



Stage II Recertification Review For Middle Raquette River Project Low Impact Hydropower Institute's (LIHI) #14B

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1. BACKGROUND

In 2014, LIHI determined that LIHI certificate #14, needed to be separated into three smaller LIHI certificates to help reduce the overall size and complexity of the issues related to multiple projects. The developments in the Federal Energy Regulatory Commission's (FERC) licenses P-2060 and P-2084 are now defined as the Upper Raquette River Project (URRP or LIHI #14A). The Lower Raquette River Project (LRRP or LIHI #14C) is FERC license P-2330. The developments in FERC license P-2320 are now defined as the Middle Raquette River Project (MRRP or LIHI #14B) that includes the Erie Boulevard Hydropower's (EBH) Higley, Colton, Hannawa and Sugar Island hydro developments.

In 1999, Niagara Mohawk Power Company (NMPC) sold their entire hydropower portfolio to Orion Power. EBH was created as a subsidiary of the newly formed company dealing with the operation of the hydropower assets. Orion Power was eventually acquired through a secession of sales and purchases by Brookfield Renewable Energy Group (BREG), the current owner of EBH. On February 13, 2002, the FERC issued the MRRP license for a term of 31 years and 11 months, ending on December 31, 2033.¹ Due to the LRRP license amendment in 2006, the WQC for the Raquette River was revised on October 13, 2006².

On November 12, 2018, LIHI sent a reminder letter to EBH stating that MRRP's current LIHI certification was set to terminate on July 9, 2019. EBH submitted a LIHI application for MRRP recertification on May 31, 2019. On July 9, 2019, to allow sufficient time for the recertification process to be completed, LIHI extended the certification term of the MRRP to November 30, 2019. EBH's LIHI coordinator is Daniel J. Maguire³.

The Stage I recertification review was completed July 8, 2019. Given the review was processed under the new, Second Edition LIHI Certification Handbook, the need for a Stage II review was necessary. The Stage I review deemed it unnecessary to submit a new revised application, but found supplemental information was needed. However, EBH resubmitted a revised LIHI application for recertification on September 3, 2019.

2. RAQUETE RIVER BASIN

The Raquette River, with a total drainage basin of 1,269 square miles at its mouth, originates in the Adirondack highlands at Blue Mountain Lake, Raquette Lake and Long Lake. The river flows generally north-northwest for more than 146 miles, through Potsdam, New York and empties into the St. Lawrence River, near Massena, New York into the St. Lawrence River/Seaway at the St. Regis Indian Reservation in Franklin County. The area experiences cold, snowy winters and short summers. Annual precipitation is about 40 inches. As the river flows north, it transitions from cold water habitat to a cool water aquatic fishery as the river reaches the lower gradients. Most of the basin is sparsely populated, with much of the land forested and brush land.

In the Raquette River headwaters, EBH's Piercefield development (FERC No. 7387, LIHI #156) at RM 88.5 releases flow into the Carry Falls impoundment which impounds 877 square miles (SQMI) of drainage (See Figure 1). Carry Falls' seasonal storage pond is the largest on the Raquette River and is used to store and regulate the majority of this upstream flow through the remaining URRP developments and EBH's downstream MRRP and LRRP developments.

¹ FERC license - <http://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=13707261>

² <https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=55629>

³ Daniel J. Maguire, P.E., EBH Compliance Manager, 184 Elm Street, Potsdam, NY 13676 - 315-267-1036 - Danny.Maguire@brookfieldrenewable.com



EBH's URRP developments include:

- Carry Falls Development, located at RM 68 and licensed as FERC No. 2060.
- Stark Development located at RM 66 and licensed as FERC No. 2084.
- Blake Development located at RM 62 and licensed as FERC No. 2084.
- Rainbow Falls Development located at RM 56 and licensed as FERC No. 2084.
- Five Falls Development located at RM 54 and licensed as FERC No. 2084.
- South Colton Development located at RM 52 and licensed as FERC No. 2084.

EBH's MRRP developments include:

- Higley Development located at RM 47 and licensed as FERC No. 2320.
- Colton Development located at RM 45 and licensed as FERC No. 2320.
- Hannawa Development located at RM 39 and licensed as FERC No. 2320.
- Sugar Island Development located at RM 38 and licensed as FERC No. 2320.



Figure 1 - Location Map

Flows downstream of Sugar Island travel through:

- The Potsdam Project (FERC No. 2869) at RM 35, owned by the Village of Potsdam.
- The Sissonville Limited Partnership's (SLP) Sissonville Project (FERC No. 9260) at RM 33.
- EBH's Hewittville Project (FERC No. 2499) at RM 32.
- EBH's Unionville Project (FERC No. 2498) at RM 31.

All of these four projects have individual dams and impoundments and operate in a run of river (ROR) mode.

Flow below Unionville enters EBH's LRRP developments. The LRRP developments include:

- Norwood Development located at RM 28.0 and licensed as FERC No. 2330.
- East Norfolk Development located at RM 23.5 and licensed as FERC No. 2330.
- Norfolk Development located at RM 22.5 and licensed as FERC No. 2330.
- Raymondville Development located at RM 20.0 and licensed as FERC No. 2330.

EBH's Yaleville Project, licensed as FERC No. 9222 (LIHI #157) is located at RM 25.0 (3 miles downstream of the Norwood development and 1.5 miles upstream of the East Norfolk development).

Downstream fish passage is provided at all the upstream facilities with the exception of Carry Falls, Hewittville, and Unionville. Downstream fish passage is scheduled for future construction at Hewittville and Unionville in 2020. Seasonal upstream eel passage is provided at all downstream dams.



3. REGULATORY SUMMARY

A. Summary of Project Licensing and Agency Consultation Process

The original license for the MRRP was issued in 1964, with an expiration date of December 31, 1993. From January 1, 1994 until issuance of the 2002 FERC license, the MRRP operated under annual licenses.

NMPC, the predecessor of EBH⁴, filed a new license application in 1991. Notice of the relicense application was issued on February 23, 1993. The U.S. Department of the Interior (USDOI), Adirondack Mountain Club (AMC), the New York State Adirondack Park Agency (NYSPA), the New York State Department of Environmental Conservation (NYSDEC), American Whitewater (AW), American Rivers (AR), the Adirondack Council (AC), the Association for the Protection of the Adirondacks (APA), the National Audubon Society of New York (NASNY), the Natural Heritage Institute (NHI) and New York Rivers United (NYRU) filed motions to intervene in the proceeding.

In 1995, parties to the FERC relicense proceedings for the LRRP and the MRRP requested that all proceedings be combined with the FERC relicense for the URRP. On December 13, 1995, the FERC approved the request and NMPC agreed to accelerate the FERC relicensing of the URRP⁵.

On April 22, 1998, NMPC filed the Raquette River Project Offer of Settlement (RRPSO)⁶. The RRPSO signatories included NMPC, the NYSDEC, the U.S. Department of the Interior's Fish and Wildlife Service (USFWS), AMC, NYSPA, NYRU, the National Park Service (NPS), the New York State Conservation Council (NYSCC), the North Country Raquette River Advocates (NCRRA), St. Lawrence County, the AC, APA, and the Jordan Club. The New York Power Authority (NYPA) and the New York Council of Trout Unlimited (TUNY) participated in the proceeding and had no objections but chose not to become signatories.

The RRPSO provided for minimum flows releases, limitations on impoundment fluctuations, and fish passage and protection measures to protect and enhance the water quality and fishery resources of the Raquette River. It also provided for enhanced recreational opportunities in a manner that is consistent with the undeveloped nature of the surroundings. Shortly thereafter, the NYSDEC issued a Water Quality Certificate (WQC) for the Raquette River on June 11, 1998.

On February 10, 1999, NMPC filed notice of a new license application reflecting the provisions of the RRPSO and the WQC⁷. The USDOI, AMC and the NYSPA filed motions to intervene in the proceeding.

On June 16, 2000, the FERC issued a Draft Environmental Assessment (DEA)⁸. The USDOI, NYSDEC, the St. Regis Mohawk Tribe, AMC, and EBH, which early in 1999 acquired all of NMPC's hydro assets, filed comments on the DEA.

⁴ In 1999, NMPC sold their entire hydropower portfolio to Orion Power. EBH was created as a subsidiary of the newly formed company dealing with the operation of the hydropower assets. Orion Power was eventually acquired through a secession of sales and purchases by BREG, current owner of EBH.

⁵ <http://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=8299440:1>

⁶ RRPSO - http://elibrary.ferc.gov/idmws/search/intermediate.asp?link_info=yes&doclist=1845587

⁷ <http://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=3150004>

⁸ <http://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=8057323>



On April 18, 2001, the FERC issued a final EA (EA)⁹. The EA concluded that relicensing the four projects will not significantly impact the quality of the human environment and recommended issuance of new licenses as proposed in the applications.

On February 13, 2002, the FERC issued separate licenses for the Carry Falls Project (P-2060)¹⁰, the Upper Raquette River Project (P-2084)¹¹, the Middle Raquette River Project (P-2320)¹² and the Lower Raquette River Project (P-2330)¹³. The term for each license was for 31 years and 11 months ending on December 31, 2033.

Key provisions in the MRRP's 2002 FERC license were to:

- Limit normal reservoir fluctuations, according to a seasonal regime at Higley to provide regulating flows and recreational opportunities;
- Limit normal reservoir fluctuations at Colton and Hannawa to no more than 0.4 feet, and at Sugar Island to no more than 1.0 foot;
- Provide additional measures to facilitate downstream fish movement at the Higley, Colton, and Hannawa developments;
- Provide 1-inch clear spacing physical barriers at the location of the existing trashrack structures at Higley, Colton, and Hannawa;
- Provide scheduled whitewater releases, a flow notification system, and access trails at Colton, Hannawa, and Sugar Island;
- Develop a recreation plan to provide a canoe portage at each development, whitewater access at Colton, Hannawa, and Sugar Island, a car-top boat launch with overnight parking at Colton, a scenic overlook, picnic facilities, and roadside parking at Hannawa, and a day use area at Sugar Island; and
- Modify the Project boundary to include all EBH lands occupied by these recreational facilities.

