monitoring of Project shorelines for threats to known or potential resources and photographic documentation of changes in bank stability and riparian zone loss since the prior annual survey. The following HPMP reports have been filed with FERC:

⁴⁸ Approved Plan - Provide documentation of all approved plans for the protection, enhancement, and mitigation of impacts to cultural and historic resources affected by the facility. Document that the facility is in compliance with all such plans.

⁴⁹ https://elibrary.ferc.gov/idmws/search/intermediate.asp?link_info=yes&doclist=2127065

⁵⁰ <https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=10615741>

⁵¹ <http://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=10091485>



- On August 3, 2012, CVPSC filed the 2012 Annual HPMP Report⁵².
- On October 31, 2013, GMP submitted the 2013 Annual HPMP Report⁵³.
- On August 1, 2014, GMP submitted the 2014 Annual HPMP Report⁵⁴.
- On July 7, 2015, GMP notified the SHPO and the SHPO concurred that due to high water, the annual monitoring needed to be delayed. GMP initially requested an extension to November 1, 2015, but was ultimately unable to complete the survey that year due to persistent high water.
- On July 29, 2016, GMP submitted the 2016 Annual HPMP Report⁵⁵.
- On August 1, 2017, GMP submitted the 2017 Annual HPMP Report⁵⁶.
- On August 1, 2018, GMP submitted the 2018 Annual HPMP Report⁵⁷.

In these reports GMP has consistently recommended that due to the documented lack of potential threats to historic properties, the need to conduct annual field inspections of archaeological properties as described in the CRMP, should be changed to occur once every three years.

On August 9, 2017, GMP requested that the VDHP decrease the monitoring frequency of the Project shorelines but has not received feedback (Appendix A, page A-188). GMP has stated it plans to continue conducting Annual HPMP Reports unless it hears differently from the VDHP.

Throughout the prior LIHI certification period, the Project has complied with all requirements regarding cultural resource protection, mitigation or enhancement included in the FERC license and no new areas of concern have arisen, thus the Project continues to satisfy this criterion.

7.8 LIHI Criterion H-Recreation

The goal of this criterion is to ensure recreation activities on lands and waters controlled by the facility are accommodated and that the facility provides recreational access to its associated land and waters without fee or charge. The development satisfies the LIHI recreation criterion in all ZOE's by meeting alternative standard H-2⁵⁸.

Per License Article 406 and the WQC, a Recreation Plan (RP) was submitted to FERC on February 13, 2002⁵⁹ and approved by FERC on June 26, 2002⁶⁰. The RP specifies recreational requirements within each ZOE as follows:

- ZOE 1 - Impoundment - Develop and maintain a canoe/kayak portage take-out;
- ZOE 2 – Bypassed Reach - Develop and maintain:
 - A parking area,
 - A scenic trail, with picnic/overlook areas, benches for canoeists, hikers and fishermen (See Figure 9),

⁵²<https://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=13040092>

⁵³<https://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=13385150>

⁵⁴<https://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=13606884>

⁵⁵<https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=14319708>

⁵⁶<https://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=14650723>

⁵⁷<https://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=14990208>

⁵⁸Agency Recommendation - Document resource agency recommendations and enforceable recreation plan that is in place for recreational access or accommodations. Document that the facility is in compliance with all such recommendations and plans.

⁵⁹<http://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=9054312>

⁶⁰<http://elibrary-backup.ferc.gov/idmws/common/opennat.asp?fileID=1042709>



- Landscaping improvements and reforestation to enhance the natural and scenic character of the surrounding area (See Figure 10);
- ZOE 3 – Downstream - Develop and maintain a footbridge and canoe/kayak portage put-in.

As documented in an August 24, 2005 FERC Environmental Inspection (FEI)⁶¹, the report documents that GMP has provided free access to the public for recreational opportunities along the left bank of Otter Creek and has provided the recreational facilities described above. The recreational facilities appear to be in excellent condition and adequate for the degree of recreational usage for the area.

