

# Memorandum

**To:** Michael Sale, Senior Technical Advisor, LIHI  
**From:** Jeffrey Cueto, P.E.  
**Date:** July 24, 2017  
**Re:** Holyoke Hydroelectric Project – LIHI Certificate #89  
Recertification Request

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This memorandum contains the results of my review of the recertification request for the Holyoke Hydroelectric System, located in Holyoke and South Hadley, Massachusetts on the Connecticut River at River Mile 87 and comprised of the Hadley Falls Station, sited at the dam, and fourteen facilities in the three-tiered canal system<sup>1</sup>. The facilities are owned and operated by a municipal utility, the City of Holyoke Gas and Electric Department (HG&E). The Holyoke Hydroelectric System facilities are operated under nine federal licenses. Hadley Falls Station and six of the canal facilities are under a single license as Project No. 2004, issued in 1999<sup>2</sup> to a former owner. There is one other independently owned and operated small hydropower facility located inside the Holyoke canal system, the Open Square Project (LIHI #86); Open Square is currently being recertified by LIHI. LIHI publicly noticed the application for recertification of the Holyoke facilities on April 21, 2017, with comments due by June 21, 2017. No comments were filed in response to this formal notice.

The Project was originally certified on July 26, 2012 for a five-year term extending from January 1, 2012 through January 1, 2017.<sup>3</sup> Certification was subject to two special conditions related to fish passage and recreation as discussed below. The certification term has been extended to accommodate the recertification application review; the present termination date is August 31, 2017.

## **I. Recertification Review Standards.**

In 2016, LIHI began reviewing new applications, both initial applications and recertification applications, under a revised set of criteria and an updated process, all outlined in the Low Impact Certification Program 2<sup>nd</sup> Edition Handbook (March 7,

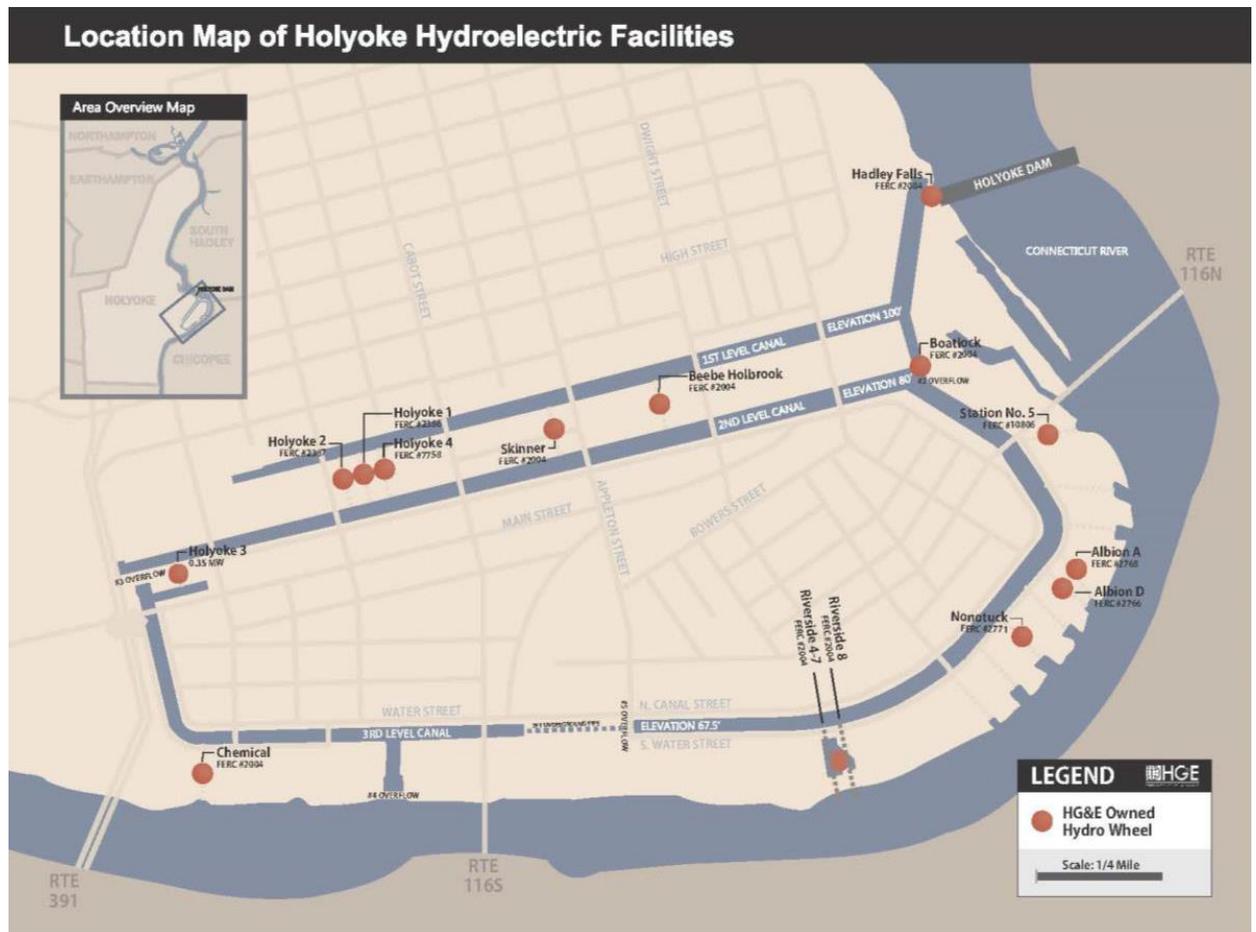
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<sup>1</sup> The Gill Mill, Mt. Tom Mill, and Crocker Mill facilities in the canal system were retired subsequent to the completion of the original certification review in 2012.

<sup>2</sup> Based on a comprehensive settlement agreement, the federal license was amended in 2005. It expires August 31, 2039.

<sup>3</sup> The reviewer report from 2012 is available at <http://lowimpacthydro.org/wp-content/uploads/2012/07/HolyokeCertificationFinalReportRev26July2012.pdf> .

2016). Section 6 of the Handbook addresses the recertification process, which is comprised of two stages. Under Stage I, LIHI can expeditiously recertify a project if it has a complete application and finds that there is neither a material change in the criteria or process or a material change in the facility that may affect conformance with the criteria. If a material change determination is made, then the application moves to Stage II for a full review under the criteria. Since the Project has not previously been subject to review under the new Handbook criteria and because that fact alone constitutes a



*Figure 1. Layout of System facilities.*

material change, the application is subject to a Stage II full review under the revised criteria. The scope of review as described in the Handbook is:

The Stage II recertification review involves a complete review of the application package, a search of public records associated with the facility, and all other necessary inquiries (e.g., to resource agencies and local non-governmental organizations) to resolve factual disputes, evaluate the veracity of claims, or make other inquiries as needed. The application reviewer also reviews and summarizes all public comments received.

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At the conclusion of the full, Stage II review, the application reviewer will produce a detailed reviewer's report similar to that issued for an initial certification and make a recommendation to the Executive Director as to whether LIHI's criteria are still met by the facility, in light of the material change and/or the change in LIHI's criteria or interpretation.

## **II. Summary Recommendation.**

Based on my review of the record, including the original LIHI reviewer report from 2012 and certain files contained in FERC eLibrary and entered subsequent to the last certification review, as well as consultation with several resource agencies, I recommend that the Holyoke Hydroelectric System be recertified for a period of ten years, subject to three conditions: (1) a condition to address operational changes that may be necessary depending on changes that may occur at upstream FERC-licensed facilities that are likely to be relicensed during the term of the LIHI certification extension; (2) a condition to assure that safe and effective fish passage is attained and maintained over the term of the certification; and (3) a condition to protect Atlantic sturgeon, an endangered species found in the lower Connecticut River from Holyoke Dam to the mouth.

*Issue 1:* The Turner Falls Hydroelectric Project, the Northfield Pump Storage Project, the Vernon Project, the Bellows Falls Project, and the Wilder Project, all upstream of Holyoke, are presently in the FERC relicensing process, and it reasonable to expect that there will be operational changes at one or more of these facilities that will alter the characteristics of inflow to the Holyoke impoundment. Significant changes may justify changes to the modified run-of-river operation at Holyoke and a revision of the COFP.

*Condition 1:* As related to the goals set forth in License Article 405, the Owner shall evaluate the need to revise its modified run-of-river operation and update the COFP if there is a material change to the operation of the Turner Falls and Northfield Pump Storage projects as a result of relicensing of those facilities. The Owner shall notify LIHI within 30 days of the licensing of those facilities and indicate its planned response.

*Issue 2:* Holyoke is at a critical location on the Connecticut River with respect to passage of migratory fish. It is important that the Owner continue to evaluate the effectiveness of its fish passage facilities and modify those facilities as necessary to assure safe, timely, and effective passage.

*Condition 2:* The Owner shall: 1) notify LIHI within 30 days of any communication from a resource agency or FERC that its fish passage facilities are not providing safe and effective upstream or downstream passage and include with the notification a copy of the communication and a statement as to the Owner's planned response and schedule for remedying deficiencies; and 2) provide a summary report on the status of fish passage activities over the prior year when filing the LIHI annual compliance statement (see Section 5.2.3 of the Handbook), which shall include any information

on related studies/evaluations, FERC actions, agency communications/recommendations, and any plans for design and/or construction of new or modified facilities. LIHI reserves the right to modify this certification as necessary to assure that its upstream and downstream fish passage standards are being met. This condition pertains to fish passage issues at all of the Holyoke units, including the canal units.

*Issue 3:* The river reach from Holyoke Dam to Long Island Sound is under consideration by NOAA Marine Fisheries Service for designation as Critical Habitat for Atlantic sturgeon, an endangered species. Changes in management and operation of the hydroelectric system may be necessary to protect this habitat.

*Condition 3:* The Owner shall notify LIHI within 30 days of any communication from a resource agency of a need to modify its management or operation of the hydroelectric system in order to assure protection of Atlantic sturgeon and its habitat. The notification shall include a copy of the communication and a statement as to the Owner's intended response.

HG&E requests an extended term based on "Plus" criteria for Ecological Flows and for Downstream Fish Passage and Protection. Please see pages 21 and 40-45 of HG&E's application, respectively. With respect to Flows, since 2001 HG&E has participated in efforts to control water chestnut infestation in the 16-acre Log Pond Cove upstream of the dam. With respect to downstream passage, HG&E has put an exceptional amount of effort and funds into research and design to assure that the recently constructed shortnose sturgeon passage facilities are functional. Overall, HG&E track record and cooperation with resource agencies to address fish passage at this critical location appears to be excellent and, in my view, merits the extended term. While HG&E's aquatic nuisance control initiative certainly has merit, it is not clear to me that it rises to a level of meriting bonus years given the overall scale of the hydroelectric system. That said, I do believe that the recent recreational improvements (Texon Mill Park and the fishway visitors center) do meet the plus criteria for Recreation. With two plus standards satisfied, the term would be extended from the normal five years to a term of ten years, and I make that recommendation.

It should be noted that FERC completed an environmental compliance inspection for Project No. 2004 on June 14, 2016 and found that the project was in compliance with all articles related to the LIHI criteria.

(<https://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=14336072>)

### **III. Standards Review**

#### Criterion A - Ecological Flow Regimes

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

*Review:* The Holyoke Hydroelectric System operates under the terms of a revised license issued on April 19, 2005 after a Comprehensive Settlement Agreement was reached addressing multiple issues, including flow management and threatened and endangered species protection. As part of the settlement process, the Massachusetts Department of Environmental Protection (MassDEP) revised and reissued the water quality certification on February 14, 2001 based on a review of a draft of the settlement agreement.

The LIHI recertification application recognizes four zones of effect: the impoundment, which extends 25 miles upstream; the 3,000-foot-long bypassed reach from the dam downstream to the Chemical plant tailrace; the canal system; and the downstream reach from the Chemical plant tailrace to the next major Connecticut River tributary, the Chicopee River, a distance of three miles. Holyoke Dam is the first dam on the Connecticut River and is located 86 miles upstream of Long Island Sound.