Due to the LRRP license amendment in 2006 to increase the installed capacity at all LRRP's developments, the WQC for the entire Raquette River was revised on October 13, 2006¹⁴.

B. Compliance Issues

A total of ten impoundment fluctuation deviations occurred during the prior LIHI certification period from July 2009 to July 9, 2014, with operator error a common cause. Of these, three were deemed license violations by FERC. During the 2014 review of the current LIHI certification which was issued on May 15, 2015, a single pond elevation deviation occurred on October 25, 2014 at Hannawa¹⁵. The development was operating normally when an alarm of low pond level was reported due to river flow change. The operator failed to recognize and respond appropriately to this low pond level alarm contributing to the 8 plus hour deviation. Corrective measures offered by EBH were to review that alarm displays are functioning properly and to provide remedial training of the system operators related to flow change procedures and alarm response. On January 14, 2015, FERC informed EBH the deviation on October 25, 2014 was a violation of the license¹⁶.

⁹ <https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=9033977>

¹⁰ FERC license P-2060 - <http://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=13707255>

¹¹ FERC license P-2084 - <http://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=11860652>

¹² FERC license P-2320 - <http://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=13707261>

¹³ FERC license P-2330 - <http://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=11860653>

¹⁴ <https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=55629>

¹⁵ <https://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=13676083>

¹⁶ <https://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=13736079>



The current LIHI Certification for the MRRP, effective July 9, 2014, required EBH to satisfy two conditions:

1. EBH will develop a draft Deviation Reduction Plan (DRP) and submit it to LIHI no later than three months after LIHI certification of the MRRP. The DRP will provide proactive operational control approaches for dam releases and pond level maintenance designed to reduce the likelihood of operational deviations occurring in the future. The DRP needs to address the specific problems and potential recommendations identified in the reviewer's report. Options to be considered should include audible alarms in control centers and programmable logic controllers. The DRP will describe options considered, those selected, and a schedule for implementation. The final DRP needs to be completed and agreed to by both EBH and LIHI no later the six months after LIHI certification;
2. EBH will provide annual reports to LIHI documenting operational deviations from instream flow or pond levels that occurred throughout each year of certification. The report shall describe all deviations that have occurred, regardless of whether the deviations were planned or unintentional or whether they are eventually deemed as not violating the license by FERC. The report is due at the same time as the annual compliance statement.

In response to condition 1, EBH developed a procedure to mitigate future flow and pond level deviations. The System Operator at the North American System Control Center (NASCC) developed a procedure for 3-way communication. EBH states that the 3-way communication helps ensure there is clear direction of actions to be taken and who will take those actions. Although the specific recommended topics in the DRP were never addressed, LIHI staff accepted this revised procedure as satisfying condition 1. The current recertification application states that the new 3-way communication procedure has resulted in FERC not documenting any license violations since 2014, however, a few deviations have occurred since then.

On December 7, 2017¹⁷, EBH filed notice of excursion of pond level at the Higley development due to a mechanical malfunction. No excursions occurred in 2018. In 2019 three excursions occurred, two were planned, one each at Higley and Hannawa, and NYSDEC and USFWS were properly notified in advance. One was unplanned and was due to tainter gate icing at Sugar Island that prevented maintaining a lowered pond level at Colton to accommodate diving operations there. FERC did not consider any of these excursions to be license violations.

4. PROJECT DESCRIPTION

The MRRP is located on the Raquette River from RM 47 to RM 38 in St. Lawrence County, NY about five miles below the URRP. The MRRP consists of four developments, Higley, Colton, Hannawa, and Sugar Island. Each development has a dam, reservoir, and powerhouse. The MRRP operates as described in the RRPSO, submitted to FERC on April 22, 1998¹⁸ and incorporated into the 2002 FERC license.¹⁹

Each MRRP development was constructed in 1928. All four developments had turbine capacity updates from 2003 through 2007, resulting in increasing the total hydraulic capacity of the MRRP from 8,223 cubic feet per second (CFS) to 11,814 CFS. The total installed capacity is 48.3 MW that produces an average annual generation (AAG) of 330.82 gigawatt-hour (GWh) per year.

¹⁷ <https://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=14772383>

¹⁸ RRPSO - http://elibrary.ferc.gov/idmws/search/intermediate.asp?link_info=yes&doclist=1845587

¹⁹ FERC License - <http://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=11860653>



Figure 2 - Higley Powerhouse

The Higley development has three retired units and a single turbine-generator with an installed capacity of 6.3 MW that operates over a hydraulic capacity range from 1,800 CFS to 2,045 CFS.



Figure 3 - Higley Generators



The Colton development has three turbines, each with an installed capacity of 10 MW that operates over a hydraulic capacity range from 1,241 CFS to 1,503 CFS.



Figure 4 - Colton Generators

On December 13, 2011, EBH notified FERC of its initial powerhouse rehabilitation construction for its Hannawa Falls development. No changes were made to the powerhouse's turbines or generators. The final construction report was submitted to FERC on October 22, 2013. The Hannawa development has two turbines, each with an installed capacity of 3.6 MW that operates over a hydraulic capacity range from 450 CFS to 1,440 CFS.



Figure 5 - Hannawa Powerhouse



Lastly, the Sugar Island development has two turbines, each with an installed capacity of 2.4 MW that operates over a hydraulic capacity range from 900 CFS to 1,190 CFS.



Figure 6 - Sugar Island Powerhouse



Figure 7 - Sugar Island Generator

A summary of installed capacity for all developments is shown in Table 1.



Table 1 – MRRP Developments Current Hydropower Metrics				
Development	River Mile	Latitude of Dam	Longitude of Dam	Total Installed Capacity (MW)
Higley	47.0	44.53053	-74.93198	6.3
Colton	45.0	44.55520	-74.93935	30.1
Hannawa	39.0	44.61185	-74.97466	7.2
Sugar Island	38.0	44.7433	-75.0053	4.7
TOTAL				48.3

The MRRP developments have an overall total installed capacity of 48.3 MW and produce an average annual generation (AAG) of 330.82 GWh.

The MRRP operation is coordinated with EBH's other projects on the Raquette River, the URRP and the LRRP. The MRRP's most upstream development, Higley, operates as a re-regulating development to provide steadier flows for the downstream hydroelectric facilities within the MRRP and LRRP. Each of the MRRP developments below Higley are allowed to operate in a pulsing mode that limits the normal reservoir fluctuation at Colton and Hannawa to no more than 0.4 feet, and at Sugar Island to no more than 1.0 foot.

Each development generates when total inflow is available to pass the minimum flow plus run one turbine at its minimum turbine limit. Once a development's net inflow (inflow available after passing minimum flow) exceeds the powerhouse's hydraulic capacity, the powerhouse is run at full hydraulic capacity and all excess water is passed over the spillway or top of flashboards.

Two USGS gages are located on the Raquette near the MRRP. The U.S. Geological Survey (USGS) gage 04267500 (Raquette River at South Colton, NY) is located upstream of the MRRP developments. This gage has a contributing drainage area of 937 SQMI and contains period of record (POR) daily flows since January 1, 1953. The USGS gage 04268000 (Raquette River at Raymondville, NY) is located downstream of the MRRP developments. This gage has a contributing drainage area of 1,125 SQMI and contains POR daily flows since November 29, 1943.

Historically, USGS gage 04267500 has been used to estimate inflows at the MRRP's developments. The minimum daily flow of 4.6 CFS occurred on June 2, 1954. The maximum daily flow of 12,400 CFS occurred on April 29, 2011. A daily flow of 620 CFS is exceeded about 90% of the time annually. A daily flow of 1,550 CFS is exceeded about 50% of the time annually. A daily flow of 3,478 CFS is exceeded about 10% of the time annually. The 1% exceeded annual daily flow is 6,429 CFS.



A. Higley

The Higley development consists of:

- A 34-foot-high concrete gravity dam with:
 - 3-foot-high wooden flashboards atop a dam crest of 880.6 feet mean seas level (FTMSL) that creates a reservoir with a 742-acre surface area and a 4,400-acre-foot (ACFT) usable storage capacity at normal maximum pool elevation 883.6 FTMSL;
 - A 209-foot-long concrete gravity ogee-crested spillway;
 - Two flood gates,
 - Eight steel forebay gates each measuring 12 feet high by 5 feet, 9 inches wide;
 - A trashrack, and;
 - Two 10 feet high by 8 feet wide waste gates;
- A 160-foot-long by 50-foot-wide flume formed by concrete retaining walls on each side;
- A retired in-place powerhouse;
- Four separate 8 ft. diameter penstocks with its own headgate;
- A new powerhouse measuring 90 feet long and 53 feet wide containing four units with a combined capacity of 6.3 MW, and;
- Appurtenant electrical and mechanical facilities.



Figure 8 - Higley Spillway



Figure 9 - Higley Intake

There are no plans for any facility upgrades at the development. Releases from Higley pass downstream into the Colton impoundment.

B. Colton

The Colton development consists of:

- A 27-foot-high concrete gravity dam with;
 - 2-foot-high flashboards;
 - An 8-foot-wide log flume;
 - A trash gate, and;
 - A 205-foot-long ogee crested spillway equipped with a single tainter gate measuring 10 feet high and 25 feet wide;
- A reservoir with a 195-acre surface area and a 620-ACFT usable storage capacity at normal maximum pool elevation of 837.0 FTMSL;
- A concrete intake structure with a brick superstructure, measuring 50 feet wide by 30 feet long by 12 feet high, equipped with a motor driven, 16-foot-high by 25.5-foot-wide tainter gate;
- A 13.5-foot-diameter steel pipeline, 11,090 feet long transitioning into a 12-foot-diameter steel pipeline, 2,100 feet long;
- An 80-foot-high surge tank;
- Three penstocks, 160 feet, 140 feet, and 125 feet long, with diameters of 7.5 feet, 7.5 feet, and 9 feet respectively;
- A brick and structural steel powerhouse measuring 165 feet long and 46 feet wide, containing three turbine-generators with a total capacity of 30.1 MW, and;
- Appurtenant electrical and mechanical facilities.