GMP filed a Recreation Report (Form 80) on January 5, 2004 and indicated moderate use of the recreational facilities. The FEI report concluded that GMP is operating in compliance with its requirements with regard to recreation resources.



Figure 9 - View of picnic table and bench at the scenic overlook along the portage trail near dam.

⁶¹ <https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=10991798>



Figure 10 -View of the portage trail.

During the prior LIHI certification period, the only compliance item filed with FERC was the latest Form 80 submitted on April 1, 2015⁶². Based partially on GMP staff observations in 2014, recreation areas continue to receive modest visitation.

Throughout the prior LIHI certification period, the Project has apparently complied with all requirements regarding recreation included in the FERC license. The Project allows access to the reservoir and downstream reaches without fees or charges, thus the Project continues to satisfy this criterion.

8 RECOMMENDATION

A review of the recertification application and a FERC docket search from the start of the previous LIHI certification, approximately February 6, 2012 through present day, exemplifies that GMP has been proactive regarding environmental issues associated with the Project.

Filings were on time without the need of time extension requests. The docket search review resulted in no major non-compliance issues surfacing in the record. The Project is also in compliance with state and federal resource agency recommendations applicable to the LIHI criteria and continues to satisfy all

⁶² <https://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=13826498>



LIHI criteria. Therefore, I recommend that GMP be issued a LIHI recertification for an additional five years for the Middlebury Lower Project, LIHI #99.

Given the recent additional information on state-listed mussels and VDEC's recommendations related to Project operations, the following condition to the certification is recommended:

Condition 1: The Facility owner shall refine the Project's operations plan in consultation with VDEC to seek to minimize the effects of Project shutdown on head pond fluctuation and spill rates, and shall develop drawdown rate procedures for water level and flow management during maintenance and repair activities for the protection of state-listed freshwater mussel species. The revised operations plan shall be submitted to LIHI within 60 days of approval. If consultation and plan refinement are not completed by December 31, 2019, the Facility owner shall provide a status update in annual compliance submittals to LIHI.

Gary M. Franc



FRANC LOGIC

Licensing & Compliance

Hydropower Consulting & Modeling



APPENDIX A
DOCUMENTS

From: Kayla Easler
To: Kate Sellers
Subject: RE: Middlebury LHI Recertification
Date: Monday, April 03, 2017 8:46:34 AM

Kayla A. Easler
Regulatory Coordinator
KLEINSCHMIDT
Office: (207) 487-3328
Direct: (207) 416-1271
www.KleinschmidtGroup.com

From: Davis, Eric [mailto:Eric.Davis@vermont.gov]
Sent: Wednesday, March 22, 2017 3:07 PM
To: Kayla Easler <Kayla.Easler@KleinschmidtGroup.com>
Subject: RE: Middlebury LHI Re-certification

Hi Kayla,

I apologize in my delay to your inquiry. We have quite a few complex projects on our plate at the moment.

You are correct that a four mile stretch of the Otter Creek from the mouth of Middlebury River to Pulp Mill Bridge has been identified as impaired due to agricultural runoff and possible failed septic systems. I can confirm that operations of the Middlebury Lower project do not contribute the impairment of the reach.

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>
(Please note my new e-mail address, effective July 27, 2015)



VERMONT DEPARTMENT OF
ENVIRONMENTAL CONSERVATION
**WATERSHED
MANAGEMENT DIVISION**
RIVERS PROGRAM

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

From: Kayla Easler [mailto:Kayla.Easler@KleinschmidtGroup.com]

From: [Davis, Eric](#)
To: [gary](#)
Cc: [mischner@lowimpacthydro.org](#), [Simam, Zebiv](#)
Subject: RE: Low Impact Hydropower Institute - Middlebury Lower Project
Date: Tuesday, February 28, 2017 6:02:08 PM