The Project No. 2004 license establishes the flow management and compliance monitoring requirements for all the zones. Under Article 406, HG&E drafted a Comprehensive Operations and Flow Plan (COFP) and a Comprehensive Canal Operations Plan (CCOP). Operating protocols are set forth in tables 3-1 (Fish Passage Season) and 3-2 (Habitat Season) of the COFP, covering how flows are dispatched between different facilities under the range of inflow conditions.

Inflows to Holyoke are highly regulated by upstream peaking operations at major projects on the mainstem Connecticut River at Turner Falls (MA), Bellows Falls (VT), and Vernon (VT), as well as the Northfield Pump Storage Project (MA), which is associated with Turner Falls. HG&E has no control over operation of those facilities.

*Impoundment and Downstream-of-Holyoke Zones.* Initially the license required the operation to convert from peaking to run-of-river, with a headpond level variation of no more than 0.4 foot below the crest of the rubber flashboard system<sup>4</sup>. A critical issue<sup>5</sup> that the operational change was to address is the existence of habitat for the Puritan tiger beetle, a federally listed threatened species, along the impoundment; however, HG&E found that it could not maintain a stable impoundment elevation at the critical habitat

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<sup>4</sup> The rubber flashboard system was installed in 2001 in order to improve control over the headpond level. The system contains several sections, a design which allows HG&E considerable operational flexibility when inflows exceed the system hydraulic capacity.

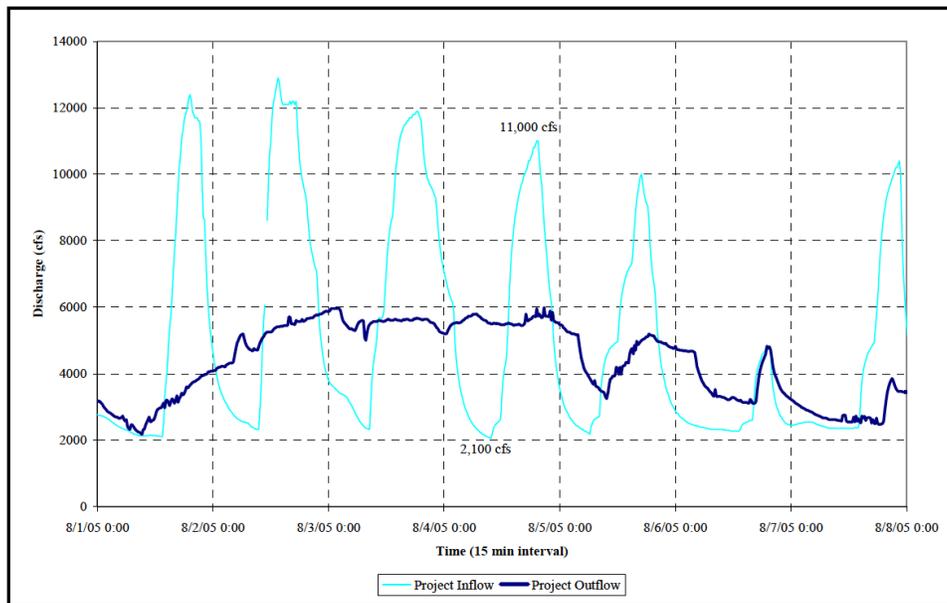
<sup>5</sup> Specifically, Article 405, as amended, set forth the following goals for a modified run-of-river operation: “(A) to more effectively limit water level fluctuations at Rainbow Beach and other habitat areas for the federally threatened and state endangered Puritan tiger beetle upstream of the Project Dam; (B) to prevent injury or significant impairment of essential behavioral patterns to the federally and state endangered shortnose sturgeon; (C) to balance the magnitude of the fluctuations in the lower and upper sections of the Impoundment; (D) to balance the impact on wetland areas adjacent to the lower and upper sections of the Impoundment; (E) to maintain the seasonally adjusted minimum flows into the bypassed reach and the canal system as stated in License Article 406; and (F) to the extent possible, reduce fluctuations in river flows downstream of the Project.”

location, which is upstream of a constricted reach of the river (the “Narrows”) about three miles upstream of the dam. The Narrows becomes a hydraulic control at inflows exceeding 11,000 cfs. An identified critical habitat location is referred to as Rainbow Beach. Consequently, HG&E developed and received approval for a modified run-of-river operation that allows drawdowns up to 1.4 feet below the crest. The modified operation is effective in attenuating the variable inflows caused primarily by the Turner Falls hydroelectric station daily peaking operation. HG&E’s current operation both results in a somewhat more stable headpond elevation upstream of the Narrows (most effective when average daily inflow is less than 7,000 cfs and peak inflow is less than 11,000 cfs) and truncates the peak flow downstream of Holyoke. The change in operation was tested for several years and the final report (*Impoundment Monitoring Under Modified Run of River Operations - 2012 Status Update: 2011 Monitoring Period Results and Cumulative Review (2002 and 2004-2011)*), July 2012) and a revised COFP filed with FERC in July 2012 when the last LIHI review was being completed. HG&E subsequently updated the COFP in 2015. While there are no specific ramping or conservation flow restrictions for the downstream flow regime, the modified run-of-river was developed using a consultative process and has the concurrence of the resource agencies<sup>6</sup>. According to HG&E (email of July 6, 2017), the operation reregulation of flows produces closer to natural flow conditions downstream than would be the case if HG&E were passing inflows. The following figure illustrates the benefit of the HG&E operation with respect to downstream flows.

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<sup>6</sup> U.S. Fish and Wildlife Service, NOAA National Marine Fisheries Service, the Massachusetts Division of Fish and Wildlife, and MassDEP, as well as the Connecticut River Watershed Council.

**TYPICAL LOWER FLOW HYDROGRAPH AT MONTAGUE  
AND HOLYOKE USGS GAGES USING AUGUST 1–8, 2005 DATA**



*Figure 2. Comparison of inflows and outflows at the Holyoke project, from Figure 3 from report *Impoundment Management Study* (March 2008). The light blue plot shows the daily-cycle inflow ranging typically from a low around 2,000 cfs to an on-peak flow of 10,000-12,000 cfs during early August 2005. HG&E’s operation (dark blue plot) moderates downstream flow effects by producing outflows maintained below 6,000 cfs.*

The Turners Falls, Vernon, Bellows Falls, and Wilder projects, all on the mainstem upstream of Holyoke, and the Northfield Pumped Storage Project, which is associated with Turner Falls, have licensing expiring in 2018. As noted in the Louis Berger Group report, *Evaluation of Modified Run-of-River Operations* (March 2012), changes to the operations of those facilities may justify a review and adjustment of HG&E’s operation in response to a different inflow patterns. The report also noted that HG&E’s operation, although benefiting from substantial experience, is hampered by the fact that the upstream operators do not make real-time operational information available to HG&E. Because these operational changes may occur during the term of the LIHI certification period, I am recommending that certification be conditioned to require updating of the COFP if inflows materially change.

*Canal Zone.* A total discharge of 550 cfs is released into the canal system as a priority. A flow of 150 cfs is for operation of the downstream fish passage louver facility, and a flow of 400 cfs is for maintenance of water quality in the canal system and for protection of aquatic biota, specifically mussels, including the state-endangered yellow lampshell mussel, as well as satisfying water rights held by hydroelectric and industrial

uses not under HG&E ownership. The louver facility begins 554 feet downstream of the gatehouse and before Level 1 of the canal system as shown in Figure 3 below. In addition to increased generation flows, up to 440 cfs additional flow is released at the gatehouse for fishway attraction flows (up to 200 cfs at the spillway entrance and up to 120 cfs at each tailrace entrance).

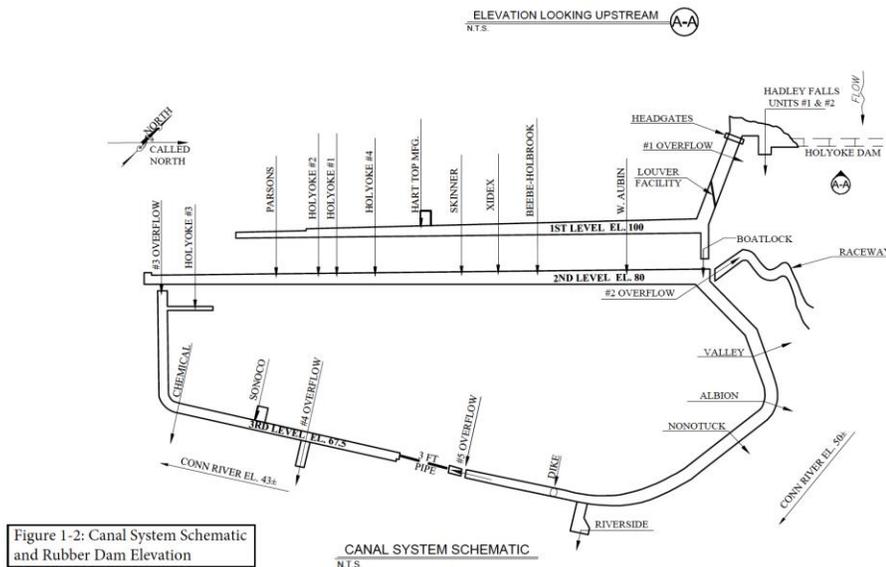


Figure 3. Canal System Layout. (*Revised Comprehensive Canal Operations Plan, 2015*)

**Bypass Zone.** The bypass reach, which consists of three channels, receives minimum flows for habitat (about 840 cfs distributed between the three channels as outlined in the Project No. 2004 water quality certification) and seasonally for zone of passage and operation of upstream fish passage (1,300 cfs). The habitat flows are based the results of a 1997 Instream Flow Incremental Study. At the time the last LIHI certification was granted, the upstream-passage fishlifts were operated from April 1 through July 14 and from September 16 through November 15. Upstream passage for shortnose sturgeon subsequently was implemented. Consequently, HG&E now releases passage flows during the intervening period as well, July 15 through November 14.

The Massachusetts water quality certification provides for reopening the issue of bypass flows after January 1, 2014 should there be an identified need. I consulted MassDEP by telephone June 30, 2017 to see if such an action had been considered. It would only be triggered by a request from the Massachusetts Division of Fish and Wildlife (MassWildlife), and there has been no request made (see appended email). Based on a conversation I had with Dr. Caleb Slater, Anadromous Fisheries Project Leader, MassWildlife, his agency is satisfied overall with the flow regime at Holyoke. He also stated with respect to inflows to Holyoke, settlement discussions for Turner Falls relicensing could result in a conversion of that facility to a run-of-river operation.

*Conclusion:* The Ecological Flow Regime Standard A-1 (*De Minimis*) is met in the impoundment zone, and A-2 (*Agency Recommendation*) and/or A-4 (*Site-Specific Studies*) is met in the other three zones based on site-specific studies, including an IFIM study for the bypassed reach and a modified run-of-river study to in part address fluctuating flows downstream caused by facilities upstream of Holyoke. This conclusion is predicated on inclusion of a condition requiring the Owner to update the COFP to assure that its operation continue to meet the goals of Article 405 to the extent practicable.

Criterion B - Water Quality

*Goal:* Water Quality is protected in waterbodies directly affected by the facility, including downstream reaches, bypassed reaches, and impoundments above dams and diversions.

*Review:* MassDEP issued a revised water quality certification on February 14, 2001 based on the provisions of a Comprehensive Settlement Agreement. While it is specifically for Project No. 2004, it also covers operation of the HG&E facilities in the canal system that are not under that license. Since the water quality certification is more than ten years old, it does not qualify as a *recent* water quality certification as defined in the new Handbook. Despite that fact, the certification is comprehensive in scope, and there is no evidence that it is outdated. In fact, MassDEP did reaffirm the applicability of the 2001 certification conditions when it certified the construction activities related to the 2015 fish passage upgrades and indicated that the 2001 certification would apply to the current relicensing of several of the canal facilities that are not part of Project No. 2004 (memorandum from MassDEP to HG&E, February 8, 2016). Consequently, I would suggest that it be considered as an Agency Recommendation for the purposes of this Standard.

