

**HOLYOKE GAS & ELECTRIC DEPARTMENT
HYDROELECTRIC SYSTEM
LIHI APPLICATION
VOLUME 1**



**Prepared for:
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HOLYOKE GAS & ELECTRIC HYDROELECTRIC SYSTEM

LIHI APPLICATION

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VOLUME 2 (on disk only)

**FERC LICENSES AND HOLYOKE PROJECT (FERC 2004) SETTLEMENT
AGREEMENT**

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Section 1

Low Impact Hydro Questionnaire

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LOW IMPACT HYDROPOWER QUESTIONNAIRE

This Application for Low Impact Hydropower Certification includes seventeen developments under twelve separate FERC licenses. Responses to some questions require individual responses for each station or license. However, the majority of the questions require a discussion of the entire Holyoke Gas & Electric Department (HG&E) hydropower system, encompassing the Hadley Falls station on the Connecticut River and sixteen stations on the Holyoke Canal System¹. This is due to the fact that the Holyoke License, which includes the Hadley Falls Station and five of the canal stations, includes numerous conditions that affect all sixteen canal stations despite their separate licensing status (e.g., fish passage and protection measures, rare, threatened and endangered (RTE) species monitoring, and canal flows and operations).

The following Table 1-1 provided project and development names, capacities and licensing status, in response to several questions on the Application Form below. Detailed responses to most questions are provided in the following sections of this Application.

¹ HG&E owns two stations on the canal system, Crocker Mill A&B and Crocker Mill C, that are currently inoperable and slated for decommissioning. These two stations are therefore not included in this application. In addition, there are three other stations on the canal system (Aubin, Sonoco and Parsons) that are not owned by HG&E, which are also not covered by this Application.

**TABLE 1-1
PROJECT/DEVELOPMENT INFORMATION**

FERC Project Number	Project Name	Development	License Issue Date	Water Quality Cert. Date	Turbines	Location	Approx. Hydraulic Capacity (CFS)	Licensed Installed Capacity (KW)	Annual Generation (MWH)
2004	Holyoke	Hadley Falls	8/20/99, major amendment 4/20/05 per Settlement	3/19/01	1 & 2	River	8,400	30,800	189,122
		Boatlock Station			1, 2 & 3	1st to 2nd	2,205	3,230	13,167
		Riverside			4, 5, 7 & 8	2nd to River	3750	7,040	30,094
		Chemical			A & B	3rd to River	1020	1600	5,423
		Beebe-Holbrook			E & F	1st to 2nd	264	250	806
		Skinner			A	1st to 2nd	240	300	841
7758	Holyoke 4	City #4	8/15/06	4/10/06 waived	J & K	1st to 2nd	340	375	1,440
2386	Holyoke 1	City #1	2/28/89	8/24/87	A,B, C & D	1st to 2nd	850	1056	3,187
2387	Holyoke 2	City #2	9/28/88	3/30/87	A	1st to 2nd	760	800	4,670
2772	Gillmill A	Gillmill A	6/29/89	3/30/89	A	2nd to River	200	450	1,183
2775	Gillmill D	Gillmill D	6/29/89	30/30/89	D	2nd to River	170	450	1,159
2771	Nonotuck	Nonotuck	6/29/89	3/30/89	E	2nd to River	260	500	1,045
2497	Mt Tom Mill	Mt Tom Mill	6/29/89	3/30/89	A	2nd to River	310	500	1,378
2768	Albion Mill A	Albion Mill	6/29/89	3/30/89	A	2nd to River	200	312	779
2766	Albion Mill D	Albion Mill	6/29/89	3/30/89	D	2nd to River	240	500	761
2758	Crocker Mill	Crocker Mill	6/29/89	3/30/89	A-B	2nd to River	310	350	*0
2770	Crocker Mill C	Crocker Mill	6/29/89	3/30/89	C	2nd to River	150	350	*0
10806	Station No. 5	Valley	6/29/90	8/16/89	A	2nd to River	490	790	3,267
2388	Holyoke 3	City #3	9/28/88	9/28/88	A	2nd to 3rd	720	450	2,225
TOTALS								50,739	260,546

*Crocker Mill units are currently not operating and are slated for decommissioning.