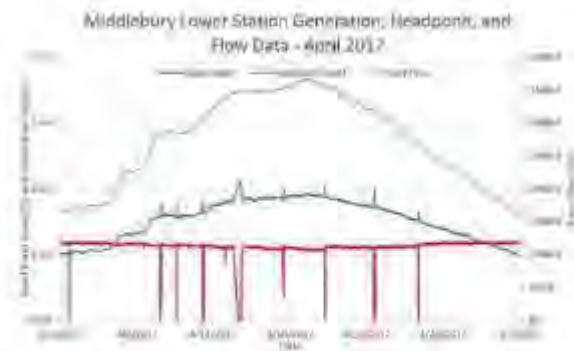
Good afternoon Gary,

The Agency of Natural Resources has been reviewing the pending LIHI application for the Middlebury Lower Hydroelectric Project (Middlebury Lower) to be certified as low impact. Prior to submitting its LIHI application, the applicant via Kleinschmidt Group engaged Agency staff. Subsequently, the Agency provided input by e-mail dated April 3, 2017 on rare, threatened and endangered species. In addition to the list originally provided, newer information includes the discovery of RTE mussel species, including: Fluted shell (E), Pocketbook (E), Giant Floater (T), and Creek Heelspitter (rare).

The Agency also requested one year of operations data to confirm compliance with water quality certification (WQC) conditions for its review. The data included water level, generation of all three turbines, and prorated flow data from USGS gage on Otter Creek, as well as turbine flow generation curves. The Agency has completed its review. The Agency supports certification of the facility and recommends a condition related to flow management to ensure the project complies, to the best of its ability, with run of river operations.

Condition B of the WQC for the project requires that Middlebury Lower operate in a run-of-river mode. In addition, condition B also requires a conservation flow of 157 cfs, or instantaneous project inflow if less, be spilled along the full spillway crest. In order to meet this requirement Middlebury Lower submitted a Project Operations Plan November of 2001, which was subsequently revised in September 2004. Specifically, the Operations Plan assessed leakage through the dam, the potential to use sluice gates to provide flow to the bypass, calibration of the weir equation, and determined the effects of project shutdown on spill rates and aquatic habitat. The plan stated that to maintain a continuous flow of 157 cfs over the entire spillway, the head pond must be maintained at 314.74 ft (NGVD).

The operations data provided from August 1, 2016 to August 2, 2017 indicate that the operations generally comply with condition B of the WQC and track changing river flow well. However there also appears to be opportunity for improvement, in particular in minimizing headpond fluctuation and codifying procedures for maintenance/repair related drawdowns, given the presence of listed mussel species. From the operations data, there appears to be occasions where turbines that are running, go offline for a short duration, then come back online. These events are likely related to some sort of equipment malfunction (turbine trip, sensor mis-read etc.) at the site. While the events are short lived, there is an impact on head pond levels and potentially a lag in downstream flows. According to the FERC order amending the project license, "consistent with run-of-river operation the licensee shall maintain a reservoir surface elevation of 314.74 ft (+/- 1 inch) NGVD during normal operations, and shall at all times act to minimize the fluctuation of the reservoir surface elevation". In addition, assessing the effect of project shutdowns on spill rates was an area of focus for the operations plan developed for the project. Please see the data provided by Kleinschmidt from April 2017 as a reference.



Additionally, procedures related to maintenance and repair related activities that require water level management have not been developed. Given the presence of state-listed mussels, operating procedures that establish drawdown rates that allow for mussel relocation should be codified in the operations plan in consultation with the Agency. Given these two elements, there is an opportunity to refine the operations plan for the Middlebury Lower Hydroelectric Project. The Agency is happy to engage with the applicant on these refinements.

Therefore, the Agency's recommended condition for certification is that GMP refine the operations plan for the project with a particular emphasis on (1) minimizing the effects of project shutdown on head pond fluctuation and spill rates and (2) develop procedures for water level and flow management when necessary.