The Category 5 condition of impairment remains unchanged from my last review, which was based on the *Final Massachusetts Year 2010 Integrated List of Waters*. The current EPA-approved list is 2014. The reaches of the Connecticut River upstream and downstream of the dam are considered impaired as shown in the following table.

**Table 1. 2014 303(d) listing.**

Segment ID	Description	Pollutant
MA34-04	Deerfield River confluence to Holyoke Dam. 34.4 miles.	- Escherichia coli - PCB in Fish Tissue
MA34-05	Holyoke Dam to Connecticut state line. 15.8 miles.	- Escherichia coli - PCB in Fish Tissue - Total Suspended Solids (TSS)

According to the MassDEP 2014 Integrated List of Waters Map, the upstream impaired use is fish consumption, although primary contact recreation is probably also impaired

by the bacteriological contamination. Downstream both uses are noted as impaired, as well as aesthetics (TSS impairment).

HG&E provided (Application Appendix B-1) a copy of an email from MassDEP stating that the Project No. 2004 is not a source of the listed pollutants that cause the impaired conditions. As required by the water quality certification, HG&E also monitors water quality at the project (dissolved oxygen and temperature) and annually reports the results to MassDEP. In Application Appendix B-2, HG&E provided a detailed list of compliance information for each of the conditions of the water quality certification. According to the application, the annual sampling and the status with respect to each of the certification conditions show full compliance.

*Conclusion:* The Water Quality Standard B-2 (*Agency Recommendation*) is met in all zones as the System is operating consistent with the 2001 water quality certification. Further, the System is not causing, or contributing to, the current condition of impairment.

#### Criterion C - Upstream Fish Passage

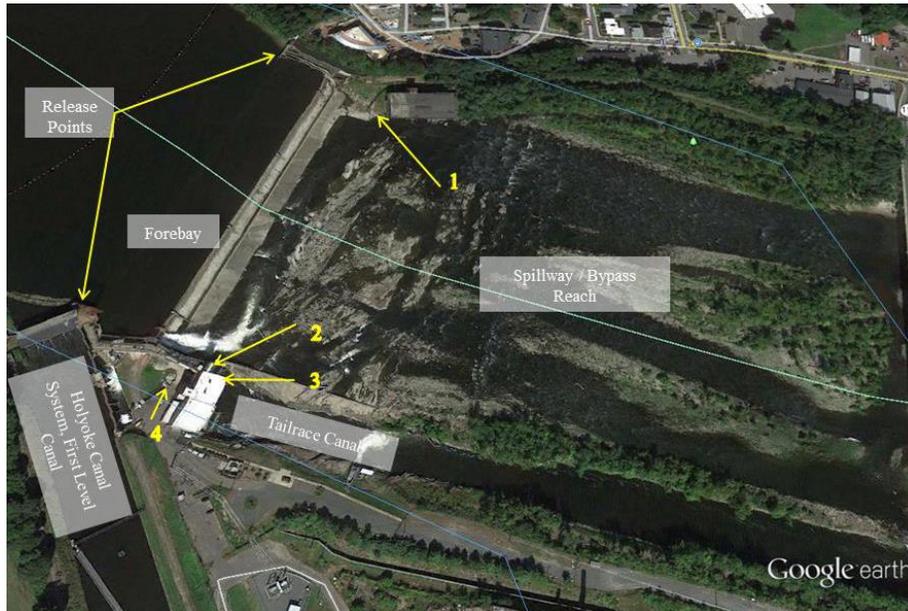
*Goal:* The facility allows for the safe, timely, and effective upstream passage of migratory fish. This criterion is intended to ensure that migratory species can successfully complete their life cycles and maintain healthy, sustainable fish and wildlife resources in areas affected by the facility.

*Review:* The extensive upstream and downstream passage measures in place at Holyoke are fully described in the 2012 reviewer report on pp. 13-14. At the time of the last review, there was an outstanding need to improve passage in order to accommodate shortnose sturgeon, a federally listed endangered species, and for American eel.

The National Marine Fisheries Service (NMFS) February 13, 2015 Biological Opinion indicates that up to 245 shortnose sturgeon attempt upstream passage at Holyoke annually but none were being passed upstream and there was no evidence of shortnose sturgeon spawning downstream of Holyoke. As approved under FERC's Order Amending License and Approving Fish Passage Facility Enhancements Pursuant to Articles 410 and 411 (March 23, 2015), HG&E completed upgrades to its passage facilities in 2015 and now monitors upstream and downstream passage of sturgeon. The work included enhancement of the existing upstream fish passage facilities by making modifications to the spillway (bypass) fishlift entrance pursuant to Article 411 and enhancement of downstream fish passage facilities through the installation of a new bar rack and associated facilities at the Hadley Falls station pursuant to Article 410. During the 2016 upstream migration, 79 sturgeon were trapped in the fishlifts, some multiple times; this is far more than historical usage. The sturgeon monitoring plan (*Study Plan – 2017 - Post Construction Shortnose Sturgeon Monitoring (FERC Project No. 2004) – Final*, May 2017) was filed with FERC for approval on May 31, 2017.

American eel now use ramp traps at four locations as shown in the following figure, as well as the fish lifts. The South Hadley eel ramp (#1 in the figure) and its attraction

water system were completely rebuilt during 2016. Juvenile eel passage totaled 38,449 in 2016, the third highest annual total recorded at Holyoke Dam. Even though operation of the South Hadley ramp was delayed by construction until June 14, it was used by 48% of the eels. (*Survey for Upstream American Eel Passage at Holyoke Dam, Connecticut River, Massachusetts, 2016*, Normandeau Associates, February 3, 2017)



*Figure 4. American eel ramp traps currently in use for upstream passage.*

The Canal 1, 2, and 3 facilities are currently in relicensing with FERC. As part of that process, HG&E recently completed a desktop analysis evaluating the effectiveness of the louver system to prevent downstream eel passage into the canal system and the potential for entrainment and mortality for any eels for which the louver system is not a barrier. The results were recently submitted to the USFWS for review and comment. FERC staff had also raised a concern that smaller shortnose sturgeon may pass through the louver system; however, the USFWS states that there is limited potential for that problem to occur (email of July 13, 2017, included in Appendix).

*Conclusion:* The upstream fish passage criteria only apply to the bypass zone where Standard C-2 (*Agency Recommendation*) is met. HG&E is operating upstream passage facilities for several migratory fish species pursuant to license terms as prescribed by the resource agencies. This conclusion is predicated on inclusion of a condition requiring the Owner notify LIHI of any resource agency or FERC communication suggesting that existing passage facilities are not providing safe and effective passage and annually reporting to LIHI on the status of passage at Holyoke.

#### Criterion D - Downstream Fish Passage and Protection

*Goal: The facility allows for the safe, timely, and effective downstream passage of migratory fish. For riverine (resident) fish, the facility minimizes loss of fish from*

*reservoirs and upstream river reaches affected by Facility operations. All migratory species are able to successfully complete their life cycles and to maintain healthy, sustainable fish and wildlife resources in the areas affected by the Facility.*

*Review:* See discussion above on upstream passage.

The original LIHI certification was conditioned on making timely upgrades to accommodate downstream passage of shortnose sturgeon; without those upgrades, sturgeon were not being moved upstream and were unable to access spawning habitat to complete life-cycle requirements:

Issue 1: HG&E is behind schedule on implementation of downstream fish passage improvements at Hadley Falls Station.

Condition 1. If HG&E does not meet any of the downstream fish passage design and implementation deadlines that fall within the 5-year term of certification, LIHI will suspend certification unless HG&E demonstrates to LIHI that the resource agencies believe good cause exists for the schedule delay. Any subsequent re-certifications of the Facility will be dependent on HG&E's passage facilities meeting effectiveness targets set by the agencies.

*Conclusion:* The downstream fish passage criteria only apply to the bypass and canal zones where Standard D-2 (*Agency Recommendation*) is met. HG&E is operating downstream passage facilities for several migratory fish species, including the federally endangered shortnose sturgeon, pursuant to license terms as prescribed by the resource agencies. This conclusion is predicated on inclusion of a condition requiring the Owner notify LIHI of any resource agency or FERC communication suggesting that existing passage facilities are not providing safe and effective passage and annually reporting to LIHI on the status of passage at Holyoke.

#### Criterion E – Shoreline and Watershed Protection

*Goal: The Facility has demonstrated that sufficient action has been taken to protect, mitigate and enhance the condition of soils, vegetation and ecosystem functions on shoreline and watershed lands associated with the facility.*

*Review:* Shoreline and Watershed Protection is as detailed in the 2012 reviewer report on p. 16. Further, HG&E developed, and received FERC approval (August 1, 2001), a Shoreline Erosion Remediation Plan under License Article 403. That plan included inventorying, evaluating, monitoring, and remediating shoreline erosion problems at the project.

*Conclusion:* The Shoreline and Watershed Protection Standard E-2 (*Agency Recommendation*) is met in the impoundment zone due to the applicable FERC-approved shoreline management plans. With respect to the other three zones, Standard E-1 (*De Minimis/Not Applicable*) is met. Either the shoreline lands in those zones are not under the ownership and control of HG&E or the lands lack ecological value due to their urbanized condition.

### Criterion F - Threatened and Endangered Species Protection

*Goal: The Facility does not negatively impact listed species.*

*Review:* The Threatened and Endangered Species Protection Plan (T&E Plan) for Project No. 2004, developed pursuant to License Article 416, includes provisions for protection of the Puritan tiger beetle, bald eagle, yellow lampmussel and the federally endangered shortnose sturgeon (listed in 1967). Sturgeon are also further protected by a NMFS Biological Opinion and Incidental Take Statement issued in February 2015; NMFS is currently revising the Biological Opinion to include an additional take provision related to changes to the tagging protocol used for post-construction monitoring, which will be in place through the license expiration in 2039.

The New York Bight Distinct Population Segment (DPS) of the Atlantic sturgeon, was listed as federally endangered in 2012. Atlantic sturgeon historically used many major rivers along the east coast for spawning runs. NOAA National Marine Fisheries Service is currently considering listing the Connecticut River from Holyoke Dam downstream as Critical Habitat for the New York Bight DPS. According to the USFWS, no issues specific to Atlantic sturgeon have been raised in the relicensing process for the Canal 1, 2, and 3 facilities (pers. comm. Julianne Rosset, USFWS, July 21, 2017); however, it is possible that issues could arise as the Critical Habitat designation advances. Atlantic sturgeon are larger than the shortnose, and there apparently is conclusive documentation that they used habitat upstream of Holyoke, although one source indicated a presence at Hadley, which is just upstream. The following is an excerpt from the 2007 *Status Review of Atlantic Sturgeon*, NOAA:

“Judd (1905) reports that sturgeon were speared at South Hadley Falls in the mid 1700s. There are historical reports of sturgeon migration as far as Hadley, MA, but regular migration of Atlantic sturgeon beyond Enfield, CT is doubtful due to presence of significant rapids (Judd 1905). A dam constructed at Enfield in 1827 effectively blocked any migration beyond this point, until 1977 when the dam was breached. Until recently, there has been no evidence that Atlantic sturgeon currently use the Massachusetts portion of the Connecticut River. On August 31, 2006, a 152.4 cm TL Atlantic sturgeon was observed in the Holyoke Dam spillway lift (~ rkm 143). The Atlantic sturgeon was not sexed and was described as a subadult (R. Murray, Holyoke Gas and Electric, Pers. Comm. 2006). However, based on the size of the Atlantic sturgeon it is possible that the fish was a mature adult. This is the first time an Atlantic sturgeon has been reported at the Holyoke Dam fish lift.”