Figure 10 - Colton Spillway



Figure 11 – Colton Dam and Intake



Figure 12 - Colton Pipeline

There are no plans for any facility upgrades at the development. Releases from Colton pass downstream into the Hannawa impoundment.

C. Hannawa

Hannawa Falls consists of:

- A 38-foot-high stone and concrete dam with:
 - 3.5-foot-high wooden flashboards;
 - A log chute;
 - A motor operated tainter gate measuring 14 feet high by 28 feet wide;
 - An ogee crested spillway, and;
 - A sluice gate;
- A reservoir with a 204-acre surface area and a 690-ACFT usable storage capacity at normal maximum pool elevation of 552.0 FTMSL;
- A headworks structure with five sliding timber gates, all 18 feet high, with three 9.7 feet wide, one 9 feet wide, and one 8.8 feet wide;
- A 2,700-foot-long canal measuring 30 feet wide at the bottom, 120 feet wide at the top, with an average depth of 22 feet, equipped with trashracks that completely cover the canal entrance;



- Two 10-foot-diameter penstocks 190-feet long;
- A sandstone and structural steel powerhouse measuring 66 feet wide by 248 feet long by 40 feet high containing two generating units with a total capacity of 7.2 MW, and;
- Appurtenant electrical and mechanical facilities.



Figure 13 - Hannawa Spillway



Figure 15 - Hannawa Power Canal



Figure 14 – Hannawa Penstocks



There are no plans for any facility upgrades at the development. Releases from Hannawa pass downstream into the Sugar Island impoundment.

D. Sugar Island

Sugar Island consists of:

- A 37-foot-high concrete gravity dam with;
 - Two tainter gates, and;
 - A 192-foot-long spillway;
- An earth saddle dike;
- A concrete and brick intake structure with trashracks and a steel head gate measuring 14 feet wide by 16 feet high;
- A 4,700-foot-long steel pipeline;
- A 71-foot-high surge tank;
- Two 8-foot-diameter penstocks;
- A brick and structural steel powerhouse measuring 35 feet wide by 67 feet long by 30 feet high containing two generating units with a total capacity of 4.7 MW;
- A reservoir with a 29-acre surface area and a 55-ACFT usable storage capacity at normal maximum pool elevation of 470.0 FTMSL, and
- Appurtenant electrical and mechanical facilities.



Figure 16 - Sugar Island Spillway



Figure 17 - Sugar Island Gates and Intake

There are no plans for any facility upgrades at the development.



5. ZONES OF EFFECT (ZOE)s

The MRRP has twelve ZOE's. The Applicant has defined ZOE's at each development from upstream to downstream and numbered them consecutively.

A. Higley

The Higley development has two ZOE's:

- ZOE 1 – Impoundment - RM 52 downstream to RM 47 (Higley Dam).
- ZOE 2 – Bypass - RM 47 (Higley Dam) downstream to RM 46.5 (Higley Tailrace).
- ZOE 3 – Downstream – RM 46.5 (Higley Tailrace) downstream to RM 45.

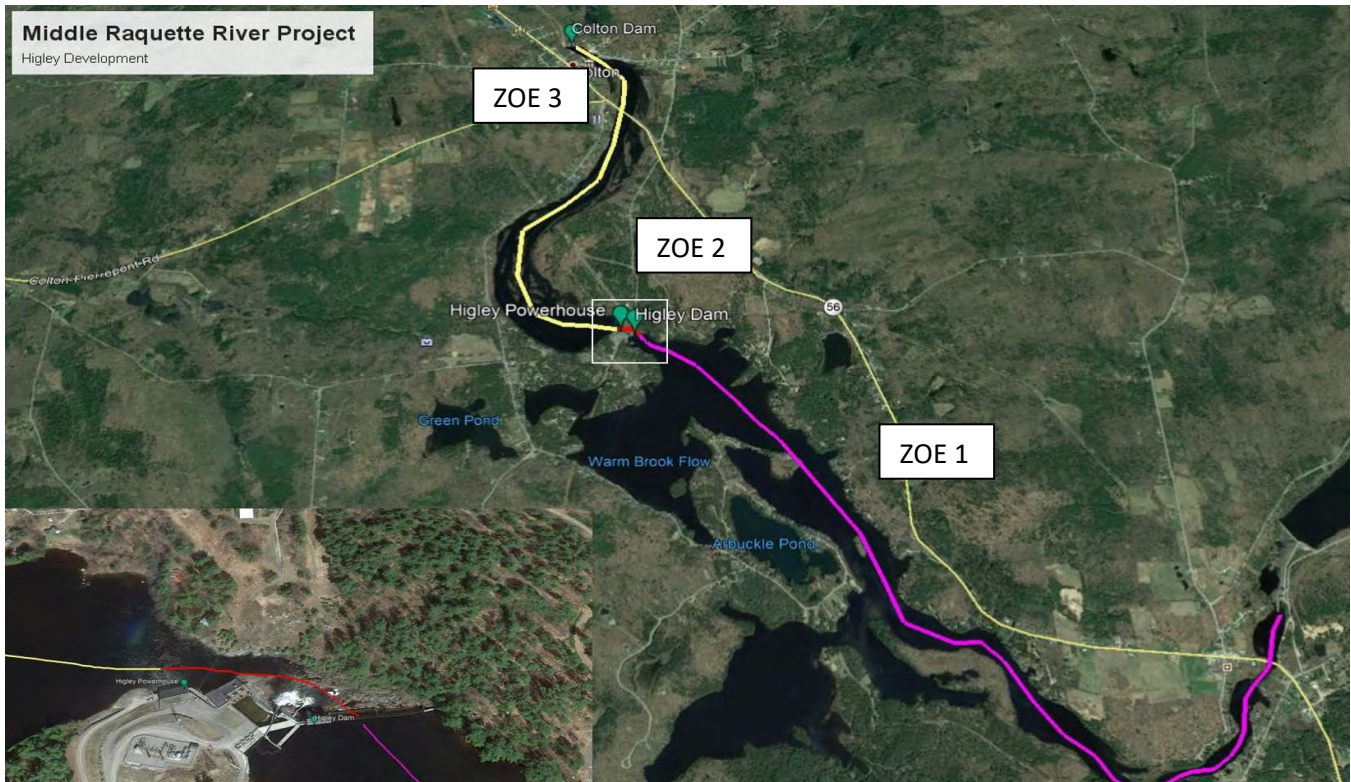


Figure 18 - Higley ZOE's 1, 2 and 3

The Higley ZOE's alternative standards are shown in Tables 2, 3 and 4.



Table 2 - Higley - ZOE 1 – Impoundment Alternative Standards

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			

Table 3 - Higley - ZOE 2 – Bypassed Reach Alternative Standards

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			

Table 4 - Higley - ZOE 3 – Downstream Reach Alternative Standards

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			



B. Colton

The Colton development has three ZOE's:

- ZOE 4 – Impoundment - RM 46.5 downstream to RM 45 (Colton Dam)
- ZOE 5 – Bypass - RM 45 (Colton Dam) downstream to RM 42 (Colton Tailrace).
- ZOE 6 – Downstream - RM 42 (Colton Tailrace) downstream to RM 39

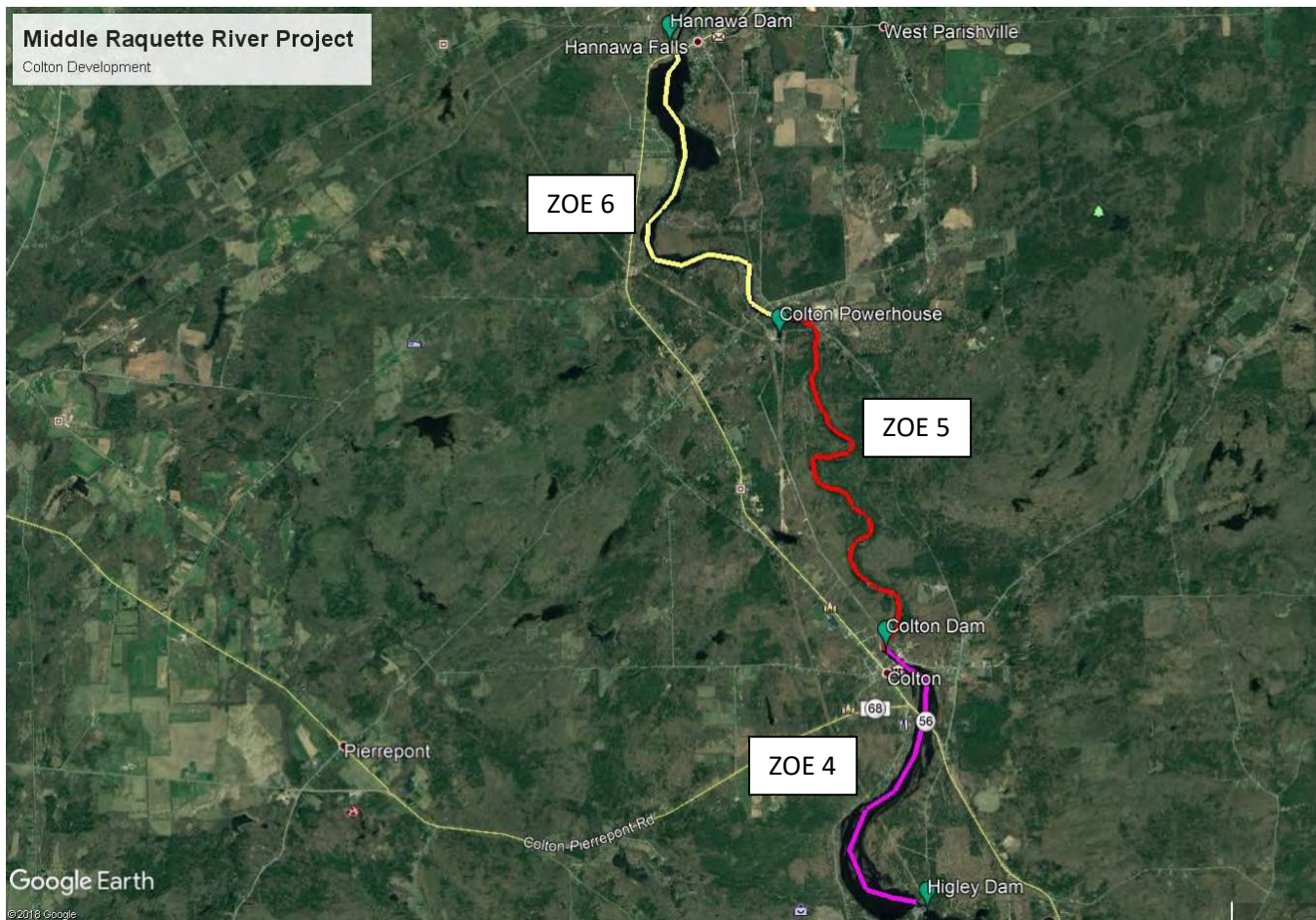


Figure 19 - Colton ZOE's 4, 5 and 6

The Colton development ZOE's alternative standards are shown in Tables 5, 6 and 7.