APPLICATION

Background Information	Applicant Answer
1) Name of the Facility.	See Table 1-1 for project names, and the development(s) included in each FERC licensed project
2) Applicant’s name, contact information and relationship to the Facility. If the Applicant is not the Facility owner/operator, also provide the name and contact information for the Facility owner and operator.	Mr. James M. Lavelle, Manager City of Holyoke Gas & Electric Department 99 Suffolk St. Holyoke, MA 01040 Phone (413) 536-9311
3) Location of Facility by river and state.	Connecticut River and Holyoke Canal System, Massachusetts See Table 1-1 for location of each canal station (canal level 1, 2 or 3) and where the station discharges to (river or lower canal level).
4) Installed capacity.	See Table 1-1.
5) Average annual generation.	See Table 1-1.
6) Regulatory status.	The dates of the current FERC Licenses and Water Quality Certifications for each Project are provided in Table 1-1. It should be noted that subsequent to issuance of the Holyoke License in 1999 the project was purchased from the Holyoke Water Power Company by HG&E. HG&E then initiated settlement discussions to address unresolved rehearing requests. A Settlement Agreement between HG&E, state and federal resource agencies and non-governmental organizations was filed with FERC on March 12, 2004. The terms and conditions of the Settlement Agreement and the related 2005 FERC License Amendment supersede the 1999 license, and the previously-filed agency recommendations for the Holyoke Project.
7) Reservoir volume and surface area measured at the high water mark in an average water year.	The Holyoke Dam reservoir volume is 26,000 acre-feet and the total surface area is 2,290 acres. The Holyoke Canal System receives flow from the Connecticut River at the canal headworks immediately upstream of the Hadley Dam. The Hadley Dam creates the impoundment for both Hadley Falls Station and the canal system and canal generating stations. The canal system has an approximate surface area of 60 acres and an estimated volume of 970 acre-feet.

<p>8) Area occupied by non-reservoir facilities (e.g., dam, penstocks, powerhouse).</p>	<p>The area occupied by non-reservoir facilities at the Hadley Falls Station is approximately 10 acres. This includes the dam, penstocks, powerhouse fish passage facilities and access roads. An accurate estimate of the area occupied by all of the canal station project facilities can not be determined because most stations are located within buildings owned by others that are used for unrelated light commercial and industrial purposes. The hydro units occupy very small areas within these larger buildings.</p>
<p>9) Number of acres inundated by the Facility.</p>	<p>The number of acres inundated by the Holyoke Dam is 2,290 acres.</p>
<p>10) Number of acres contained in a 200-foot zone extending around entire impoundment.</p>	<p>Approximately 1,164 acres are contained within the 200-foot zone extending around the 48 mile long shoreline of the Holyoke impoundment.</p>
<p>11) Please attach a list of contacts in the relevant Resource Agencies and in non-governmental organizations that have been involved in recommending conditions for your Facility.</p>	<p>A list of key resource agencies and NGOs involved in license proceedings and the Holyoke Project Settlement Agreement is provided in Appendix A.</p>
<p>12) Please attach a description of the Facility, its mode of operation (i.e., peaking/run of river) and a map of the Facility.</p>	<p>A description of the Projects is provided in Section 2 of this Application. All of HG&E’s projects are operated in a run-of-river mode. Operation of all projects is directed by the numerous flow requirements established under the Settlement Agreement and 2005 Amended License. Therefore, project operations are addressed in Section 3 in association with a discussion of resource protection and fish passage related flow requirements.</p>
<p>Questions for “New” Facilities Only: If the Facility you are applying for is “new” i.e., an existing dam that added or increased power generation capacity after August of 1998 please answer the following questions to determine eligibility for the program</p>	<p>No “new” capacity has been added since August 1998. Several units at various stations have been rehabilitated with new runners and generator rewinds, which has optimized generation of the existing stations and units, but no completely new units have been installed.</p>
<p>13) When was the dam associated with the Facility completed?</p>	<p>Not Applicable</p>

<p>14) When did the added or increased generation first generate electricity? If the added or increased generation is not yet operational, please answer question 18 as well.</p>	<p>Not Applicable</p>
<p>15) Did the added or increased power generation capacity require or include any new dam or other diversion structure?</p>	<p>Not Applicable</p>
<p>16) Did the added or increased capacity include or require a change in water flow through the facility that worsened conditions for fish, wildlife, or water quality (for example, did operations change from run-of-river to peaking)?</p>	<p>Not Applicable</p>
<p>17) (a) Was the existing dam recommended for removal or decommissioning by resource agencies, or recommended for removal or decommissioning by a broad representation of interested persons and organizations in the local and/or regional community prior to the added or increased capacity?</p> <p>(b) If you answered “yes” to question 17(a), the Facility is not eligible for certification, unless you can show that the added or increased capacity resulted in specific measures to improve fish, wildlife, or water quality protection at the existing dam. If such measures were a result, please explain.</p>	<p>No resource agency or other organization has recommended removal of the Holyoke Dam, or decommissioning of any of HG&E’s stations.</p>
<p>18) (a) If the increased or added generation is not yet operational, has the increased or added generation received regulatory authorization (e.g., approval by the Federal Energy Regulatory Commission)? If not, the facility is not eligible</p>	<p>Not Applicable</p>