*Conclusion:* The Threatened and Endangered Species Protection Standard F-2 (*Recovery Planning and Action*) is met in the impoundment, bypass, and canal zones where the Project No. 2004 T&E Plan and the NMFS Biological Opinion and Incidental Take Statement are in effect. Standard F-1 (*Not Applicable/De Minimis Effect*) is currently met in the downstream zone; while listed species may occur downstream, the reach is outside the project boundary, and the operation of Holyoke generally has a positive effect on the downstream flow regime, which should enhance habitat conditions. This conclusion is predicated on inclusion of a condition requiring the

Owner notify of any resource agency contact requesting a change in management or operation in order to protect Atlantic sturgeon.

Criterion G - Cultural and Historic Resource Protection

*Goal: The Facility does not inappropriately impact cultural or historic resources that are associated with the Facility's lands and waters, including resources important to local indigenous populations, such as Native Americans.*

*Review:* Under Article 420 of the Project No. 2004 license, a cultural resources management plan (CRMP) was filed with FERC on September 8, 2000. Under the CRMP, HG&E files activity reports annually with FERC. The Holyoke and the South Hadley canal systems are both listed as Historic Districts in the National Register of Historic Places. When LIHI was reviewing the Holyoke Hydroelectric System for certification in 2012, HG&E was seeking permission to demolish the historic Texon Mill, located downstream of the left dam abutment. This step was being taken after failed attempts at adaptive reuse of the building. HG&E subsequently reached an agreement (LIHI Application, Appendix B-6) with the Corps of Engineers, State Historic Preservation Office (SHPO), and the South Hadley Selectboard and Historic Commission, and has demolished the mill, cleaned up the site, and installed recreational and public access improvements (Texon Mill Park).

HG&E also could not avoid adverse effects on historic properties when upgrading the fish passage facilities in 2015. The properties were the submerged timber crib dam (described as the original 1849 Holyoke Dam) and a 1950s-era cofferdam, both considered as contributing elements to the Holyoke Hydropower System Historic District. On January 13, 2015, FERC staff executed a MOA with the SHPO requiring HG&E to transfer photographs of the construction of the fish passage enhancement work to the Holyoke Historical Commission and, should it be found necessary to remove a portion of the timber crib dam, to salvage pieces of wood from it, in coordination with the Holyoke Historical Commission, for preservation. HG&E could not avoid removal of a portion of the crib dam, and reported completion of the two mitigation actions to FERC on May 10, 2016.

*Conclusion:* The Cultural and Historic Resource Protection Standard G-2 (*Approved Plan*) is met at the Holyoke Hydroelectric System as it is subject to, and compliant with, a cultural resources management plan.

Criterion H - Recreational Resources

*Goal: The facility accommodates recreation activities on lands and waters controlled by the facility and provides recreational access to its associated lands and waters without fee or charge.*

*Review:* Under License Article 418, HG&E produced the Comprehensive Recreation and Land Management Plan and has developed and maintained recreational facilities consistent with that plan. More recently, as mentioned under Cultural and Historic Resource Protection, HG&E constructed the Texon Mill Park at South Hadley. HG&E also recently completed the construction of a new visitor center at its fishway, which it intended to open to the public starting on May 3, 2017.

Within the canal system, the canal is fenced off for safety reasons, and there is no public access to the hydroelectric facilities.

During the prior review, an issue was identified with respect to compliance with the Project No. 2004 recreation plan, which indicated that HG&E would support an annual Shad Derby for two May weekends. The LIHI certification was made subject to a special condition:

Issue 2: HG&E reduced the length of the annual Shad Derby without consultation of Resource Agencies and NGOs and without seeking an amendment of the FERC-approved recreation plan.

Condition 2. HG&E shall either 1) restore the Shad Derby to two May weekends per year starting with May 2013 and at a minimum through the term of this certification, or 2) shall sponsor the Shad Derby for only one May weekend per year but only if the change from two weekends to one is approved by FERC based on an application to amend the Project 2004 recreation plan, with full consultation of Resource Agencies and interested NGOs. Should HG&E seek to amend the recreation plan, the Shad Derby shall be sponsored for two weekends per year until such time as FERC acts. HG&E shall inform LIHI of its decision by October 1, 2012. If it chooses to seek to amend the recreation plan, it shall notify LIHI of FERC's final decision within 30 days of issuance. Continued non-compliance with this element of the recreation plan shall result in immediate revocation of this certification. Should HG&E obtain a written determination from FERC that the change from two weekends to one is not subject to FERC approval, HG&E shall provide LIHI with a copy of the determination and this condition shall become nullified.

HG&E has restored the fishing derby to two weekends. In fact, according to Dr. Slater, MassWildlife (pers. comm., July 5, 2017), HG&E has shown an interest in extending the derby to weekdays.

*Conclusion:* The Recreational Resources Standard H-2 (*Agency Recommendation*) is met as HG&E has implemented improvements pursuant to a FERC-approved recreation plan and is continuing to monitor and enhance recreational use.

### PLUS Standards Satisfied

*Ecological Flows:* On Page 21 of its application, HG&E presents its argument as to why it meets the plus standard by providing non-flow habitat enhancements in the form of invasive species control. Since 2001, HG&E has participated in efforts to control a water chestnut infestation in the 16-acre Log Pond Cove, part of the impoundment upstream of the dam. In the context of the scale of this large hydroelectric system on a major river, it is not clear that this effort alone is of great enough significance to warrant a certification term extension.

*Downstream Fish Passage and Protection:* On pp. 40-45 of its application, HG&E presents a persuasive related to downstream passage. HG&E has put an exceptional amount of effort and funds into research and design to assure that the recently constructed shortnose sturgeon passage facilities are functional. Although the Project No. 2004 FERC License did direct HG&E to implement measures at the Project for the safe and effective downstream passage of the federally endangered Shortnose Sturgeon, very little was known about this enigmatic fish at the time of HG&E's purchase of the Project. Consequently, HG&E spent nearly 15 years working in close consultation and collaboration with agencies in order to establish appropriate design criteria based on the results of flume testing and extensive Computational Fluid Dynamic modeling, as well as to develop a final design that included not just a rack, but also highly innovative fish bypasses and a downstream energy dissipater. Effectiveness testing of these modifications will be continuing for several years. Initial results appear to be favorable and HG&E remains committed to making changes in the future as required in order to ensure the continued success of these modifications.

Overall, HG&E's track record and cooperation with resource agencies to address fish passage at this critical location appears to be excellent and, in my view, merits the extended term. Appendices B-4 and B-5 of the LIHI application contain communications from USFWS and NMFS applauding HG&E's downstream passage efforts.

*Recreational Resources:* HG&E recently completed two facilities that were not part of the FERC-approved recreational plan for Project No. 2004: the Texon Mill Park in South Hadley and the fishway visitors center. These are significant new public recreational opportunities and, in my opinion, merit recognition through the plus standard.

# **APPENDIX**

## **Communications with Agencies**

Sarah LaRose @

Re: Holyoke flows

To: Jeffrey Cueto, Cc: Paul S. Duchenev, Dr. Michael J. Sale, Jeanette Sypek

July 6, 2017 at 11:42 AM

[Details](#)

SL

Hi Jeff,

I definitely understand your point with regards to using the A-1 criterion for the Downstream of Chemical Tailrace ZOE (ZOE#4). Criterion A-4 would probably work best for that one - would you like me to provide an updated application section that is responsive to that criterion instead?

In order to respond to your question below, please see attached the 2008 Modified ROR Cumulative Study, which is where the conclusion was initially formed that Modified ROR operations smooth out flow downstream of the dam and better emulate a more natural flow regime. Note that the hydrograph data collected on the downstream side of the dam that led to that conclusion was from USGS gauge 01172010 Connecticut River at I-391 Bridge at Holyoke, MA. This gauge is located in the beginning of ZOE#4, and therefore this information (and subsequent conclusions) take into account effects from flows both through the Hadley Falls Station/Holyoke Dam and the Canal System. Although Modified ROR operations provide HG&E with slightly more operational flexibility with regards to maintaining water levels at the dam, storage capacity is still extremely limited so operations are still essentially ROR more than anything else (hence "Modified ROR"). As you can see on our Comprehensive Operations and Flow Plan (COFP) charts, for the most part whatever we get coming down the river we pass immediately. The Modified ROR operations just make it a little easier for our operators to better deal with/smooth out the "Northfield wave" (i.e. the peaking nature of projects upstream). A really good visual of how these operations actually impact flows downstream can be found in the Figures provided in the attached 2008 Study. Specifically, for a visual depiction of Modified ROR operations impact on flows, please refer to Figures 3 & 4 (pages 11 & 12 of report, PDF pages 23 & 24) and Figures 8 & 9 (pages 31 & 32 of report, PDF pages 43 & 44). For reference, a visual depiction of standard ROR operations is available in Figures 5 & 7 (pages 20 & 22 of report, PDF pages 32 & 34). There are other visual depictions of Modified ROR operations in the report as well in Figures 19-22 (pages 46 & 47 of report, 58 & 59 of PDF) with the reference for standard ROR in Figure 18 (page 45 of report, PDF page 57).

I hope this answers your question! Please let me know if there is anything I haven't adequately addressed, or if you have any more questions. Also please let me know if I should update the Ecological Flow Regime section of the application for ZOE#4 with criterion A-4 instead of A-1 and send over to you.

Thank you,

**Sarah LaRose**

Project Engineer  
Holyoke Gas & Electric  
99 Suffolk Street  
Holyoke, MA 01040  
Phone: (413) 322-1522  
Email: [slarose@hged.com](mailto:slarose@hged.com)

-----Jeffrey Cueto <[ompompanoo@aol.com](mailto:ompompanoo@aol.com)> wrote: -----

[See More from Jeffrey Cueto](#)



2008 ROR Report.pdf



Revised Table 3-1 to...-14.xls

Jeffrey Cueto

Holyoke flows

To: Sarah LaRose, Cc: Paul S. Duchenev, Dr. Michael J. Sale

June 29, 2017 at 4:06 PM

[Details](#)



Hi, Sarah. I'm trying to get a better understanding of what the outflow regime is below Holyoke. FERC eLibrary wasn't very cooperative today. So I couldn't pull up the 2015 version of the COFP, but I have looked at the prior version which was released right after I completed the 2012 LIHI review.

First, I should note that your application used the A-1 de minimis criterion for the Ecological Flows standard. To use A-1 for a downstream zone, the project must be operated true run-of-river as defined in the LIHI Handbook. Normally this would mean that downstream flows are close to natural conditions. For Holyoke, inflows are highly regulated by peaking at Vernon and Turner Falls upstream. So, instead of A-1, either A-2 or A-4, which are science-based approaches, would be more appropriate. My impression is that Holyoke is operating in a manner that likely improves the downstream flow regime by smoothing the hydrographic inflow pulse. While the focus of the modified run-of-river operation is impoundment stabilization upstream of the Narrows in order to protect the tiger beetle, the change also benefits the tailrace zone as explained in the 2012 Cumulative Report. The change was supported by the federal and state fisheries agencies, as well as MassDEP. That said, it is not real clear to me what the resulting downstream flow regime is in terms of minimum and maximum outflows, and whether any ramping measures are in effect. There are certain prescribed minimum flows for passage, bypass habitat, and the canal system, but there is no downstream prescription. Again, downstream flows are probably better (higher) than they would be under "true" run-of-river conditions when Turner Falls is storing water, but I would appreciate some elaboration from you to clarify the actual flow regime below the project. The combined minimum flows for the bypass and the canal system are substantially less than the USFWS aquatic base flow from its New England Flow Policy.

I also realize that both Vernon and Turner Falls are fairly advanced in their relicensing processes and wonder if HG&E has been participating in those processes and whether you expect that there may be changes the operating characteristics that will necessitate some changes to the Holyoke operation.