Table 5 – Colton - ZOE 4 – Impoundment Alternative Standards

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			

Table 6 – Colton - ZOE 5 – Bypassed Reach Alternative Standards

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			

Table 7 – Colton - ZOE 6 – Downstream Reach Alternative Standards

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			



C. Hannawa

The Hannawa development has three ZOE's:

- ZOE 7 – Impoundment - RM 42 downstream to RM 39 (Hannawa Dam).
- ZOE 8 – Bypass - RM 39 (Hannawa Dam) downstream to RM 38.5 (Hannawa Tailrace).
- ZOE 9 – Downstream - RM 38.5 (Hannawa Tailrace) downstream to RM 38.

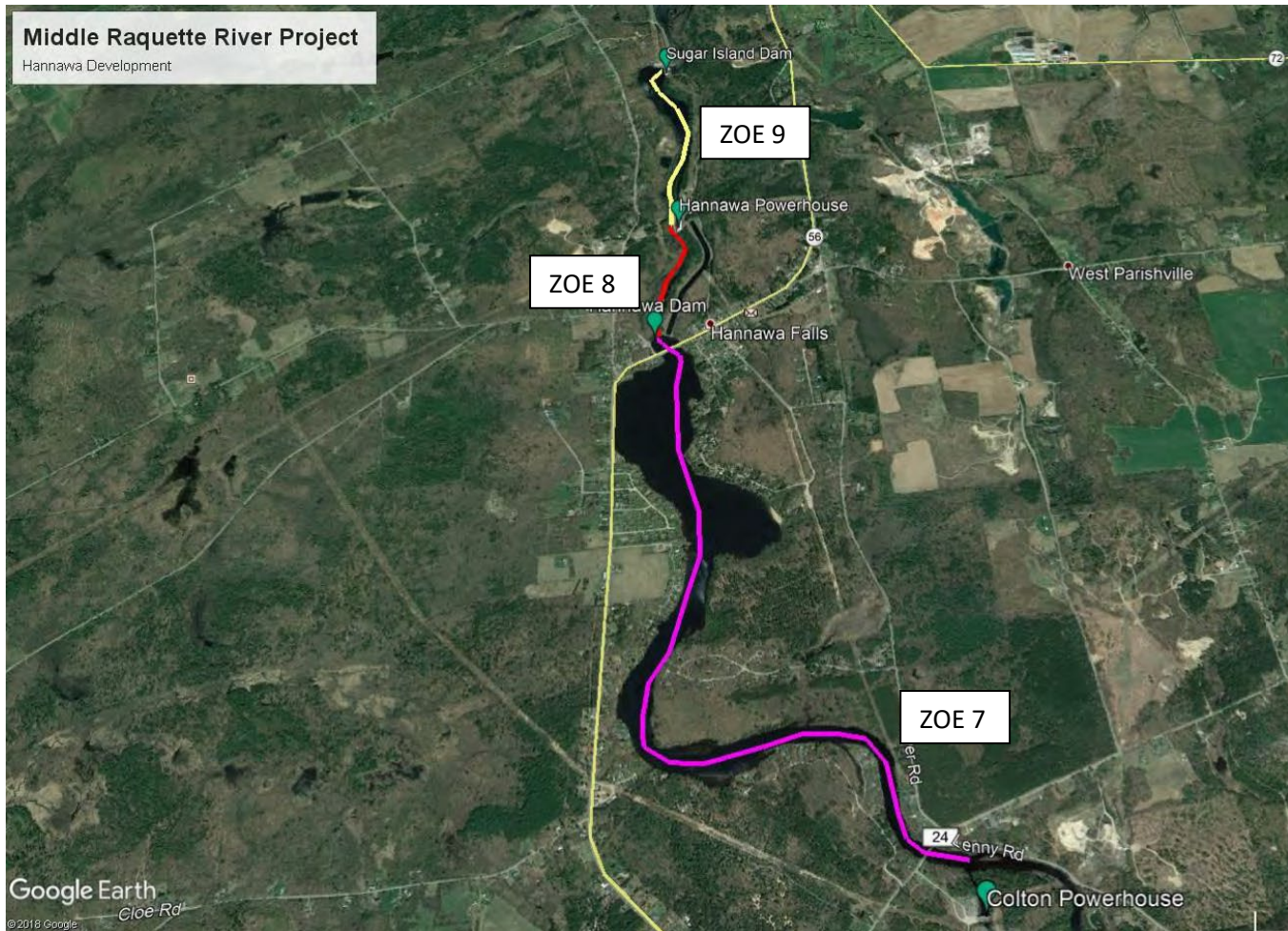


Figure 20 - Hannawa ZOE's 7, 8 and 9

The Hannawa development ZOE's alternative standards are shown in Tables 8, 9 and 10.



Table 8 – Hannawa - ZOE 7 – Impoundment Alternative Standards

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			

Table 9 – Hannawa - ZOE 8 – Bypassed Reach Alternative Standards

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			

Table 10 – Hannawa - ZOE 9 – Downstream Reach Alternative Standards

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			



D. Sugar Island

The Sugar Island development has three ZOE's:

- ZOE 10 – Impoundment - RM 38.5 downstream to RM 38 (Sugar Island Dam)
- ZOE 11 – Bypass - RM 38 (Sugar Island Dam) to RM 37 (Sugar Island Tailrace).
- ZOE 12 – Downstream - RM 37 (Sugar Island Tailrace) to RM 35 (East and West Dams in Potsdam).

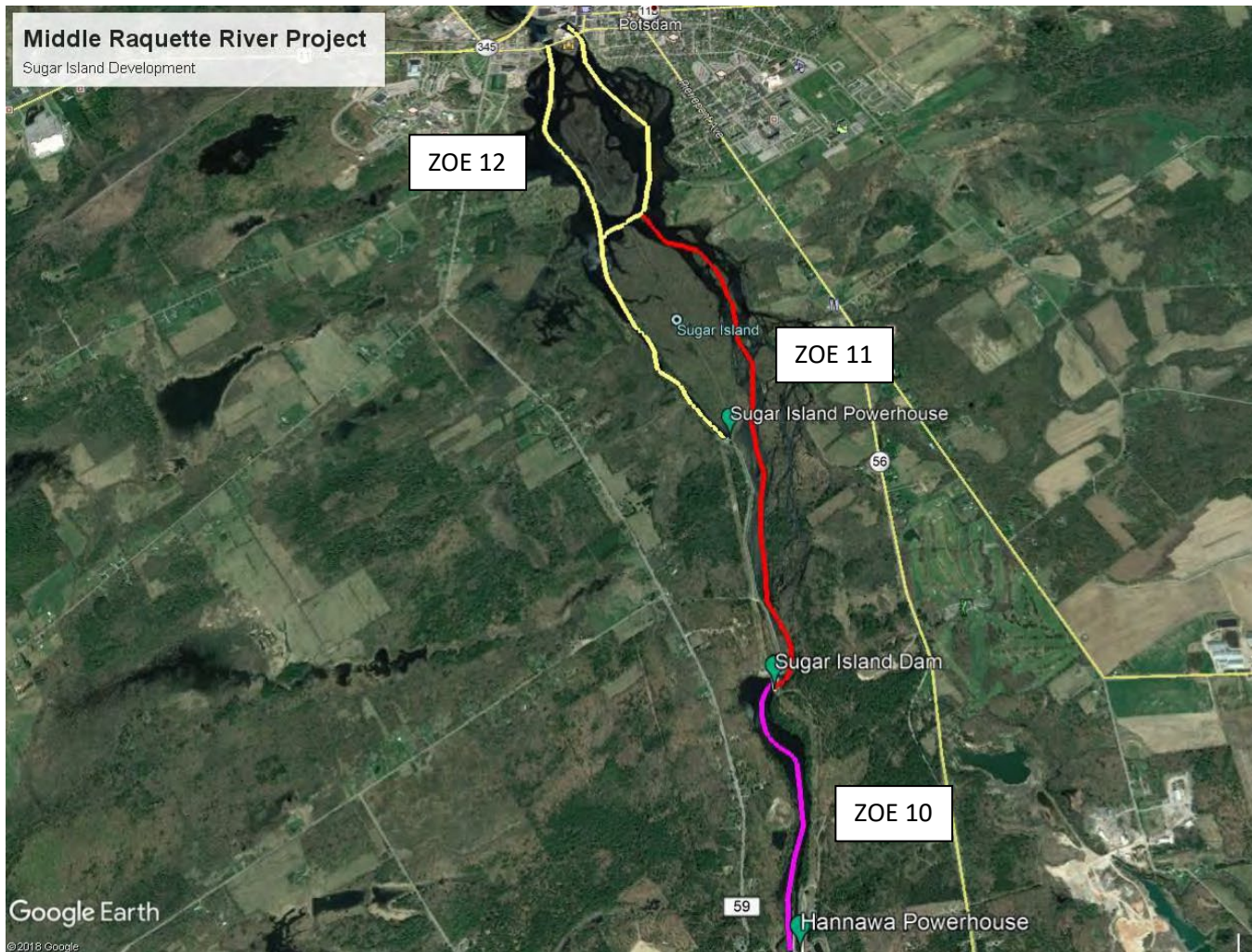


Figure 21 - Sugar Island ZOE's 10, 11 and 12

The Sugar Island development ZOE's alternative standards are shown in Tables 11, 12 and 13.