We appreciate the opportunity to comment on the LIH application,
Eric

Eric Davis, River Ecologist

1 National Life Drive, Main 2
Montpelier, VT 05602-3522
802-490-6180 / eric.davis@vermont.gov
<http://www.watershedmanagement.vt.gov/rivers>



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

From: gary <francgm@verizon.net>

Sent: Sunday, January 13, 2019 5:21 AM

To: Popp, Bob <Bob.Popp@vermont.gov>; Mackenzie, Chet <Chet.Mackenzie@vermont.gov>; Davis, Eric <Eric.Davis@vermont.gov>; Ferguson, Mark <Mark.Ferguson@vermont.gov>; Melissa Grader

<Melissa_Grader@fws.gov>

Subject: Low Impact Hydropower Institute - Middlebury Lower Project

I am the LIHI reviewer tasked with determining whether Green Mountain Power (GMP)'s Middlebury Lower Hydroelectric Project (FERC No. 2737) should be LIHI recertified. I am emailing you today because you have been identified in the application by the owner as resource agency contacts familiar with the project. I would appreciate your perspective regarding the project's proposed operation with regard to satisfying its environmental obligations (FERC articles, MOUs, etc.). Without your input my review can only be based on the documents found in the application and FERC docket. Thank you for your time in this matter. The LIHI application can be found at this web address – <https://lowimpacthydro.org/lihi-certificate-99-middlebury-lower-middlebury-and-weybridge-vermont/> .



Virus-free, www.avp.com

From: Katie Sellers
To: "Davis, Eric"
Cc: "Greenham, John"; Andy Qua
Subject: Operations Data Submission for Middlebury Lower LHM Application
Date: Friday, December 28, 2018 9:41:00 AM
Attachments: Middlebury Lower Theoretical Turbine Curves 2018.pdf

This message contains attachments delivered via [ShareFile](#).

- 2016-2017 Middlebury Lower Operations Data_FINAL.xlsx (23.4 MB)

Download the attachments by [clicking here](#).

Hi Eric,

Kleinschmidt, on behalf of GMP, herein provides one-year (2016-2017) of Middlebury Lower Hydroelectric Project (FERC No. 2737) operations data via ShareFile for review. This operations dataset is being supplied to the Vermont Department of Environmental Conservation (VDEC) for verification of Project compliance with Water Quality Certificate conditions, as requested for Low Impact Hydropower Institute application review.

The attached 2016-2017 data depicts project generation, headpond level, and river flow data to display operations occurring at the Middlebury Lower Project. As depicted in the spreadsheet cover page, flow data was obtained from USGS gage 04282500 – Otter Creek at Middlebury, VT, located upstream of the Project. Compliant operations are represented well across the dataset. Please note that the station does not have flashboards.

In addition, please find theoretical turbine rating curves attached for the Middlebury Lower plant. The curves were developed using a combination of the attached operations data and standard factory information on the individual turbines. The theoretical curves have an accuracy range of approximately +5% to -10%.

Please note that the attached operational data is considered provisional by GMP, but has been vetted with operations staff. Should you have any questions upon review, please do not hesitate to make contact with John or myself as GMP staff are available to provide background information or further explanation as needed.

Thank you!
Katie

*To access ShareFile documents, select the "clicking here" link, fill in your name, email, and organization name when prompted (no passwords required). You will then be allowed to download the documents.

Katie E. Sellers, M.S.
Regulatory Coordinator



United States Department of the Interior



FISH AND WILDLIFE SERVICE
New England Ecological Services Field Office
70 COMMERCIAL STREET, SUITE 300
CONCORD, NH 03301
PHONE: (603)223-2541 FAX: (603)223-0104
URL: www.fws.gov/newengland

Consultation Code: 05E1NE00-2017-SLI-0149

October 27, 2015

Event Code: 05E1NE00-2017-E-00182

Project Name: Middlebury Lower Hydroelectric Project

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project.