Thanks,  
Jeff Cueto

Jeffrey Cueto 

Holyoke P-2004 water quality certification

To: robert.kubit@state.ma.us

June 30, 2017 at 12:15 PM



Bob — Thanks for taking my call today concerning the two questions I had regarding Holyoke.

1) I had asked whether the bypass flow continued jurisdiction reopener in the certification had been exercised, or if any consideration has been given to exercising it, since January 1, 2014, which was the earliest date for such action. You said the MassDEP would need a request from the Mass. Division of Fish and Wildlife before considering such an action and has not received one.

2) I asked if there had been a follow through with regard to amending the water quality certification to make the modified run-of-river operation permanent, my understanding being that the 2001 certification requires the stable impoundment (100.4 feet +/- 0.2 feet). You said you would check further on that. Following is your 6/29/12 memo.

Thanks!

Jeff

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**From:** Kubit, Robert (DEP) <robert.kubit@state.ma.us>  
**Sent:** Friday, June 29, 2012 2:57 PM  
**To:** 'Richard Murray'; adonlon@ctriver.org; Slater, Caleb (MSC); don.pugh@yahoo.com; John\_Warner@fws.gov; julie.crocker@noaa.gov; Jessica.Pruden@Noaa.gov  
**Cc:** Paul Duchenev; Nancy J. Skancke  
**Subject:** RE: Holyoke - Draft Revised COFP

Rich,

The MA Department of Environmental Protection concurs with the modified Run of River protocol to be used on a permanent basis. We also concur with the revised Comprehensive Operation and Flow Plan that incorporates this change.

The Department has determined that a modification to the Water Quality Certificate is necessary to make this change.

Bob

Robert Kubit, P.E.  
MassDEP  
Division of Watershed Management  
627 Main Street  
Worcester MA 01608  
Telephone: (508) 767-2854  
Email: [robert.kubit@state.ma.us](mailto:robert.kubit@state.ma.us)  
Fax: (508) 791-4131

**Julianne Rosset** 

July 14, 2017 at 12:20 PM

JR

Re: Holyoke LIHI recertification

[Details](#)

To: Jeffrey Cueto, Cc: John P. Warner, Dr. Caleb Slater

Hi Jeff,

The information listed is correct and we do not have any other issues at this time.

Kind regards,  
Julianne

Julianne Rosset  
Fish & Wildlife Biologist  
USFWS New England Field Office  
70 Commercial Street, Suite 300  
Concord, NH 03301  
603-227-6436  
[julianne\\_rosset@fws.gov](mailto:julianne_rosset@fws.gov)

[See More from Jeffrey Cueto](#)

Found in Sent - AOL Mailbox



**Jeffrey Cueto**

July 14, 2017 at 11:17 AM



Fwd: Holyoke LIHI recertification

[Details](#)

To: Julianne Rosset, Cc: John P. Warner, Dr. Caleb Slater

Julianne — Here is the email I sent John (and Caleb) originally. Having done some additional work on this project and having talked to Caleb, I have made some progress on answers. With regard to #1, my understanding is that there are no conservation flows per se downstream of Holyoke, but the operation does follow operational protocols set forth in tables contained in the Comprehensive Operations and Flow Plan, and the protocols result in downstream flows that are closer to natural conditions than the inflow regime created by Turner Falls. So there is an overall improvement in flows downstream, and this will likely be revisited when Turner Falls, Northfield Pump Storage, and Vernon are relicensed. So it doesn't seem that the USFWS regional flow policy question really applies.

#2: Caleb said the flow regime in the bypass is sufficiently protective (paraphrasing here).

#3: The usable sturgeon spawning habitat is upstream of the dam, and there is no documentation of spawning habitat in the bypass apparently.

#4: The resource agencies are hopeful that Turner Falls' operation will change significantly for the better. If so, HG&E's operation will need to be reevaluated.

#5: I gather all the eel and sturgeon passage upgrades have been completed, and effectiveness studies are ongoing.

Please let me know if the above sounds correct or if you have any other issues.

Regarding the eel discussion yesterday, I think I am all set based on the information you gave me yesterday. Eel passage (and not sturgeon) through the louver barrier and down the canal system is an issue being addressed in the City facilities relicensing process. If significant impacts on eel are identified, then additional passage upgrades may be necessary.

If I could hear back today, that would be terrific.

Jeff

[See More from Jeffrey Cueto](#)

**Julianne Rosset**   
Re: Holyoke LIHI recertification  
To: Jeffrey Cueto

July 13, 2017 at 11:48 AM



Hi Jeff,

An EPRI 2006 sturgeon study shows that sturgeon guidance efficiency at the louver is relatively high and HG&E's newest desktop analysis indicates that total survival rates for sturgeon at Holyoke 1-3 are high while entrainment is low. Might be worth asking NOAA their position but we have not raised any issues regarding sturgeon in the canal.

Kind regards,  
Julianne

Julianne Rosset  
Fish & Wildlife Biologist  
USFWS New England Field Office  
70 Commercial Street, Suite 300  
Concord, NH 03301  
603-227-6436  
[julianne\\_rosset@fws.gov](mailto:julianne_rosset@fws.gov)

[See More from Jeffrey Cueto](#)

Found in Sent - AOL Mailbox



**Jeffrey Cueto**   
Re: Holyoke LIHI recertification  
To: Julianne Rosset, Cc: John P. Warner

July 13, 2017 at 11:22 AM

[Details](#)



Thanks. John mentioned eels, but it looks like sturgeon passage through the louver and down the canal system was also a potential issue. Sound right?

[See More from Julianne Rosset](#)

☆ **Julianne Rosset**   
Holyoke LIHI recertification  
To: Jeffrey Cueto

July 13, 2017 at 10:27 AM



Hi Jeff,

John Warner asked me to send you our letters regarding HG&E's canal projects, please see attached. I also included FERC's deficiency letter from June 1, 2016, in case it is also helpful. Any questions, please feel free to contact me.

Kind regards,  
Julianne

Julianne Rosset  
Fish & Wildlife Biologist  
USFWS New England Field Office  
70 Commercial Street, Suite 300  
Concord, NH 03301  
603-227-6436  
[julianne\\_rosset@fws.gov](mailto:julianne_rosset@fws.gov)



Itr to HG&E RE pad-al...ck.PDF



LTR TO HG&E RE PA...K.PDF



study request- albions...ck.PDF



FWS City Comm...ter.PDF



FERC deficen...ltr.PDF

Jeffrey Cueto

Holyoke LIHI recertification

June 30, 2017 at 3:33 PM

[Details](#)



To: John P. Warner, Dr. Caleb Slater, Cc: Kubit, Robert (DEP), Dr. Michael J. Sale

John and Caleb — I left phone messages for both of you today to see if we could discuss the status of HG&E's hydroelectric system. I am reviewing the system for recertification using LIHI's newly adopted handbook. So the criteria are a bit different from those I used five years ago for the original certification.

The topics I'd like to cover include:

1. Under the modified run-of-river operation, which allows impoundment drawdowns up to 1.4 feet below the crest of the rubber dam system (99.2 to 100.6 feet NGVD), are there any specific target flows or ramping restrictions to protect habitat downstream of Holyoke? My understanding is that there is overall a benefit downstream by re-regulating the peaking flows that result from the Turner Falls operation; however, it is not clear (to me at least) what the resulting downstream flow regime is. The combined minimum flows for the canal, fish passage (including both operation of the up/down fish passage facilities and ZOP in the bypass), and bypass habitat protection are substantially lower than USFWS ABF flows. So I was hoping that I could get some science-based explanation as to what the downstream regime is and why it is protective of aquatic habitat.
2. The bypass habitat flow number, which is distributed into three channels, was based on a 1979 IFIM study as I understand it. Do the resource agencies still believe that the flow is sufficient? I note that the 2001 water quality certification (Condition 18a) allows MassDEP to increase bypass minimum flows after January 1, 2014. If the minimum flow is now considered inadequate, has an adjustment been considered?
3. Is there sturgeon habitat in the bypass, and, if so, is the current minimum flow sufficient for protection of sturgeon?
4. I understand that Turner Falls is in the later stages of relicensing. Do the resource agencies expect changes in operation at Turner Falls that may justify/necessitate changes in how Holyoke is operated?
5. The 2012 LIHI certification contained a special condition related to the implementation schedule for fish passage: *If HG&E does not meet any of the downstream fish passage design and implementation deadlines that fall within the 5-year term of certification, LIHI will suspend certification unless HG&E demonstrates to LIHI that the resource agencies believe good cause exists for the schedule delay. Any subsequent re-certifications of the Facility will be dependent on HG&E's passage facilities meeting effectiveness targets set by the agencies.* I also believe that upstream eel passage had been delayed. Have both downstream sturgeon passage and upstream eel passage been satisfactorily implemented and have effectiveness studies been completed or are on schedule for completion? (I think sturgeon effectiveness studies are supposed to be done in 2018.)

My sense from my prior review and the more recent information is that HG&E has done an exemplary job overall.

If there are any other comments or issues, I would certainly appreciate whatever input you can give me. I am trying to finish this up by the end of next week. A response to this email would be fine or I can call you whenever convenient.

Thanks!

Jeff Cueto

FEDERAL ENERGY REGULATORY COMMISSION

Washington, D.C. 20426

June 1, 2016

OFFICE OF ENERGY PROJECTS

Project No. 2386-003 – Holyoke No. 1 (City 1)  
Hydroelectric Project  
The City of Holyoke Gas & Electric Department

Project No. 2387-002 – Holyoke No. 2 (City 2)  
Hydroelectric Project  
The City of Holyoke Gas & Electric Department

Project No. 2388-003 – Holyoke No. 3 (City 3)  
Hydroelectric Project  
The City of Holyoke Gas & Electric Department

Paul Duchenev  
Superintendent - Hydro  
Holyoke Gas & Electric Department  
One Canal Street  
Holyoke, MA 01040

**Reference: Review of Draft License Application for Holyoke No. 1, Holyoke No. 2, and Holyoke No. 3 Hydroelectric Projects; Identification of Potential Deficiencies and Additional Information Needs**

Dear Mr. Duchenev:

On April 13, 2016, Holyoke Gas & Electric Department (HG&E) provided Commission staff with a draft license application (DLA) for the Holyoke No. 1 (City 1), Holyoke No. 2 (City 2), and Holyoke No. 3 (City 3) Hydroelectric Projects. The projects are located on the Holyoke Canal System, adjacent to the Connecticut River, in the City of Holyoke, in Hampden County, Massachusetts.

Upon review of the application we have identified some potential deficiencies and some additional information needs. License application deficiencies may result in the rejection of the application. When preparing the final license application, adequately addressing the potential deficiencies and the additional information requested in our

Project Nos. 2386-003, 2387-002, and 2388-003

2

comments on the draft license application will facilitate the licensing process for the proposed project.

Any questions on our comments should be directed to me at (202) 502-8963, or via email at: [kyle.olcott@ferc.gov](mailto:kyle.olcott@ferc.gov).

Sincerely,

Kyle Olcott, Project Coordinator  
West Branch  
Division of Hydropower Licensing

Attachment: Schedule A – Comments on Draft License Application

cc: Mailing List  
Public File

**Schedule A**

**Comments on Draft License Application**

**for the**

**Holyoke No. 1, Holyoke No. 2, and Holyoke No. 3 Hydroelectric Projects**

Holyoke No.1, Holyoke No. 2, and Holyoke No. 3 Hydroelectric Projects  
Project Nos. 2386-003, 2387-002, and 2388-003  
Schedule A - 2 -

**Exhibit E**

*1. Table of Contents*

The table of contents for each Exhibit E does not correspond with the location of the content. For example, the table of contents for each DLA indicates Section 3.1 is located on page E-39. However, in the document this section is located on page E-41. In order to maintain clarity and consistency, please ensure that the table of contents corresponds with the actual location of the sections in the Final License Application (FLA).