Table 11 – Sugar Island - ZOE 10 – Impoundment Alternative Standards

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			

Table 12 – Sugar Island - ZOE 11 – Bypassed Reach Alternative Standards

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			

Table 13 – Sugar Island - ZOE 12 – Downstream Reach Alternative Standards

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			



6. LIHI RE-CERTIFICATION PROCESS

On November 12, 2018, LIHI sent a reminder letter to EBH stating that MRRP's current LIHI certification was set to terminate on July 9, 2019. EBH submitted a LIHI application for MRRP recertification on May 31, 2019. On July 9, 2019, to allow sufficient time for the recertification process to be completed, LIHI extended the certification term of the MRRP to November 30, 2019.

The Stage I recertification review was completed July 2, 2019. Given the review was processed under the new, Second Edition LIHI Certification Handbook, the need for a Stage II review is necessary. The Stage I review deemed it unnecessary to submit a new revised application, but found supplemental information was needed. However, EBH resubmitted a revised LIHI application for recertification on September 3, 2019. LIHI assigned Mr. Gary Franc to perform the Stage II recertification review.

A. Comment Letters

On August 13, 2019, LIHI provided notice on their email list that the public comment period for the application has been opened. Comments could be submitted until 5 pm Eastern time on October 12, 2019. No comments were received by LIHI.

B. Agency Correspondence

On August 13, 2019, LIHI²⁰ emailed contacts²¹ listed in the Project application as knowledgeable about the Project stating, "...You may have already received the notice below if you are on the Low Impact Hydropower Institute (www.lowimpacthydro.org) email list. However, you were also identified as an agency or stakeholder contact on the LIHI recertification applications recently submitted by Erie Boulevard Hydropower (Brookfield Renewable Energy Group) for the Lower Raquette and Middle Raquette Hydroelectric Projects located on the Raquette River. The application reviewer, Gary Franc (copied here), may be in contact with you if he has questions about the projects or wishes to clarify any aspects of the LIHI applications. You may also provide comments directly to LIHI. More information about the projects and their applications can be found in the link <https://lowimpacthydro.org/lihi-certificate-14b-middle-raquette-river-project-new-york/>. "

The review determined that no additional outreach to agencies or stakeholders was warranted. On September 3, 2019, I called EBH's Danny Maguire for information on the MRRP. Danny emailed me the same day stating that responses to the Stage I comments have been finalized and would be returned to LIHI shortly. That information along with a revised application was submitted on September 3, 2019. He also said that all the MRRP developments with the exception of Colton have programmable logic controllers (PLCs) installed.

7. RE-CERTIFICATION REVIEW

This section contains my Stage II recertification review of the MRRP with regard to LIHI's Certification criteria. As part of my review, I conducted a FERC e-library search to verify claims in the certification

²⁰ Maryalice Fischer – LIHI Certification Program Director - mfischer@lowimpacthydro.org - 603-664-5097 office - 603-931-9119 cell

²¹ Jessica Hart – Jessica.Hart@dec.ny.gov; Nicholas Conrad - Nick.Conrad@dec.ny.gov; Robyn Niver - Robyn_Niver@fws.gov; Steve Patch - Stephen_Patch@fws.gov; Michael Lynch - Michael.Lynch@parks.ny.gov



application. My review concentrated on the period from July 9, 2014, the effective date of the current LIHI certification, through August of 2019, for FERC docket number P-2320.

A. LIHI Criterion-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's operation.

The application states that the MRRP satisfies the LIHI flow criterion in all impoundment ZOE's by meeting alternative standard A-1. The LIHI flows criterion in all bypass ZOE's is satisfied by meeting alternative standard A-2 and in all downstream ZOE's by meeting alternative standard A-1.

On October 30, 2008, FERC issued an order approving the Streamflow Monitoring Plan (SMP)²². The SMP defines EBH's monitoring requirements associated with impoundment fluctuation levels and minimum flow releases. The SMP requires EBH to measure the impoundment levels at all MRRP developments with remote gauging equipment that records headpond elevations every 15 minutes. An hourly average is recorded to the nearest 0.1 foot.

I. Impoundment Fluctuation

As described in the RRPSO, the WQC, and the 2002 FERC license, the MRRP developments operate in a pulsing mode that limits impoundment fluctuations while providing minimum flows and whitewater releases.

Higley serves dual purposes of providing reregulation of peaking flows from the URRP, as well as providing significant recreational opportunities during summer months. To facilitate these dual purposes, EBH limits impoundment fluctuations at Higley by season.

For the non-recreational season (end of Labor Day weekend to start of Memorial Day weekend), a 2.5-foot impoundment fluctuation limit is used as needed to facilitate reregulation (883.6 FTMSL to 881.1 FTMSL).

For the recreational season (Memorial Day weekend through the Labor Day weekend) the following rules apply:

- From 6:00 am on Mondays through 10:00 pm on Fridays: a 2.5-foot impoundment fluctuation is used as needed to facilitate reregulation (883.6 feet MSL to 881.1 feet MSL);
- From 10:00 pm on Fridays through 6:00 am on Mondays: by 10:00 pm on Friday, the impoundment should be at, or near, top of flashboards (883.6 feet MSL). Over the course of the weekend EBH can utilize a 2.0-foot drawdown. By 6:00 am Monday, the impoundment should be at, or near, 2.0 feet below top of flashboards (881.6 feet MSL).

The downstream developments operate in a pulsing mode that limits the normal impoundment fluctuation to 0.4 feet at Colton and Hannawa Falls, and to 1.0 feet at Sugar Island. Normal impoundment fluctuations are measured from the permanent dam crest or top of flashboards.

The impoundment fluctuation limitations may be curtailed or suspended if required by operating emergencies beyond the control of EBH, including security, and for short periods upon mutual agreement

²² <https://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=11841490>



between EBH and NYSDEC. If the limitations are so modified, EBH notifies FERC as soon as possible, but no later than ten business days after each such incident.

For construction and maintenance activities that require lowering the level of an impoundment below the normal operating limits, EBH's operating procedure (HOP 202²³) requires notification to NYSDEC and compliance with drawdown rates specified in the WQC.

II. Minimum Flow

Minimum flows at any given time may be slightly above or below the required value. The degree of variation is a function of head pond impoundment fluctuation. EBH determines the appropriate gate settings to provide minimum flows at each development based upon the midpoint of the impoundment fluctuation of each development²⁴.

Bypass minimum flows were determined through a Delphi Instream Flow study (report not available on the FERC elibrary) that encompassed the entire Raquette River. According to the FERC Environmental Assessment (EA)²⁵, the flow volumes and periodicity at each development were intended to support multiple resource agency management objectives that prioritized restoration of walleye spawning and incubation as the top priority, fish movement, restoration of benthic invertebrate and forage fish production, riparian and wetland production, aesthetics, safety, and water quality. In reaches where little improvement could be made the flow volumes were kept minimal. In reaches where significant benefits were expected, larger volumes and/or longer periods of seasonal flows were established. The reaches were each characterized and evaluated for aquatic habitat including metrics such as wetted area, water depth, velocity, substrate, and cover. Site-specific walleye spawning studies conducted as part of relicensing also informed the current minimum flows incorporated into the Settlement Agreement²⁶ which stated that the Delphi study goal was *"to develop a comprehensive, biologically-based flow recommendation that incorporates and balances all relevant flow-related environmental values for each bypass each."*

According to the Settlement Agreement, the agency management goal was to recreate a complete riverine ecosystem within that bypass reach and also at Hannawa (0.5 miles), and Sugar Island (1.0 miles) thus the minimum flows at these development are higher than at other developments and flows vary seasonally to follow natural hydrological trends while balancing resource needs and habitat variability within the reaches. Sugar Island's minimum bypass flow is the highest of all developments due to its numerous braided channels, bars, and islands. Minimum instream flows are not required in the bypass reach at Higley although fish bypass flows are required, and Raymondville has a base flow requirement.

At the Higley development, a 20-CFS year-round minimum flow is released through the stop log section of the dam to facilitate downstream fish passage.

At the Colton development, the intake structure was rehabilitated 1998. A butterfly flap gate located immediately adjacent to the pipeline intake serves as a trash sluice. This gate empties to a short channel which merges with the bypass reach and is retrofitted to serve as the primary downstream fish movement point. Additionally, a plunge pool has been provided. EBH passes at least 20 CFS of minimum flow through

²³ HOP 202 is a separate operating procedure that EBH has developed for use at all of the hydro sites.

²⁴ For example, if the impoundment fluctuation is 1.0 foot, and the instream flow is 45 CFS, the gate setting to provide 45 CFS shall be based upon a drawdown of 0.5 feet.

²⁵ <https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=9033977>

²⁶ <https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=8157082>



this gate. Other gates provide any remainder of the minimum flow. EBH is not required to provide safe fish movement and/or downstream plunge pools at these gates.

The 3-mile-long Colton bypass reach is the longest and one of the most complex bypass reaches on the Raquette River. The management goal is to recreate a complete riverine ecosystem within the bypass reach. A minimum flow of 110 CFS (100-120 CFS) is released from November 1 to the start of walleye spawning season²⁷ and 200 CFS (180-220 CFS) is released throughout the walleye spawning season. If spring spillage is occurring, the 200 CFS is increased to 240 CFS (216-264 CFS). From the end of the walleye spawning season through June 30, the minimum flow is set to 200 CFS (180-220 CFS), drops to 125 CFS (113-138 CFS) from July 1 to August 15, drops further to 90 CFS (81-99 CFS) from August 16 to September 15, and increases to 125 CFS (113-138 CFS) from September 16 through October 31.

For the Hannawa Development, flow levels reflect variations over the course of the year and are intended to follow natural hydrologic trends. At the Hannawa development, minimum flow is released through a stop log section of the dam. A minimum flow of 50 CFS (48-52 CFS) is released from October 31 to the start of walleye spawning season. The release is increased to 90 CFS (87-93 CFS) from the start of the walleye spawning season through June 30. The minimum flow is then lowered to 65 CFS (63-67 CFS) from July 1 to October 31.