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(C)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

<http://www.fws.gov/endangered/csa-library/pdf/TOC-GLOS.PDF>

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (<http://www.fws.gov/windenergy/>) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm>; <http://www.towerkill.com>; and <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/commtow.html>.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment



United States Department of Interior
Fish and Wildlife Service

Project name: Middlebury Lower Hydroelectric Project

Official Species List

Provided by:

New England Ecological Services Field Office
70 COMMERCIAL STREET, SUITE 300
CONCORD, NH 03301
(603) 223-2541
<http://www.fws.gov/newengland>

Consultation Code: 05E1NE00-2017-SLE-0149

Event Code: 05E1NE00-2017-E-00182

Project Type: DAM

Project Name: Middlebury Lower Hydroelectric Project

Project Description: Middlebury Lower LIHI Re-certification

Please Note: The FWS office may have modified the Project Name and/or Project Description, so it may be different from what was submitted in your previous request. If the Consultation Code matches, the FWS considers this to be the same project. Contact the office in the 'Provided by' section of your previous Official Species list if you have any questions or concerns.

<http://ecos.fws.gov/ipac>, 10/27/2016 01:43 PM



United States Department of Interior
Fish and Wildlife Service

Project name: Middlebury Lower Hydroelectric Project

Project Location Map:



Project Coordinates: The coordinates are too numerous to display here.

Project Counties: Addison, VT

<http://ecos.fws.gov/ipac>, 10/27/2016 01:43 PM



United States Department of Interior
Fish and Wildlife Service

Project name: Middlebury Lower Hydroelectric Project

Endangered Species Act Species List

There are a total of 2 threatened or endangered species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Critical habitats listed under the **Has Critical Habitat** column may or may not lie within your project area. See the **Critical habitats within your project area** section further below for critical habitat that lies within your project. Please contact the designated FWS office if you have questions.

Mammals	Status	Has Critical Habitat	Condition(s)
Indiana bat (<i>Myotis sodalis</i>) Population: Wherever found	Endangered		
Northern long-eared Bat (<i>Myotis septentrionalis</i>) Population: Wherever found	Threatened		

<http://ecos.fws.gov/ipac>, 10/27/2016 01:43 PM



United States Department of Interior
Fish and Wildlife Service

Project name: Middlebury Lower Hydroelectric Project

Critical habitats that lie within your project area

There are no critical habitats within your project area.

<http://ecos.fws.gov/ipac>, 10/27/2016 01:43 PM

From: [Davis, Eric](#)
To: [Kayla Escher](#)
Cc: [Katie Soliers](#)
Subject: RE: Middlebury UHL Re-certification
Date: Monday, April 03, 2017 12:35:14 PM
Attachments: [image006.png](#)

Good morning Kayla,

I have consulted with the Department of Fish and Wildlife regarding listed species in the vicinity of the Lower Middlebury hydroelectric project, as well as the potential for adverse effects due to project operations.

Our Natural Heritage Program has identified the presence of the following rare, threatened and endangered species in the vicinity of the project:

- Indiana Bat (federally and state threatened)
- Northern Long-eared Bat (federally and state endangered)
- Bald Eagle (state endangered)
- Osprey ("uncommon"/ "species of greatest conservation need")
- Cuckoo flower (S2-Rare) – *Cardamine dentata* (syn. *Cardamine pratensis* var. *palustris*)
- Frank's love-grass (S3-Uncommon) – *Eragrostis frankii*
- Gray's sedge (S3-Uncommon) – *Carex grayi*

While the last three plant species were documented in a 1996 survey, our natural heritage program notes that while they have reports of these species in the area, but would welcome the results from the 1996 survey, if available.

Regarding potentially negative effects of project operations, if operated in compliance with certification conditions, the project would not be expected to negatively affect listed species in the vicinity of the project.