*2. Section 2.3.1 Fisheries*

In Section 2.3.1 *Fisheries* of the DLA for the projects state that the full-depth louver system required under the Holyoke Project's license (FERC Project No. 2004) "substantially prevent fish from entering the First Level Canal". The DLA goes on to say that the louver system is a "physical barrier to larger fish and a behavioral barrier to smaller fish..." Because each of the projects are located downstream of this barrier, Holyoke Gas & Electric (HG&E) does not anticipate any significant fishery issues.

While Section 2.3.1 of the DLA provides some general fish survey results from sampling conducted in 2004, 2006, and 2007, the summary lacks specific information and the detail needed for the Commission to conduct its environmental review of the projects. For example, while the DLA states that the louver system "has been proven to create conditions that effectively guide fish" away from entering the First Level Canal, it does not provide any specific information to support its claim. Similarly, the DLA states that a 2006 Electric Power Research Institute (EPRI) study found that the louver system is effective at excluding shortnose sturgeon from the First Level Canal; what the DLA does not define the term "effective" or whether all classes of shortnose sturgeon are prevented from entering the First Level Canal, as it is only a "behavioral barrier to smaller fish". We also note that the 2006 EPRI report, the 2004 and 2007 Kleinschmidt reports, and the 2007 Normandeau report referenced in this section of the DLA are not included in Section 5.0 *Literature Cited*.

Because the louver system only "substantially prevent fish" from entering the First Level Canal, and so that we may fully evaluate the potential projects' effect(s) on the fishery resources of the Connecticut River and the federally listed shortnose sturgeon, the FLA must include a clear description of the fishery resources present within the First Level Canal and articulate the presence or absence of all age classes of shortnose sturgeon downstream of the louver system. While we recognize that HG&E has not

Holyoke No.1, Holyoke No. 2, and Holyoke No. 3 Hydroelectric Projects  
Project Nos. 2386-003, 2387-002, and 2388-003  
Schedule A - 3 -

conducted any fish studies downstream of the louver system, we anticipate this information is available within the identified reports. If this information is not available, a fishery survey within the First Level Canal may be necessary.

Section 2.3.1 *Fisheries* the DLAs do not include an analysis of how each of the projects affect the fishery resources of the Connecticut River. If it is determined that fishery resources of the Connecticut River, including shortnose sturgeon, are present within the First Level Canal, the FLAs must assess the project's effects on those resources.

3. *Section 2.3.2 Freshwater Mussels*

Section 2.3.2 *Freshwater Mussels* of the DLAs, makes reference to "mussel monitoring surveys" and "critical mussel habitat areas" within the "Canal System." So that we may fully evaluate the projects' effects on mussels within the Canal System, please describe the mussel monitoring survey (e.g., method, frequency, and duration) and present the result of the survey in the FLA, including any maps that identify the location of surveys, mussel habitats, and mussel communities.

In Section 2.3.2 *Freshwater Mussels* the DLAs state that a minimum flow of 400 cubic-feet-per-second (cfs) is maintained within the Canal System. In Section 2.3.2 *Fisheries*, the DLAs state that, "[T]he Canal System is periodically dewatered for maintenance purposes." Please reconcile these two statements.

4. *Section 2.4.1 Water Quality Studies*

Section 2.4.1 *Water Quality Studies* of the DLAs state that HG&E has monitored temperature and dissolved oxygen within the Canal System in May, August, and November and filed annual reports with the Massachusetts Department of Environmental Protection (MADEP) since March 2002. While the DLAs also generally state that water quality samples taken during 2013, 2014, and 2015 met the water quality standards for Class B waters in the State of Massachusetts, no actual water quality data was provided. So that we may fully understand and evaluate the projects' potential effect on dissolved oxygen and temperature, please include a table in the FLAs that provide the Canal water quality data since monitoring began and any corresponding water quality data for the Connecticut River in the vicinity of the Holyoke Project (FERC No. 2004). The FLAs should also describe the standards associated with a Class B designation in the State of Massachusetts and discuss any canal monitoring results (prior to 2013) that did not meet state standards, the circumstances of the event, and any remedial actions taken to ensure future compliance with state standards.

Holyoke No.1, Holyoke No. 2, and Holyoke No. 3 Hydroelectric Projects  
Project Nos. 2386-003, 2387-002, and 2388-003  
Schedule A - 4 -

5. *Section 2.4.2 Water Use*

Section 2.4.2 *Water Use* of the DLAs generally note that the Canal System water is utilized by 14 HG&E hydroelectric projects and “for generation or process water to others on the Canal System.” This information is insufficient to support an analysis of the potential project’s effects on water supply and/or aquatic resources. The FLAs should: (1) provide the mean monthly flows of the Connecticut River at the Holyoke Project (P-2004); (2) describe the amount of water diverted into the canal from the Connecticut River at the Holyoke Project on a mean monthly basis; (3) articulate the project’s usage of canal water on a mean monthly basis; and (4) describe the usage of other water users on the canal on a mean monthly basis, to the extent known.

6. *Section 2.8 Cultural Resources*

In Section 2.8 *Cultural Resources* you state that the individual projects are not listed on the National Register of Historic Places (National Register); however, you add that a small portion of the Holyoke Canal System Historic District (Historic District) is within the existing project boundaries. We also have three letters from the Massachusetts Historical Commission (MA SHPO), filed with us on July 9, 2013, January 13, 2014, and January 16, 2014, stating that the Commission make a conditional determination of “no historic properties affected” for the relicensing of these projects, as proposed in your relicensing applications. However, before we can make such a determination of no historic properties affected, we need to know whether any of the three projects are eligible for inclusion in the National Register of Historic Places, and whether they should be considered as contributing elements to the Holyoke Canal System Historic District. If you find that these projects are eligible for the National Register, please consult with the Massachusetts State Historic Preservation Office (MA SHPO) and seek their concurrence in writing that they are eligible for the National Register, along with a short contextual statement on when the projects were built and how they relate to the Holyoke Canal System Historic District. Also add in your letter, as you propose in your draft relicense applications, there will be no new modifications to the projects, and you seek their concurrence that there would be no historic properties affected by the relicensing the three projects. Request that the MA SHPO respond back to you in writing on these concurrences. On the other hand, if you determine that the projects are not eligible for the National Register, consult with the MA SHPO, state your reasons why, and seek concurrence from the MA SHPO that they concur with you that the projects are not eligible for the National Register, and that no historic properties would be affected by the project. Request that the MA SHPO respond back in writing on these concurrences. Along with your analysis on the National Register eligibilities of the three projects, file all your comments to the MA SHPO, and their responses back, to us when you file your final license application.

Document Content(s)

P-2386-003Letter.DOC.....1-6



The City 2 Project consists of: (1) an intake off of the First Level Canal; (2) two 240-foot-long, 9-foot-diameter steel penstocks; (3) a surge tank about 17 feet high and 10 feet in diameter; (4) a powerhouse about 60 feet long, 40 feet wide and 50 feet high containing one vertical turbine-generator unit rated at 800 kW; (5) two parallel brick arched tailrace conduits, each 9 feet wide, 10 feet high and 120 feet long; (6) an 800-foot-long 4.8-kV transmission line; and (7) appurtenant facilities. The average annual generation at City 2 is 4,378,000 kWh.

The City 3 Project consists of: (1) an intake trashrack about 52 feet, 3 inches long and 14 feet high covering an opening in the Second Level Canal; (2) two headgates about 11 feet square; (3) two low pressure brick penstocks, each about 85 feet long and 93 square feet in cross section; (4) a reinforced concrete powerhouse about 42 feet long, 34 feet wide and 28 feet high, housing one turbine-generator unit rated at 450 kW with an average head of 12.5 feet; (5) an open tailrace about 118 feet long, 29.7 feet wide and 10 feet deep; (6) 4.8-kV generator leads that connect directly to the 4.8-kV area distribution system; and (7) appurtenant facilities. The average annual generation at City 3 is 2,119,000 kWh.

## COMMENTS

### 2.3 Aquatic Resources

Fish can enter the farthest upstream point of the Holyoke canal through the gatehouse gates located at HG&E's Holyoke Project, FERC no. 2004. Once in the canal entrance, fish either move along the louver and into the downstream fish bypass pipe that transports them to the tailrace of Project No. 2004 or they enter the canal system by passing through the louver slats. HG&E states that the full-depth louver and bypass facility have been proven to create conditions that effectively guide fish from below the canal gatehouse back to the mainstem river and away from the canal system. However, there have been no louver- or canal-specific studies to date. Kleinschmidt (2004) aimed to evaluate the effectiveness of the full depth louver to pass Atlantic salmon smolts (*Salmo salar*), juvenile shad (*Alosa sapidissima*), and juvenile river herring (*Alosa aestivalis* and *Alosa pseudoharengus*), but the study focused on whether water velocity measured during guidance testing at the partial depth louver, installed in 1992, changed with the addition of the bottom louver section that was installed in 2002. No tagging or tracking efforts were made, and American eel (*Anguilla rostrata*) and shortnose sturgeon (*Acipenser brevirostrum*) were not included in this study.

An additional study identified sturgeon guidance efficiency (percent guided to the bypass) as 100 percent at flow rates of  $85\text{-m}^3\text{s}^{-1}$  and  $42.5\text{-m}^3\text{s}^{-1}$ , but only 57 percent efficient at  $170\text{-m}^3\text{s}^{-1}$  (Electric Power Research Institute [EPRI] 2006). In 2007, Normandeau Associates estimated the effectiveness of passage at Project No. 2004 (Normandeau Associates 2007). In total, 19 eels were released: eight used the Hadley Falls station hydroelectric units (at the dam) for passage, six used or attempted to use the canal system, and five used the spillway. Of the six eels that attempted to use the canal system, four were guided by the louver array through the bypass and two passed beyond the louver array and entered the canal (eel codes #28 and #41). The eel coded #28 passed into the canal system 25 minutes after entering the study area, but manual tracking efforts to locate it in the canal were unsuccessful until 20 days later, when it was found in the Connecticut River, stationary and presumably dead. The second eel, coded #41, entered the canal

within 2 hours of being released upstream and was manually detected in the middle and lower canal, where it became stationary and presumably died.

A subsequent study by EPRI in 2007 failed to describe a route of passage for eels and instead described the movement and behavior of a selected group of 12 eels that passed through the bypass and 12 eels that passed through the louver. The EPRI (2007) study does not report passage efficiency and instead “assesses the behavior of radio-tagged eels as they interact with an angled louver array and associated structures, including evaluating the influence of surgically implanted radio tags on eel movement behavior.” Recently, Don Pugh (Trout Unlimited) used all of the EPRI 2007 telemetry data to assign a route of passage to 57 of the 60 total tagged eels and found that 54.4 percent were guided by the louver and bypassed to the tailrace, while 45.6 percent passed through the louver (Julianne Rosset, Service, personal communication). Based on these reports, a substantial proportion of eels enter the canal system.

HG&E will be performing a post-construction monitoring study of the new downstream fish passage facility at the main Hadley Falls Station in the fall of 2016. However, this effort will mimic the Normandeau Associates (2007) study and will not be louver- or canal-specific, and similar to the Normandeau Associates (2007) study, there exists the potential that very few eels would come into contact with the louver system or pass into the canal. Therefore, the 2016 study may not provide sufficient data pertaining to louver efficiency or within-canal eel movement and survival.

The Service strongly supports FERC’s June 1, 2016 Identification of Potential Deficiencies and Additional Information Needs letter (Attachment A). Specifically, on page 4, FERC’s letter states that “while we (FERC) recognize that HG&E has not conducted any fish studies downstream of the louver system, we anticipate this information is available within the identified reports. If this information is not available, a fishery survey within the First Level Canal may be necessary.” The identified reports are those discussed above and none of the referenced studies have been conducted downstream of the louver system, or provide sufficient information on American eel passage in the canal.