For the Sugar Island Development, the bypass reach is characterized by numerous braided channels, bars, islands, and rock gardens. The primary objective is to recreate a complete riverine ecosystem within the bypass reach. A year-round minimum flow of 300 CFS (282-318 CFS) is released from the minimum flow pipe. From the start of the walleye spawning season through June 30, an additional 100 CFS (94-106 CFS) is passed through an instream flow release structure that empties into a plunge pool of adequate depth for fish.

Minimum flows may be curtailed or suspended if required by operating emergencies beyond the control of EBH or for short periods upon mutual agreement between EBH and NYSDEC. If the limitations are so modified, EBH notifies FERC as soon as possible, but no later than ten business days after each such incident.

III. Base Flow

No base flow requirements are defined for the MRRP.

IV. Whitewater Flow

To track changing conditions that may affect river flows and management objectives, the Raquette River Advisory Council (RRAC) was created as part of the 2002 FERC license. Current participants include NYSDEC, TUNY, NYSCC, St. Lawrence County and EBH. The NYSDEC chairs the RRAC.

Whitewater activities at MRRP are managed by a Whitewater Subcommittee (WS) of the RRAC. The WS is charged with the responsibility of developing an annual whitewater release schedule. At a minimum, the

²⁷ The walleye spawning season at all of the MRRP developments is based on water temperature readings taken in the vicinity of the tailrace of the South Colton development, which is a development within the URRP. Walleye spawning season starts when water temperature reaches 4 degrees Celsius (39.2 degrees F) for four consecutive days after March 15 of each year and ends 30 days after water temperature has reached 10 degrees Celsius (50 degrees F) for four consecutive days.



WS consists of EBH, NYSDEC, AMC and representatives of local boater interests and local government. Any member of the RRAC may elect to participate on the WS each year or only during specific years.

The WS meets no later than February 1st each year to determine how to schedule and allocate the whitewater budget for the Colton, Hannawa and Sugar Island developments. EBH provides a report of the WS's release schedule for the upcoming whitewater season to the RRAC by March 1st. This report contains the release schedule for the upcoming season, a summary of energy losses associated with the release schedule, a summary of the previous year's use records, and rationale for the release schedule and any changes in ramping flow rates.

The whitewater season runs from July 1 through September 30. The peak whitewater flows are 1250 CFS at Colton, 800 CFS at Hannawa and 1,500 CFS at Sugar Island. Ramping flows are an hourly doubling of the minimum flows when ascending to the peak flow, and an hourly halving when descending.

An associated maximum seasonal energy loss total is also part of the whitewater budget. Every five years since 2005, this maximum seasonal energy loss total is reviewed by the WS. Upon mutual agreement, the 800-MWh whitewater budget may be increased up to a maximum of 1,080 MWh (six full days of release at Colton, Hannawa, and Sugar Island). Conversely, the whitewater budget may also be decreased to a minimum of 400 MWh (three full days at Colton). The rationale for any changes in the whitewater budget must be included in the WS's annual report submitted to the RRAC for that year.

Whitewater releases may be curtailed or suspended if required by operating emergencies beyond the control of EBH, including security, and for short periods upon mutual agreement between EBH and NYSDEC. If the limitations are so modified, EBH notifies FERC as soon as possible, but no later than ten business days after each such incident.

V. Criterion-Flows Summary

The MRRP's hydropower operations create a stable impoundment environment. However, during the prior LIHI term, from 2009 through 2014, a total of ten impoundment deviations occurred. FERC determined five of the deviations as events caused by unusual circumstances beyond the control of EBH personnel and that the proposed measures to avoid similar occurrences were appropriate. Four of the remaining deviations were caused by deficient SCADA program logic and operator error and were deemed violations of the license by FERC. No FERC response was found in the docket for EBH's December 9, 2013 notification of a deviation at Colton²⁸. A report of the deviation was submitted to FERC separately using CEII (privileged status), therefore details of this event are unknown.

The current LIHI Certification for the MRRP, effective July 9, 2014, required EBH to satisfy two conditions. The second condition dealt with notification of any future operational deviations. Condition 1 required EBH to develop a draft Deviation Reduction Plan (DRP) and submit it to LIHI no later than three months after LIHI certification of the MRRP. The DRP was to provide proactive operational control approaches for dam releases and pond level maintenance designed to reduce the likelihood of operational deviations occurring in the future. The DRP was to address the specific problems and potential recommendations identified in the January 6, 2015 Reviewer's Report. Options to be considered included audible alarms in control centers and programmable logic controllers. The DRP was to describe options

²⁸ <https://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=13421253>



considered, those selected, and a schedule for implementation. The final DRP was to be completed and agreed to by both EBH and LIHI no later the six months after LIHI certification.

In response to condition 1, EBH developed a procedure to mitigate future flow and pond level deviations. The System Operator at the NASCC developed a procedure for 3-way communication that EBH states helps ensure there is clear direction of actions to be taken and who will take those actions. Although all of the recommended topics in the DRP were not specifically addressed, LIHI staff accepted this revised procedure as satisfying condition 1.

The current recertification application states that the new 3-way communication procedure has resulted in FERC not documenting any license violations since 2014. The 3-way communication procedure has significantly reduced deviation occurrences from ten during the prior LIHI certification to just two unplanned deviations since July 9, 2014.

I recommend that EBH continue to provide annual reports to LIHI documenting all operational deviations that occurred throughout the year whether unintentional or planned. The report will be due at the same time as the annual compliance statement.

Based on the information provided, and the reduction in the number of deviations, the MRRP complies with resource agency conditions and recommendations issued related to flow conditions and impoundment fluctuation generally, and therefore the MRRP continues to satisfy the flows criterion.

B. LIHI Criterion-Water Quality

The goal of this criterion is to ensure water quality is protected in water bodies directly affected by facility operations, including downstream reaches, bypassed reaches, and impoundments above dams and diversions.

The Applicant states that the MRRP satisfies the LIHI water quality criterion in all ZOE's by meeting alternative standard B-2.

The 2016 State of New York 303(d) List of Impaired Waters²⁹ does not identify the waters in the MRRP area as being impaired. NYSDEC classifies the Project area based on their designated best use. Water classifications for the Project include:

- Class B - Coldwater fishery. Best use is primary contact recreation and other uses except as a source of water supply for drinking and culinary or food processing purposes;
- Class C (T) - Coldwater fishery that supports trout. Best use is fishing and all other uses except as a source of water supply for drinking, culinary or food processing purposes and primary contact recreation, and;
- Class D - Warm water fishery. Best use is secondary contact recreation.

NYSDEC issued the original WQC for the Raquette River on June 11, 1998, and issued a revised WQC on October 13, 2006³⁰. The revised WQC was issued in response to EBH's July 3, 2006 application to amend the downstream LRRP Project license to increase the authorized capacity of the LRRP and change operation

²⁹ https://www.dec.ny.gov/docs/water_pdf/303dListfinal2016.pdf

³⁰ October 13, 2006 WQC - <http://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=11162942>



at all four LRRP developments from the existing store and release mode of operation to a ROR mode of operation.

Since the WQC was issued more than ten years ago, EBH requested that NYSDEC to reconfirm the legitimacy of the WQC in a letter or email statement. In an email dated August 14, 2019, NYSDEC stated that the 2006 WQC is still valid with regard to the operation of the MRRP (See Appendix A, page A-1).

There are no other agency recommendations or compliance activities related to water quality.

Throughout the prior LIHI Certification period, no new areas of concern have occurred. Given the NYSDEC confirmation and lack of impaired waters, the Project does not appear to adversely impact water quality. Therefore, the MRRP continues to satisfy the water quality criterion.

C. LIHI Criterion-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 project facilities.

The Applicant states that the MRRP satisfies the LIHI upstream fish passage criterion in all ZOE's by meeting alternative standard C-1.

There are no anadromous species present and no upstream fish passage requirements were part of the 2002 FERC license. However, Article 403 of the license reserves FERC's authority to require EBH to construct, operate, and maintain fishways as the USDOJ may prescribe.

As part of the 2006 Amended License for the downstream LRRP Project, EBH was required to install upstream eel passage at all four developments of the LRRP Project and Yaleville Project (P-9222). On March 3, 2008, FERC issued approval of the Eel Passage Plan (EPP)³¹ and implementation schedule filed by EBH on December 17, 2007³². Upstream eel passage is installed at LRRP and Yaleville. To date, no resource agencies have requested upstream eel passage for the MRRP developments. The 2006 LRRP amendment application included a letter from FWS noting that the natural barrier to upstream eel passage was likely at the Hannawa development of this MRRP Project³³ located at RM 39. FWS stated that installing upstream eel passage at the LRRP and Yaleville Projects would open 11 miles of habitat to eels from Raymondville at RM 20 to the Unionville Project at RM 31. As noted in Section 2, there are four dams in the 7 miles between the LRRP's Norwood development at RM 28 and MRRP's Sugar Island development at RM 38, and to date FWS has not requested upstream eel passage at any of those dams. Throughout the prior LIHI Certification period, the MRRP has not needed to provide upstream fish passage. No new issues have arisen. The MRRP will install upstream eel passage when required; and therefore, the Project continues to satisfy the upstream fish passage criterion.

D. LIHI Criterion-Downstream Fish Passage

The 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

³¹ <https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=11600045>

³² <https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=11566062>

³³ <https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=11078485>



affected by facility operations. All migratory species can successfully complete their life cycles and maintain healthy, sustainable populations in areas affected by the facility.

The application states that the MRRP satisfies the LIHI downstream fish passage criterion in all impoundment and bypass ZOE's by meeting alternative standard D-2 and satisfies the LIHI downstream fish passage criterion in all downstream ZOE's by meeting alternative standard D-1.

As defined in the 2002 FERC license, EBH provides for safe downstream fish movement and protection at all of the MRRP developments coincident with the release of minimum flows and modifications to the structures and streambed in order to make the flows more "fish friendly"³⁴.