Thank you,
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>
(Please note my new e-mail address, effective July 27, 2015)



VERMONT DEPARTMENT OF
ENVIRONMENTAL CONSERVATION
**WATERSHED
MANAGEMENT DIVISION**
RIVERS PROGRAM

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

From: [Popp, Bob](#)
To: [Kayla Easler](#)
Subject: RE: Middlebury LHE Re-certification
Date: Thursday, March 16, 2017 9:07:13 AM
Attachments: [image005.png](#)

Sorry Kayler, I thought that I had responded. If none of the operating conditions are proposed to change, then you are all set and no further inventory is warranted.

Thanks,

Bob

Bob Popp
Department Botanist
VT. Dept of Fish & Wildlife
5 Perry St. Suite 40
Barre, VT. 05641

(802) 476-0127
bob.popp@vermont.gov

From: Kayla Easler [<mailto:Kayla.Easler@KleinschmidtGroup.com>]
Sent: Thursday, March 16, 2017 8:37 AM
To: Popp, Bob <Bob.Popp@vermont.gov>
Subject: FW: Middlebury LHE Re-certification

Morning Bob,

Just checking in to see where you are with the project review and if you need anything else.

Thank you,

Kayla A. Easler
Regulatory Coordinator
KLEINSCHMIDT
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Direct: (207) 416-1271
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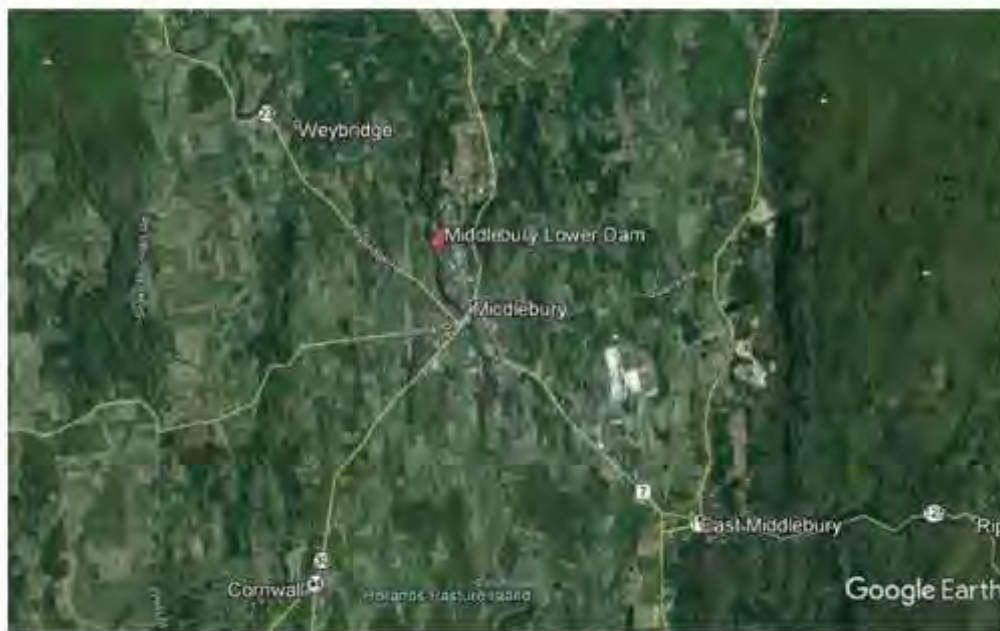
From: Kayla Easler
Sent: Thursday, February 16, 2017 2:01 PM
To: Popp, Bob <Bob.Popp@vermont.gov>
Cc: Katie Sellers <Katie.Sellers@KleinschmidtGroup.com>
Subject: RE: Middlebury LHE Re-certification

Hi Bob,

Thank you for getting back to me so quickly.