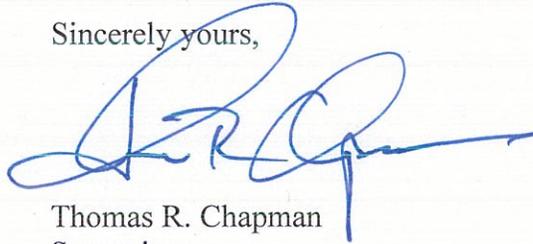
An understanding of passage route selection and relative survival of fish is necessary to evaluate the impacts of the Holyoke canal projects. Therefore, the Service fully supports HG&E conducting a fishery survey within the canal, especially one that analyzes the entrainment and mortality of American eel.

Kimberly D. Bose, Secretary  
November 1, 2016

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Thank you for this opportunity to comment. If you have any questions regarding these comments, please contact Julianne Rosset of this office at (603) 227-6436, or John Warner at (603) 227-6420.

Sincerely yours,

A handwritten signature in blue ink, appearing to read 'TRC', with a long horizontal stroke extending to the right.

Thomas R. Chapman  
Supervisor  
New England Field Office

Attachment

LITERATURE CITED

Electric Power Research Institute; D. Dixon. March 2006. Evaluation of an Angled Louver Facility for Guiding Sturgeon to a Downstream Bypass.

Electric Power Research Institute; D. Dixon. August 2007. Movement Behavior of American eel (*Anguilla rostrata*) on an Angled Louver Array at a Hydroelectric Project.

Kleinschmidt. 2004. Evaluation of Full Depth Louver Velocities in the Holyoke Canal.

Normandeau Associates. April 2007. American Eel Emigration Approach and Downstream Passage Routes at the Holyoke Project, 2006.

Kimberly D. Bose, Secretary  
November 1, 2016

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cc: FERC, Secretary  
FERC, DHL  
NPS, Kevin Mendik  
FERC, DHAC, Tom Papsidero  
EPA, Ralph Abele  
MA DFW, Caleb Slater  
MA DEP, Bob Kubit  
MA DEP, Therese Beaudoin  
BCPA-ERT  
Reading File  
ES: JRosset:11-1-16:603-227-6436



tailwater empties into a channel that leads to the Connecticut River, a 0.6-kilovolt (kV), 650-foot-long transmission line, a 13.8-kV, 90-foot-long transmission line, and appurtenant facilities.

The Albion D Project is located on the Second Level Canal and consists of a gated intake with submerged trashracks, a 190-foot-long, 9-foot-diameter steel penstock, a single runner Francis turbine directly coupled to a 500-kW Westinghouse generator, a 205-foot-long, 9-foot-wide by 12-foot-high arched, brick-lined tailrace tunnel, a concrete gated outlet structure where the tailwater empties into a channel that leads to the Connecticut River, a 0.6-kV, 605-foot-long transmission line, a 13.8-kV, 90-foot-long transmission line, and appurtenant facilities.

The Nonotuck Mill Project is located on the Second Level Canal and consists of a gated intake with submerged trashracks, a 10.5-foot-diameter, 225-foot-long penstock, a 500-kW generating unit located in the Nonotuck Mill Building, two parallel 9-foot-high by 9-foot-wide brick arched tailrace tunnels, 190 feet long extending from the draft tube to an existing concrete outlet structure, a concrete gated outlet structure where the tailwater empties into a channel that leads to the Connecticut River, a 13.8-kV transmission line, and appurtenant facilities.

HG&E proposes no changes to the existing facilities.

## COMMENTS

### **2. Project Location, Facilities, and Operations**

#### 2.3. Description of Facilities and Operations

In the PAD, HG&E states that the Albion A, Albion D, and Nonotuck units are not typically operated because the First Level Canal does not have sufficient hydraulic capacity to feed enough water into the Second Level Canal, on which the units are located, to enable consistent operations. Additionally, it is noted that due to water shortages from the First Level Canal, running the units under existing conditions would result in less generation than if other, more efficient units on the Second Level Canal were operated. Based on the information provided in the PAD, it is still unclear how all of the canal units interact with the main Holyoke unit, how the canal units are sequenced, how often each of the other units operate, and the prioritization sequence of canal unit operations. While the U.S. Fish and Wildlife Service (Service) understands that Figures 2-4 and 2-5 are provided to help facilitate our understanding of canal operations, Albion A, Albion D, and Nonotuck are not listed. A detailed description of canal unit operations should be included in the PAD.

HG&E also notes in this section that recent generation data for the subject units are unavailable. The Service requests the most recent generation data that are available for all three projects be included in the PAD. Additionally, the maximum hydraulic capacity, dimensional area of the intake structure, and spacing of the trashracks at the subject and other canal projects should be provided.

### 3. Description of Existing Environment and Resource Impacts.

#### 3.4. Fish and Aquatic Resources

Fish can enter the farthest upstream point of the Holyoke canal through the gatehouse gates located at HG&E's Holyoke Project, FERC Project No. 2004. Once in the canal, fish either move along the guidance louver, into the downstream passage system, and discharge to the tailrace of Project No. 2004, or continue into the canal system by passing through the louver slats. The PAD states that the full depth louver and bypass facility have been proven to create conditions that effectively guide fish from below the canal gatehouse back to the mainstem river and away from the canal system. This conclusion was based on a study (Kleinschmidt 2004) that evaluated the effectiveness of the full depth louver to pass Atlantic salmon smolts (*Salmo salar*), juvenile shad (*Alosa sapidissima*), and juvenile river herring (*Alosa aestivalis* and *Alosa pseudoharengus*). The study evaluated whether water velocities measured during guidance testing of the partial depth louver, installed in 1992, changed with the addition of the bottom louver section installed in 2002. The study did not include any tagging or tracking of fish and did not assess louver effectiveness for American eel (*Anguilla rostrata*) or shortnose sturgeon (*Acipenser brevirostrum*).

Subsequent laboratory studies have identified sturgeon guidance efficiency (percent guided to the bypass) as 100 percent at flow rates of 85 cubic meters per second ( $m^3s^{-1}$ ) and  $42.5\text{-}m^3s^{-1}$ , but only 57 percent efficient at  $170\text{-}m^3s^{-1}$  (EPRI 2006). Studies describing downstream American eel passage at the Holyoke Project are either not specific to the canal or louver (Normandeau 2007) or describe only the movement of 12 eels through the bypass and 12 eels through the louver (EPRI 2007). Recently, independent researcher Don Pugh used all of the EPRI 2007 study data to assign a route of passage to 57 of the 60 tagged eels and found that 54.4 percent were safely bypassed to the tailrace, while 45.6 percent passed through the louver into the canal system (Don Pugh, pers. comm.).

An understanding of passage route selection and relative survival of the American eel is necessary to evaluate the impacts of the canal projects. Therefore, the Service is requesting a canal-specific eel study (Attachment A).

#### 3.4.2. Freshwater Mussels

Figure 3-1 shows where known yellow lampmussel (*Lampsilis cariosa*) habitat exists in the canal system. A map showing areas where alewife floater (*Anodonta implicata*), eastern elliptio (*Elliptio complanata*), and dwarf wedgemussel (*Alismidonta heterodon*) populations are located should be included in the PAD.

#### 3.7. Rare, Threatened, and Endangered Species

The PAD states that HG&E implements measures for the protection and enhancement of aquatic resources in the canal system, which include maintaining a minimum flow throughout the canal, adjusting the timing of canal drawdowns, performing regular habitat monitoring, and taking

Paul S. Duchenev  
August 10, 2016

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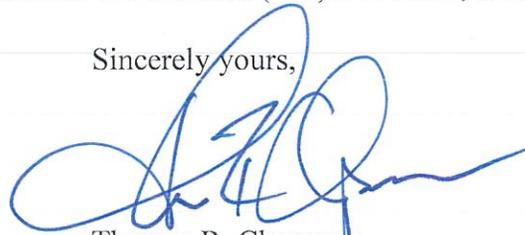
several steps to protect aquatic resources during canal drawdowns. While most measures are further outlined in this section, it is unclear what type of habitat monitoring occurs and where. A detailed description of habitat monitoring should be provided as well as a map that shows where, in the canal, habitat monitoring is performed. Additionally, a map of areas within the canal that are continuously wetted by enhancement measures should be included.

#### RECOMMENDED STUDIES

The Applicant has not identified any studies for the Albion A, Albion D, or Nonotuck projects. Enclosed please find our formal study request (Attachment A) in the format required pursuant to 18 CFR §4.38(b)(5).

Thank you for this opportunity to comment. If you have any questions regarding these comments, please contact Julianne Rosset of this office at (413) 548-8002, extension 8120.

Sincerely yours,



Thomas R. Chapman  
Supervisor  
New England Field Office

Attachment

LITERATURE CITED

Electric Power Research Institute; D. Dixon. March 2006. Evaluation of an Angled Louver Facility for Guiding Sturgeon to a Downstream Bypass.

Electric Power Research Institute; D. Dixon. August 2007. Movement Behavior of American eel (*Anguilla rostrata*) on an Angled Louver Array at a Hydroelectric Project.

Kleinschmidt. 2004. Evaluation of Full Depth Louver Velocities in the Holyoke Canal.

Normandeau Associates. April 2007. American Eel Emigration Approach and Downstream Passage Routes at the Holyoke Project, 2006.

Paul S. Duchenev  
August 10, 2016

6

cc: FERC, Secretary  
MADFW, Pete Hazelton  
MA DFW, Caleb Slater  
MA DEP, Bob Kubit  
MA DEP, Therese Beaudoin  
Reading File  
ES: JRosset:8-10-16:413-548-8120



system, and five used the spillway. Of the six eels that attempted to use the canal system, four were guided by the louver array through the bypass and two passed beyond the louver array and entered the canal system (eel codes #28 and #41). The eel coded #28 passed into the canal system 25 minutes after entering the study area, but manual tracking efforts to locate it in the canal were unsuccessful until 20 days later when it was found in the Connecticut River, stationary and presumably dead. The second eel, coded #41, entered the canal within 2 hours of being released upstream and was manually detected in the middle and lower canal where it became stationary and presumably died.

A separate and subsequent study by the Electric Power Research Institute (EPRI) in 2007 failed to describe a route of passage for eels and instead described the movement and behavior of a selected group of 12 eels that passed through the bypass and 12 eels that passed through the louver. Nowhere in the EPRI (2007) study is passage efficiency explicitly stated. As stated in the report: "The original objective was to assess the fish guidance efficiency of the louver system for American eels. This objective required the use of eels that had not previously encountered the louver system. However, the team was unable to collect eels from upstream locations. Only eels from the bypass sampler, or eels that had already been "guided" by the louver, were available for this study. The project objective was therefore revised to assess the behavior of radio-tagged eels as they interact with an angled louver array and associated structures, including evaluating the influence of surgically implanted radio tags on eel movement behavior." Recently, Don Pugh (Trout Unlimited) used all of the EPRI 2007 telemetry data to assign a route of passage to 57 of the 60 total tagged eels and found that 54.4 percent were guided by the louver and bypassed to the tailrace, while 45.6 percent passed through the louver (Julianne Rosset, Service, personal communication). Based on this analysis, a substantial proportion of the eels entered the canal system.

In your letter, you indicate that you will be performing a post-construction monitoring study of the new downstream fish passage facility at the main Hadley Falls Station, part of Project No. 2004, in the fall of 2016. However, this effort will mimic the Normandeau (2007) study and will not be louver- or canal-specific. For this proposed study, HG&E wrote that the agencies, during study planning, stated that *at least* 34 of the 105 telemetered eels will pass downstream into the canal system. This is only an estimate, however, and similar to the Normandeau (2007) study, there exists the potential that very few eels would come into contact with the louver system or pass into the canal. Therefore, the fall 2016 study may not provide sufficient data pertaining to louver efficiency or within-canal eel movement and survival.