Passage flows are generally of sufficient volume to serve as attractant flows to help guide fish to the release structure. Each site has been specifically examined to determine the most feasible fish movement route. Factors considered were proximity to the trashracks, use of existing facilities, adequate plunge pools and conveyance to downriver areas. The locations have been chosen to maximize the attraction flow and the ability of the fish to locate the movement route while minimally disrupting Project operations. EBH has reduced the roughness of the spillway surfaces, implemented measures to reduce dispersion of the minimum release over the spillways, and has ensured the release structure empties into pools of adequate depth.

For the MRRP developments, with the exception of Sugar Island, 1-inch clear spacing physical barriers were to be installed by the end of 2011. The Sugar Islands development's trashracks were not replaced since the much larger instream flow through a special release structure that empties into a pool of adequate depth for fish satisfies the need for safe downstream fish passage. FERC determined that the average approach velocities, as measured 1 foot in front of the trashracks, were generally less than 2 feet per second (FPS), and the installation of the 1-inch trashracks would not cause any adverse effects on fisheries resources if EBH routinely removed debris from the trashracks.

At Higley in 2003 and at Hannawa Falls in 2013, 1-inch clear spacing physical barriers were installed above the existing trashrack structures. The new installation of 1-inch trashracks at Colton was completed on November 6, 2014.

The primary route for downstream fish passage at:

- Higley is 20 CFS via a stop log section located between intake canal and the spillway;
- Colton is at least 20 CFS via a rehabilitated trash sluice structure;
- Hannawa is 50 CFS via an instream flow release structure, and;
- Sugar Island is 300 CFS via instream flow release structure.

There are no barriers to downstream fish passage in the downstream ZOE's. Once fish pass the dams into the bypass reaches, the fish do not have any further impediments to passage downstream.

Downstream fish passage may be curtailed or suspended if required by operating emergencies beyond the control of EBH, including security, and for short periods upon mutual agreement between EBH and NYSDEC. If the limitations are so modified, EBH will notify FERC as soon as possible, but no later than ten business days after each such incident.

³⁴ Fish-friendly flow is a flow that is released in a manner that is not expected to injure fish through contact with hard or rough surfaces



For construction and maintenance activities that require curtailment of downstream fish passage, EBH's operating procedure (HOP 202) requires notification to NYSDEC.

Throughout the prior LIHI Certification period, the Project has provided protective downstream passage and no new issues have arisen; therefore, the MRRP continues to satisfy the downstream fish passage and protection criterion.

E. LIHI Criterion-Shoreline and Watershed Protection

The shoreline and 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 Applicant states the LIHI shoreline and watershed protection criterion in all impoundment ZOE's is satisfied by meeting alternative standard E-2, and in all bypass and downstream ZOE's by meeting alternative standard E-1.

The license did not require the development of any Shoreline Management Plan, the requirement of a buffer zone, or allocation of shoreline management funds. However, the RRPSO, the WQC and the SMP³⁵ limit fluctuations within the impoundments at the four developments that in turn helps to reduce erosion along the impoundment shorelines.

The overbank areas of the Middle Raquette River located between the MRRP developments is comprised of natural lands of non-significant ecological value³⁶. Land around MRRP is largely rural, forested and the area that is dependent on forestry, some agriculture, wood products, and tourism. Historically, the river has been developed for water power for sawmills, paper mills, tanneries, and other industry.

During the current LIHI certification period, no new issues have arisen pertaining to shoreline and watershed protection. Given the small footprint of the Project boundary, and lack of potential impacts to the shoreline, the MRRP continues to satisfy the shoreline and watershed protection criterion.

F. LIHI Criterion-Threatened and Endangered Species

The threatened and endangered species protection criterion is designed to ensure that the facility does not negatively impact state or federally-listed threatened or endangered species.

The Applicant states the LIHI Threatened and Endangered Species criterion in all ZOE's is satisfied by meeting alternative standard F-2.

The yellow lampmussel exists in the vicinity of the MRRP and is not listed but considered a species of concern/interest by USFWS and NYSDEC. EBH surveyed reaches of the river for yellow lampmussel and found that populations were larger than previously known. The final EA concluded that no further studies were required. The FWS and NYSDEC did not provide any comments on the final EA conclusions.

³⁵ <https://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=11841490>

³⁶National Land Cover Database 2016 - <https://www.mrlc.gov/tools>



The FERC EA noted that two species have been documented in the vicinity of the MRRP: the common loon (an unlisted but protected wildlife/special concern species), and the spruce grouse, a state endangered species with a recovery plan in place³⁷. According to the recovery plan, the Project area is located in the southern-most range of the species which is found in isolated populations in lowland coniferous forests which are “inherently patchy” and occur within a matrix of deciduous and mixed hardwood conifer forests.

A U.S. Fish and Wildlife Information for Planning and Conservation Trust Resources Report (IPCTRR) was generated April 6, 2019 for the MRRP area (Appendix A, page A-2). The Report identified one threatened species, the Northern long-eared bat (*Myotis septentrionalis*), and nine migratory birds protected by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act that could be present in the Project vicinity.

Birds listed as Birds of Conservation Concern:

- Bald Eagle (*Haliaeetus leucocephalus*);
- Black-billed Cuckoo (*Coccyzus erythrophthalmus*);
- Bobolink (*Dolichonyx oryzivorus*);
- Cape May Warbler (*Setophaga tigrina*);
- Eastern Whip-poorwill (*Antrostomus vociferous*);
- Evening Grosbeak (*Coccothraustes vespertinus*);
- Golden-winged Warbler (*Vermivora chrysoptera*);
- Rusty Blackbird (*Euphagus carolinus*), and;
- Wood Thrush (*Hylocichla mustelina*).

The only year-round bird found in the MRRP area is the bald eagle. All the other eight species would be found exclusively during breeding season.

The bald eagle is a state-endangered species listed under the protection of the New York Endangered Species Law³⁸. The Northern long-eared bat is also state-listed as threatened. No critical habitat for the species has been designated.

During the current LIHI certification period, no new issues have arisen pertaining to threatened and endangered species. It is unlikely that Project operations or related activities would adversely affect any of these species even if any are present; therefore, the MRRP continues to satisfy the threatened and endangered species protection criterion.

G. LIHI Criterion-Cultural Resource Protection

The cultural and historic resource protection criterion is designed to ensure that the facility does not unnecessarily impact cultural and historic resources associated with the facility’s lands and waters, including resources important to local indigenous populations.

The Applicant states the LIHI cultural and historic resources criterion in all ZOE is satisfied by meeting alternative standard G-2.

On February 6, 2002, EBH signed a fully revised Programmatic Agreement (PA) with FERC, the Advisory Council on Historic Preservation (ACHP), and the New York State Historic Preservation Officer (SHPO) for the four FERC licenses on the Raquette River, with the St. Regis Tribe and the USDOJ as concurring

³⁷ https://www.dec.ny.gov/docs/wildlife_pdf/sprucegrouserrecplan2013.pdf

³⁸ <https://www.dec.ny.gov/animals/7494.html>



parties. On February 11, 2002, the ACHP filed with FERC the executed agreement that amended the previous 1996 PA.

There is one identified archaeological site associated with the Project, the foundation of an early tanning factory located downstream of the Colton dam between the bypass reach and a hiking trail. An interpretive sign describes importance of the tannery to the local economy when it operated between 1856 and 1898. EBH's predecessor conducted surveys of the Project in 1991 at which time the SHPO concluded that the Higley plant, built in 1911 met the criteria for listing on the National Register of Historic Places based on its example of operations of a small hydro facility during the period of development of electrical engineering.

On April 14, 2003, Erie submitted its required Historic Property Management Plan³⁹ (HPMP) to FERC. On September 28, 2004, FERC issued an order approving the HPMP⁴⁰. The HPMP requires EBH to file an annual report. EBH has successfully complied with this requirement. The latest 2018 filing occurred on February 1, 2019⁴¹.

Throughout the prior LIHI Certification period, the MRRP has complied with all requirements related to cultural resource protection, mitigation or enhancement included in the FERC license and no new areas of concern have arisen. Therefore, the MRRP continues to satisfy the cultural and historic resources protection criterion.

H. LIHI Criterion-Recreation

The goal of this criterion is to ensure that 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 application states that the MRRP satisfies the LIHI recreation criterion in all ZOE's by meeting alternative standard H-2. License Article 404 required EBH to develop a Recreation Plan (RP), in consultation with the Raquette River Advisory Committee (RRAC), which included measures to implement new recreational facilities at the MRRP developments. On April 11, 2003, EBH submitted their final RP⁴². The RP was modified and approved by FERC on November 17, 2004⁴³.

Facilities provided within MRRP include:

- At Higley: a canoe portage;
- At Colton: a canoe portage, whitewater access and car-top boat launch with overnight parking;
- At Hannawa Falls: a canoe portage, scenic overlook and picnic facilities, Red Sandstone trail – (southern end), whitewater access and roadside parking;
- At Sugar Island: a canoe portage, day use area, Red Sandstone trail – (northern end) and Clear Pond Wild Forest trail;

³⁹ <http://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=10473424>

⁴⁰ <http://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=10255973>

⁴¹ <https://elibrary.ferc.gov/idmws/common/OpenNat.asp?fileID=15153594>

⁴² (CEI privileged document)- <https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=10485845>

⁴³ <https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=10295185>



All recreation facility improvements were completed according to schedule in a timely manner, in consultation with parties to the RRPSO. All facilities have both access to the reservoirs and downstream reaches free of charge. The RRAC can advise EBH on issues related to recreation, and other resource enhancements. Additionally, the MRRP provides whitewater releases at the Colton, Hannawa and Sugar Island developments. Details can be found in section 7.A.IV. The most recent FERC environmental inspection conducted on July 26, 2017⁴⁴, found minor items related to signage needing replacement and the addition of two picnic tables at Higley. EBH submitted documentation of completion of those items on September 21, 2017⁴⁵.

Throughout the current LIHI certification period, the MRRP has complied with all requirements related to recreation and no significant areas of concern were found, therefore, the MRRP continues to satisfy the recreational criterion.

8. RECOMMENDATION

The application for LIHI recertification was adequate to allow for LIHI review which also included a review of FERC docket documents, the RRPSO and discussions with EBH. No material change in circumstances has occurred since the last recertification of the MRRP.