The Middlebury Lower Hydroelectric Project (FERC No. 2737) (Project) is located on the Lower Falls of the Otter Creek at river mile (RM) 24.7 and situated within the towns of Middlebury and Weybridge, Addison County, Vermont (44 0258, -73.1778). The Project operates in a run-of-river mode. Based on requirements of LIHI application, the project boundary includes the impoundment which inundates approximately 16 acres or approximately one mile of Otter Creek upstream of the Middlebury Lower dam; the bypassed reach which is approximately 750-feet from the dam and reconnects to the tail water at the end of powerhouse; and the downstream section which starts at the powerhouse and stretches to the Beldens dam at RM 23 (PDF attached).

At this time no changes are planned for the project.



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From: Popp, Bob (<mailto:Bob.Popp@vermont.gov>)
Sent: Thursday, February 16, 2017 9:14 AM
To: Kayla Easler <Kayla.Easler@KleinschmidtGroup.com>
Subject: RE: Middlebury UHI Re-certification

Kayla, we would need to know the boundary of the project if we are to provide updated information re. the project. Also if there were to be any change that might create some impact, a rare plant inventory would be warranted since the previous one was done more than 3 yrs. Ago.

Thanks

Bob

Bob Popp
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5 Perry St. Suite 40
Barre, VT. 05641

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From: Kayla Easler (<mailto:Kayla.Easler@KleinschmidtGroup.com>)
Sent: Tuesday, February 14, 2017 2:51 PM
To: Ferguson, Mark <Mark.Ferguson@vermont.gov>; Mackenzie, Chet <Chet.Mackenzie@vermont.gov>; Popp, Bob <Bob.Popp@vermont.gov>
Cc: Katie Sellers <Katie.Sellers@KleinschmidtGroup.com>
Subject: Middlebury UHI Re-certification

Good afternoon,

Katie and I have another LIHI application in need of threatened and endangered species review. This is for the Middlebury Hydroelectric Project (FERC No. 2737) a run-of-river project located on Otter Creek.

Upon reviewing the USFWS IPAC Report and FERC's 2000 Environmental Assessment for this Project, a list of potential threatened and endangered species that may occur within this project area has been developed. Could you a) review the below species list to make sure it is accurate and/or suggest updates as appropriate; and b) review this list to confirm that the Project continues to not negatively affect any of the currently listed species that may occur within the Project area?

Species List
Indiana Bat (federally and state threatened)

Northern Long-eared Bat (federally and state endangered)
Bald Eagle (state endangered)
Osprey ("uncommon"/ "species of greatest conservation need")

In addition, a rare plant survey was completed in 1996, three "uncommon" species listed by the Vermont nongame and Natural Heritage Program were identified within the project area. These include the Frank's love-grass (S3), cuckoo flower (S2), and Gray's sedge (S3)

No changes to the project or tree cutting are planned at this time. Do let me know if you have any follow-up questions.

Thank you,

Kayla A. Easler
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From: Katie Sellers
To: "Dillon, Scott"
Cc: "Greenan, John"
Subject: Middlebury Lower Hydroelectric Project - LHI Application
Date: Wednesday, August 09, 2017 2:53:00 PM
Attachments: [2016 Middlebury Lower Report.pdf](#)

Hi Scott,

Want to touch base with you in regards to the Annual CRMP Report for the Middlebury Lower Hydroelectric Project (FERC No. 2737).

Green Mountain Power is applying to the Low Impact Hydropower Institute (LIHI) for re-Certification of the Middlebury Lower Project. After reading through the Annual CRMP Reports for this facility, it appears that Charity Baker recommended an altered 3-year CRMP Reporting timeline in the last several years of Annual Reports. Seeing no commentary from the Division on this topic, would you be able to comment as to whether or not this altered reporting timeline would be approved by the Division within the next 5-years (approximate LIHI certification term)? The 2016 CRMP Report is attached for your reference.

Any thoughts you have on this topic would be much appreciated.

Thank you.
Katie

Katie E. Sellers, M.S.
Regulatory Coordinator

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