The merits of our study request are supported by the Federal Energy Regulatory Commission's (FERC) June 1, 2016 Identification of Potential Deficiencies and Additional Information Needs letter for the Holyoke No. 1, Holyoke No.2, and Holyoke No.3 projects (Attachment A). On page 4, FERC's letter states that "while we (FERC) recognize that HG&E has not conducted any fish studies downstream of the louver system, we anticipate this information is available within the identified reports. If this information is not available, a fishery survey within the First Level Canal may be necessary." The identified reports are those discussed in this letter and none of the referenced studies have been conducted downstream of the louver system. Thus, the Service agrees with FERC's concern, and requests, in accordance with our original study letter, that a louver- and canal-specific study be conducted.

### **Description of Facilities and Operations**

While a detailed description of canal unit operations can be located in the Comprehensive Operation and Flow Plan and Comprehensive Canal Operation Plans for Project No. 2004, it is relevant to include these details within the PAD for the projects being relicensed. In your letter, you state that the Albion A, Albion D, and Nonotuck units are listed as Harris Energy in Figures 2-4 and 2-5 in the PAD, however "Harris Energy" is not listed in either figure. Thus, from the PAD, it is unclear 1) how the canal units operate; and 2) what the generation data is for each project.

The Service requested information on the maximum hydraulic capacity, area of the intake structure, and spacing of the trashracks at each project. Your letter listed this information for Albion A, Albion D, and Nonotuck but notes that "it is not clear how similar information on other canal units is pertinent." On the contrary, the Service believes that similar information for other canal units is very pertinent to our understanding of canal operations and the possible effect each unit may have on fish movement within the canal and the potential for entrainment and injury/mortality. The Service requests that this relevant data be included in the PAD.

The information provided in your letter lists a trashrack spacing of 3.5 inches at Albion A, Albion D, and Nonotuck. According to other information in our files on the projects, (Attachment B), the trashrack spacing was said to be 1 inch "which will minimize entrainment for those fish that do enter the canal." The actual rack spacing for these units needs to be clarified. If the trashrack spacing is 3.5 inches, then there is in effect no fish protection at these projects and there is an even greater need for a canal-specific study to better understand eel entrainment and survival.

### **Rare, Threatened, and Endangered Species**

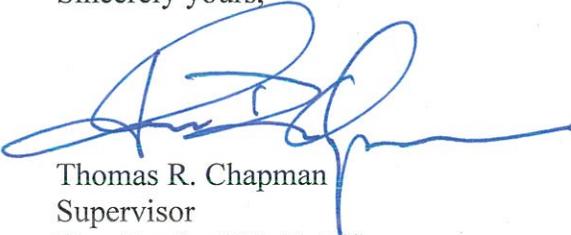
The Service requested that habitat monitoring in the canal be included via a detailed description and a map that shows where, in the canal, habitat monitoring is performed, as it was unclear as written in the PAD. In your letter, you state information on habitat monitoring and measures are included in the Project No. 2004 record. It is the Service's position that this relevant data be included in the PAD for a more robust and complete understanding of canal operations and impacts.

Paul S. Ducheny  
October 27, 2016

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If you have any questions regarding these comments, please contact Julianne Rosset of this office at (603) 227-6436, or John Warner at (603) 227-6420.

Sincerely yours,

A handwritten signature in blue ink, appearing to read 'T. Chapman', with a long horizontal flourish extending to the right.

Thomas R. Chapman  
Supervisor  
New England Field Office

Attachments

LITERATURE CITED

Electric Power Research Institute; D. Dixon. August 2007. Movement Behavior of American eel (*Anguilla rostrata*) on an Angled Louver Array at a Hydroelectric Project.

Normandeau Associates. April 2007. American Eel Emigration Approach and Downstream Passage Routes at the Holyoke Project, 2006.

Paul S. Duchenev  
October 27, 2016

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cc: FERC, Secretary  
FERC, DHL  
NPS, Kevin Mendik  
FERC, DHAC, Tom Papsidero  
EPA, Ralph Abele  
MA DFW, Caleb Slater  
MA DEP, Bob Kubit  
MA DEP, Therese Beaudoin  
Reading File  
ES: JRosset:10-27-16:603-227-6436

**Study Request #1**  
**Downstream American Eel Passage Assessment**  
**at Holyoke Canal Louver**  
(Albion A, P-2768; Albion D, P-2766; Nonotuck P-2771)

***Goals and Objectives***

The goal of this study is to assess the behavior and downstream movement patterns of emigrating American eels at the canal entrance and inside the canal at the full depth louver located at Holyoke Gas and Electric's (HG&E) Holyoke Project, FERC Project No. 2004. It is important to understand the passage routes at the louver and within the canal, as well as the potential for delay, injury, and mortality to assess any alternative management options that may be needed to increase survival at the Albion A, Albion D, and Nonotuck units.

The objectives of this study are:

1. assess the effectiveness of the full depth louver facility to effectively guide downstream migrating American eels into the tailrace of Project No. 2004; and
2. describe and assign routes of passage and fate for all tagged eels released into the upper end of the canal.

***Resource Management Goals***

The Atlantic States Marine Fisheries Commission (ASMFC) has developed two documents related to the management of American eel:

1. Interstate Fishery Management Plan for American Eel. April 2000. Atlantic States Marine Fisheries Commission.
2. Addendum II to the Fishery Management Plan for American Eel. Atlantic States Marine Fisheries Commission. Approved October 23, 2008. 8 pp.

Objectives of the management plan include: (1) protect and enhance American eel abundance in all watersheds where eel now occur; and (2) where practical, restore American eel to those waters where they had historical abundance, but may now be absent, by providing access to inland waters for glass eel, elvers, and yellow eel, and adequate escapement to the ocean for pre-spawning adult eel.

Addendum II contains specific recommendations for improving upstream and downstream passage of American eel, including requesting that member states and jurisdictions seek special consideration for American eel in the Federal Energy Regulatory Commission relicensing process.

In addition, the Connecticut River Atlantic Salmon Commission (CRASC) developed A Management Plan for American Eel (*Anguilla rostrata*) in the Connecticut River Basin in 2005. The goal of the plan is “to protect and enhance the abundance of the American eel resource to ensure its continued role in the Connecticut River Basin ecosystem...” Management objectives in the plan include the following:

1. protect and enhance eel populations where they currently exist;
2. where practical, restore populations to waters where they had historical abundance;
3. provide effective upstream and downstream fish passage around dams and other barriers within the species’ range in the basin; and
4. comply with all requirements of the Fishery Management Plan of the ASMFC.

Based on these plans, the U.S. Fish and Wildlife Service (Service) seeks the accomplishment of a number of resource goals and objectives through the relicensing process for the projects. General goals include the following:

1. ensure that protection, mitigation and enhancement measures are commensurate with project effects and help meet regional fish and wildlife objectives for the basin; and
2. conserve, protect, and enhance the habitats for fish, wildlife, and plants that continue to be affected by the projects.

Specific to downstream passage of American eel, the Service’s goals are:

1. minimize current and potential negative project operation effects that could hinder management goals and objectives; and
2. minimize project-related sources of downstream passage delay, injury, stress, and mortality in order to maximize the number of silver eels migrating to the spawning grounds.

Our study requests are intended to facilitate the collection of information necessary to conduct effects analyses and to develop reasonable and prudent conservation measures, and protection, mitigation, and enhancement measures pursuant to the Endangered Species Act of 1973, as amended (16 U.S.C. §1531 *et seq.*), the Fish and Wildlife Coordination Act, as amended (16 U.S.C. §661 *et seq.*), and the Federal Power Act (16 U.S.C. §791a, *et seq.*).

### ***Public Interest***

The requester is a resource agency.

### ***Existing Information***

Fish can enter the farthest upstream point of the Holyoke canal through the gatehouse gates located at HG&E’s Holyoke Project, FERC Project No. 2004. Once in the canal, fish either move along the louver, enter the fish bypass and are conveyed to the tailrace of Project No. 2004, or enter the three-level canal system by passing through the louver slats. The PAD discusses two studies conducted at the Holyoke Project specific to American eel (EPRI 2007 and Normandeau 2007). However, the referenced EPRI 2007 study tagged 60 eels but did not describe their

individual routes of passage; rather, it described the movement of 12 eels through the bypass and 12 eels through the louver. Normandeau (2007) was not specific to the canal system, as the 20 tagged eels used in this study were released approximately one mile upstream of the Holyoke Dam in the middle of the Connecticut River. Recently, independent researcher Don Pugh used the EPRI 2007 study data to assign a route of passage to 57 of the 60 tagged eels and found that 54.4 percent were safely bypassed to the tailrace, while 45.6 percent passed through the louver (Don Pugh, pers. comm.). While nearly 50 percent of 57 eels were shown to have passed through the louver, there is some concern that, since the eels used in the study had previously encountered the louver system, those eels may be more likely to use the same route again, thereby biasing passage results in favor of higher effectiveness.

To date, there have been no directed studies of eel route selection specific to the canal. Specifically, it is unclear what proportion of eels are guided by the louver and enter the bypass, and what proportion enter the three-level canal through the louver. Additionally, if eels get through the louver, it is unclear if they will survive in the canal system and/or be able to navigate back to the Connecticut River. These information gaps need to be filled so resource agencies can assess the relative and cumulative impact of the Albion A, Albion B, Nonotuck and other canal project operations on down-migrating eels.

#### *Nexus to Project Operations and Effects*

The Albion A, Albion D, Nonotuck and other canal units may result in eel mortality if eels are able to pass through the existing louver system, as there are no safe alternative downstream passage routes out of the canal. Previously conducted studies pertaining to eels are not specific to the canal or louver, thus it is unclear what percentage of the down-migrating population successfully enters the bypass system or passes through the louvers and enters the three-level canal system.

#### *Methodology Consistent with Accepted Practice*

In order to understand the movements of outmigrating eels as they relate to operations at the Holyoke louver system, radio telemetry technology should be utilized. Radio telemetry is an accepted technology that has been used for a number of studies associated with hydropower projects.

Studies should be designed to investigate route selection (i.e., bypass vs. passing through the louver) and the route eels take once they enter the canal.

#### Objective 1: Route Selection

This study will involve systematic releases of radio-tagged silver phase eels downstream of the Holyoke Project gatehouse to assess routes of passage through the canal system. Active downstream migrants should be collected within-basin if possible (i.e., Turners Falls bypass sampler), but fish sourced from out of basin are also acceptable to meet sample size demands. Experimental fish must meet morphometric (e.g., eye diameter relative to body size) criteria to ensure they are migrant silver phase. Collections should be made within the migratory season (late August to mid-October), and eels should be tagged and released within 7 days of collection.

A minimum number of 50 telemetered eels (e.g., five separate groups of approximately 10 eels each) will be required to maximize the data return. Eels will be released downstream of the canal gatehouse. Radio telemetry antennas will be strategically placed to assess louver guidance and passage, and passage through the canal system by unguided eels.

Data analyses of route selection will follow standard methodology.

Project operation (flows, levels, gate openings, and which canal units are operating, and operation level) and environmental conditions (river flow, temperature, turbidity, air temperature, precipitation) will be monitored regularly (hourly measurements if possible) throughout the duration of the studies.

These methodologies are consistent with accepted practice.

***Level of Effort/Cost, and Why Alternative Studies will Not Suffice***

The level of cost and effort for the downstream eel passage study would be moderate; silver eels would need to be collected, tagged, and released over the course of the migration season. Antennas and receivers would need to be installed at the canal entrance, as well as at strategic locations in the canal system, and monitored regularly. Data would need to be retrieved periodically and then analyzed. A multi-site route selection study conducted by the USGS Conte Lab on the Shetucket River in Connecticut cost approximately \$75,000 for the first year of study.

## **REFERENCES**

Electric Power Research Institute; D. Dixon. August 2007. Movement Behavior of American eel (*Anguilla rostrata*) on an Angled Louver Array at a Hydroelectric Project.

Normandeau Associates. April 2007. American Eel Emigration Approach and Downstream Passage Routes at the Holyoke Project, 2006.