Based on my review of the available information, I recommend that the Middle Raquette River Project be recertified for a term of five years with the following condition:

1. The Facility Owner shall continue to provide annual reports to LIHI in annual compliance submittals that document operational deviations that occurred throughout the year whether unintentional or planned. The report will be due at the same time as the annual compliance statement.

Gary M. Franc



FRANC LOGIC

Licensing & Compliance

Hydropower Consulting & Modeling

⁴⁴ <https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=14665269>

⁴⁵ <https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=14687840>



FRANC LOGIC

October 2019

APPENDIX A
DOCUMENTS



From: Hogan, Chris M (DEC) <chris.hogan@dec.ny.gov>

Sent: Wednesday, August 14, 2019 2:01 PM

To: Zehr, Jason <Jason.Zehr@brookfieldrenewable.com>

Cc: VanMaaren, Chris C (DEC) <chris.vanmaaren@dec.ny.gov>

Subject: Brookfield WQCs

CAUTION: This email originated from outside of the organization. Do not click on links or open attachments unless you recognize content is safe. Please report suspicious emails [here](#)

ATTENTION: Ce courriel provient d'une source externe, ne cliquez pas sur les liens et n'ouvrez pas les pièces jointes, à moins que vous en reconnaissiez la source. Veuillez nous aviser [ici](#) de tout courriel suspect.

Jason – Chris VanMaaren forwarded me your email requesting that the NYSDEC confirm that the Section 401 Water Quality Certificates (WQC) for the Brookfield Renewable facilities listed below are still in effect.

Lower Raquette River (P-2330) – WQC effective date of October 2006

Middle Raquette River (P-2320) – WQC effective date of October 2006

School Street (P-2539) – WQC effective date of October 2006

Hoosic River (P-2616) – WQC effective date of September 2002

This email serves to confirm that the WQCs for the above reference facilities were issued to expire concurrent with the FERC license. As such, all of the NYSDEC WQCs are valid and in full effect for these facilities.

If you need anything further from the NYSDEC please contact me.

Christopher M. Hogan

Chief, Major Project Management Unit

Department of Environmental Conservation

Division of Environmental Permits

625 Broadway, 4th Floor

Albany, NY 12233-1750

(518) 402-9151

chris.hogan@dec.ny.gov



APPENDIX D THREATENED AND ENDANGERED SPECIES IPaC REPORT

406279

IPaC: Ecology Location

U.S. Fish & Wildlife Service

IPaC

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as trust resources) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS offices with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NMW Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

St. Lawrence County, New York



<https://tools.fws.gov/ipac/location/USFWS/00444444/USFWSResources/ingrassia/00444444>

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406279

IPaC: Ecology Location

Local office

New York Ecological Services Field Office

☎ 180.771.7534-0334
📠 180.771.7534-0399

3817 Luker Road
Corland, NY 13045-6385

<https://www.fws.gov/northeast/ny/office/section7.htm>

<https://tools.fws.gov/ipac/location/USFWS/00444444/USFWSResources/ingrassia/00444444>

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Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species' range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act requires Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can only be obtained by requesting an official species list from either the Regulatory Review section in RUC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species¹ and their critical habitats are managed by the [Ecological Services Program](#) of the U.S. Fish and Wildlife Service (USFWS) and the fisheries divisions of the National Oceanic and Atmospheric Administration (NOAA Fisheries).

Species and critical habitats under the sole responsibility of NOAA Fisheries are not shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

<https://doi.org/10.1093/nar/gkx867>

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1. Species listed under the [Endangered Species Act](#) are threatened or endangered. IAP also shows species that are candidates, or proposed, for listing. See the [listing status page](#) for more information.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
Northern Long-eared Bat: <i>Myotis septentrionalis</i> No critical habitat has been designated for this species. https://www.fws.gov/wetlands/petrels/5045	Threatened

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act¹ and the Bald and Golden Eagle Protection Act.²

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

1. The Migratory Bird Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

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Additional information can be found using the following links:	
<ul style="list-style-type: none">Birds of Conservation Concern http://www.fws.gov/land/management/management-species/birds-of-conservation-concern.phpMeasures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.phpNationwide conservation measures for birds http://www.fws.gov/migratorybirds/conservation/conservation-measures.pdf	
<p>The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birds and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.</p> <p>For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.</p>	
NAME:	BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES IN WHICH THE BIRD BREEDS ELSEWHERE IN THE RANGE. "BREEDS ELSEWHERE" INDICATES THAT THE BIRD DOES NOT LIKELY BREED IN YOUR PROJECT AREA.)
http://www.fws.gov/land/management/management-species/birds-of-conservation-concern.php	#105
NOT FOR CONSULTATION	
NAME:	BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES IN WHICH THE BIRD BREEDS ELSEWHERE IN THE RANGE. "BREEDS ELSEWHERE" INDICATES THAT THE BIRD DOES NOT LIKELY BREED IN YOUR PROJECT AREA.)
http://www.fws.gov/land/management/management-species/birds-of-conservation-concern.php	
NOT FOR CONSULTATION	
Bald Eagle <i>Haliaeetus leucocephalus</i> This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. http://www.fws.gov/land/management/management-species/birds-of-conservation-concern.php	Breeds Dec 1 to Aug 31
Black-billed Cuckoo <i>Coccyzus erythrophthalmus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. http://www.fws.gov/land/management/management-species/birds-of-conservation-concern.php	Breeds May 15 to Oct 10
Bobolink <i>Dolichonyx oryzivorus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 20 to Jul 31
Cape May Warbler <i>Setophaga tyrina</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Jun 1 to Jul 31
Eastern Whip-poor-will <i>Antrostomus vociferans</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 1 to Aug 20
Evening Grosbeak <i>Coccothraustes vespertina</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 15 to Aug 10
Golden-winged Warbler <i>Geothlypis trichas</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. http://www.fws.gov/land/management/management-species/birds-of-conservation-concern.php	Breeds May 1 to Jul 20
http://www.fws.gov/land/management/management-species/birds-of-conservation-concern.php	
NOT FOR CONSULTATION	



Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (%)

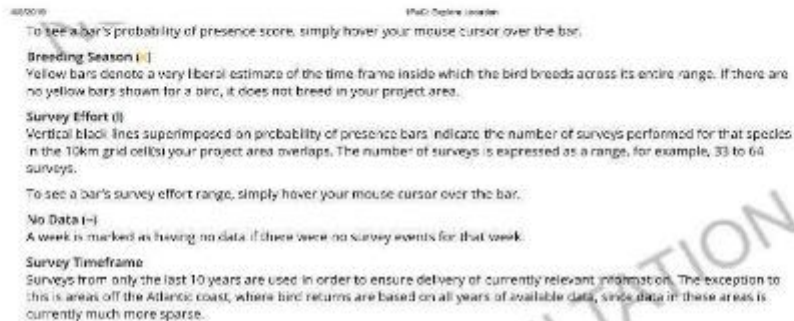
Each green bar represents the bird's relative probability of presence in the 10km grid cells your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence on each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks, for example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is $0.25/0.25 = 1$; at week 20 it is $0.05/0.25 = 0.2$.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

<https://doi.org/10.1016/j.joule.2020.102654>

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DOI:10.1002/for.1240

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Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

<https://www.franclogic.com/franclogic/migratory-birds>

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What does IPaC use to generate the migratory birds potentially occurring in my specified location?
The Migratory Bird Resource List is comprised of USFWS [Birds of Conservation Concern \(BCC\)](#) and other species that may warrant special attention in your project location.
The migratory bird list generated for your project is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#) and is queried and filtered to return a list of those birds reported to occur in the 100m grid cells which your project intersects, and that have been identified as warranting special attention or potential impact to development. In some cases, additional requirements may apply to a species that has a particular vulnerability to a specific activity or development.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the [Avian Knowledge Network \(AKN\)](#). This data is derived from a growing collection of [survey, banding, and citizen science datasets](#).
Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go to the [Probability of Presence Summary](#) and then click on the "Tell me about these graphs" link.

Again, the Migratory Bird Resource List includes only a subset of birds that may occur in your project area, is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the [Franc Logic Data Tool](#).

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's migratory project area falls within (i.e., breeding, wintering, migrating or year-round), you may refer to the following resources: [The Cornell Lab of Ornithology Neotropical Birds Guide](#), or [the Birds of North America](#). If you are unsuccessful in locating the bird of interest, then the Cornell Lab of Ornithology Neotropical Birds Guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

The Migratory Bird Resource List is comprised of USFWS [Birds of Conservation Concern \(BCC\)](#) and other species that may warrant special attention in your project location.
The migratory bird list generated for your project is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#) and is queried and filtered to return a list of those birds reported to occur in the 100m grid cells which your project intersects, and that have been identified as warranting special attention or potential impact to development. In some cases, additional requirements may apply to a species that has a particular vulnerability to a specific activity or development.

<https://www.franclogic.com/franclogic/migratory-birds>

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Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. BCC Range-wide birds are [Birds of Conservation Concern](#) (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands).
2. BCC - RCR birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA, and
3. Non BCC - Vulnerable birds are not BCC species in your project area, but appear on your list either because of the [Eagle Act](#) requirements (for eagles) or (for non-eagles) potential susceptibility in offshore areas from certain types of development or activities (e.g., offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of range-wide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the RAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area of the Atlantic Coast, please visit the [Northwest Ocean Data Portal](#). The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternatively, you may download the bird model results files underlying the portal maps through the [NOAA-NEOS Integrated Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf](#) project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the [Drum Head Study](#) and the [tagging studies](#) or contact [Caleb Spiegel](#) or [Ryan Loring](#).

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to [obtain a permit](#) to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area; only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the RAQ "What does IPaC use to generate the migratory bird list?" and "What other birds may be in my project area?". Please be aware this report provides the "probability of presence" of birds within the 1/4 mile grid cells that overlap your project, not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is

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not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the RAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the [National Wildlife Refuge](#) system must undergo a 'Consultation Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

Wetlands in the National Wetlands Inventory

Impacts to [Wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information, please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

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