<p>for consideration; and</p> <p>(b) Are there any pending appeals or litigation regarding that authorization? If so, the facility is not eligible for consideration.</p>	<p>Not Applicable</p>		
<p>A. Flows</p>	<p>PASS</p>	<p>FAIL</p>	<p>Applicant Answer</p>
<p>1) Is the Facility in Compliance with Resource Agency Recommendations issued after December 31, 1986 regarding flow conditions for fish and wildlife protection, mitigation and enhancement (including in-stream flows, ramping and peaking rate conditions, and seasonal and episodic instream flow variations) for both the reach below the tailrace and all bypass reaches?</p>	<p>YES = Pass, Go to B</p> <p>N/A = Go to A2</p>	<p>NO = Fail</p>	<p>Yes. See section 3 of this Application for discussion of flow requirements for Holyoke Dam, Hadley Falls Station and the Holyoke Canal System.</p>
<p>2) If there is no flow condition recommended by any Resource Agency for the Facility, or if the recommendation was issued prior to January 1, 1987, is the Facility in Compliance with a flow release schedule, both below the tailrace and in all bypass reaches, that at a minimum meets Aquatic Base Flow standards or “good” habitat flow standards calculated using the Montana-Tennant method?</p>	<p>YES = Pass, go to B</p> <p>NO = Go to A3</p>		<p>Not Applicable</p>
<p>3) If the Facility is unable to meet the flow standards in A.2., has the Applicant demonstrated, and obtained a letter from the relevant Resource Agency confirming that demonstration, that the flow conditions at the Facility are</p>	<p>YES = Pass, go to B</p>	<p>NO = Fail</p>	<p>Not Applicable</p>

appropriately protective of fish, wildlife, and water quality?			
B. Water Quality	PASS	FAIL	
1) Is the Facility either: a) In Compliance with all conditions issued pursuant to a Clean Water Act Section 401 water quality certification issued for the Facility after December 31, 1986? Or b) In Compliance with the quantitative water quality standards established by the state that support designated uses pursuant to the federal Clean Water Act in the Facility area and in the downstream reach?	YES = Go to B2	NO = Fail	Yes. See Section 4 of this Application for a discussion of water quality in the Project areas.
2) Is the Facility area or the downstream reach currently identified by the state as not meeting water quality standards (including narrative and numeric criteria and designated uses) pursuant to Section 303(d) of the Clean Water Act?	YES = Go to B3 NO = Pass		Yes, but non-attainment is not project related. See Section 4 of this Application for a discussion of water quality in the Project areas.
3) If the answer to question B.2 is yes, has there been a determination that the Facility is not a cause of that violation?	YES = Pass	NO = Fail	Yes, non-attainment is not project related. See Section 4 of this Application for a discussion of water quality in the Project areas.
C. Fish Passage and Protection	PASS	FAIL	
1) Is the Facility in Compliance with Mandatory Fish Passage Prescriptions for upstream and downstream passage of anadromous and catadromous fish issued by Resource Agencies after December 31, 1986?	YES = Go to C5 N/A = Go to C2	NO = Fail	Yes. See Section 5 of this application for a discussion of fish passage requirements and provisions related to the Holyoke Dam, Hadley Falls Station and Holyoke Canal projects.

<p>2) Are there historic records of anadromous and/or catadromous fish movement through the Facility area, but anadromous and/or catadromous fish do not presently move through the Facility area (e.g., because passage is blocked at a downstream dam or the fish run is extinct)?</p>	<p>YES = Go to C2a NO = Go to C3</p>		<p>No. See Section 5 of this application for a discussion of historic fisheries, and fish passage requirements and provisions related to the Hadley Falls Station, Holyoke Dam and Holyoke Canal System.</p>
<p>a) If the fish are extinct or extirpated from the Facility area or downstream reach, has the Applicant demonstrated that the extinction or extirpation was not due in whole or part to the Facility?</p>	<p>YES = Go to C2b N/A = Go to C2b</p>	<p>NO = Fail</p>	<p>Not Applicable.</p>
<p>b) If a Resource Agency Recommended adoption of upstream and/or downstream fish passage measures at a specific future date, or when a triggering event occurs (such as completion of passage through a downstream obstruction or the completion of a specified process), has the Facility owner/operator made a legally enforceable commitment to provide such passage?</p>	<p>YES = Go to C5 N/A = Go to C3</p>	<p>NO = Fail</p>	<p>Not Applicable.</p>

<p>3) If, since December 31, 1986:</p> <p>a) Resource Agencies have had the opportunity to issue, and considered issuing, a Mandatory Fish Passage Prescription for upstream and/or downstream passage of anadromous or catadromous fish (including delayed installation as described in C2a above), and</p> <p>b) The Resource Agencies declined to issue a Mandatory Fish Passage Prescription,</p> <p>c) Was a reason for the Resource Agencies' declining to issue a Mandatory Fish Passage Prescription one of the following: (1) the technological infeasibility of passage, (2) the absence of habitat upstream of the Facility due at least in part to inundation by the Facility impoundment, or (3) the anadromous or catadromous fish are no longer present in the Facility area and/or downstream reach due in whole or part to the presence of the Facility?</p>	<p>NO = Go to C5 N/A = Go to C4</p>	<p>YES = Fail</p>	<p>No. See Section 5 of this application for a discussion of fish passage requirements and provisions related to the Hadley Falls Station, Holyoke Dam and Holyoke Canal System</p>
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<p>4) If C3 was not applicable: a) Are upstream and downstream fish passage survival rates for anadromous and catadromous fish at the dam each documented at greater than 95% over 80% of the run using a generally accepted monitoring methodology? Or b) If the Facility is unable to meet the fish passage standards in 4.a., has the Applicant demonstrated, and obtained a letter from the US Fish and Wildlife Service or National Marine Fisheries Service confirming that demonstration, that the upstream and downstream fish passage measures (if any) at the Facility are appropriately protective of the fishery resource?</p>	<p>YES = Go to C5</p>	<p>NO = Fail</p>	<p>Yes. See Section 5 of this application for a discussion of fish passage requirements and provisions related to the Holyoke Dam, Hadley Falls Station and Holyoke Canal System</p>
<p>5) Is the Facility in Compliance with Mandatory Fish Passage Prescriptions for upstream and/or downstream passage of Riverine fish?</p>	<p>YES = Go to C6 N/A = Go to C6</p>	<p>NO = Fail</p>	<p>Yes. See Section 5 of this application for a discussion of fish passage requirements and provisions related to the Holyoke Dam, Hadley Falls Station and Holyoke Canal System.</p>
<p>6) Is the Facility in Compliance with Resource Agency Recommendations for Riverine, anadromous and catadromous fish entrainment protection, such as tailrace barriers?</p>	<p>YES = Pass, go to D N/A = Pass, go to D</p>	<p>NO = Fail</p>	<p>Yes. See Section 5 of this application for a discussion of fish passage requirements and provisions related to the Holyoke Dam, Hadley Falls Station and Holyoke Canal System</p>

D. Watershed Protection	PASS	FAIL	
<p>1) Is there a buffer zone dedicated for conservation purposes (to protect fish and wildlife habitat, water quality, aesthetics and/or low-impact recreation) extending 200 feet from the high water mark in an average water year around 50 - 100% of the impoundment, and for all of the undeveloped shoreline</p>	<p>YES = Pass, go to E and receive 3 extra years of certification</p>	<p>NO = go to D2</p>	<p>No. There is a buffer zone but it does not encompass 50% or more of the impoundment shoreline. See Section 6 of this application for a discussion of shoreline protection requirements and provisions related to the Holyoke Impoundment.</p>
<p>2) Has the facility owner/operator established an approved watershed enhancement fund that: 1) could achieve within the project's watershed the ecological and recreational equivalent of land protection in D.1.,and 2) has the agreement of appropriate stakeholders and state and federal resource agencies?</p>	<p>YES = Pass, go to E and receive 3 extra years of certification</p>	<p>NO = go to D3</p>	<p>No. See Section 6 of this application for a discussion of shoreline protection requirements and provisions related to the Holyoke Impoundment.</p>
<p>3) Has the facility owner/operator established through a settlement agreement with appropriate stakeholders and that has state and federal resource agencies agreement an appropriate shoreland buffer or equivalent watershed land protection plan for conservation purposes (to protect fish and wildlife habitat, water quality, aesthetics and/or low impact recreation).</p>	<p>YES = Pass, go to E</p>	<p>NO = go to D4</p>	<p>Yes. See Section 6 of this application for a discussion of shoreline protection requirements and provisions related to the Holyoke Impoundment.</p>

<p>4) Is the facility in compliance with both state and federal resource agencies recommendations in a license approved shoreland management plan regarding protection, mitigation or enhancement of shorelands surrounding the project.</p>	<p>YES = Pass, go to E</p>	<p>No = Fail</p>	<p>Yes. See Section 6 of this application for a discussion of shoreline protection requirements and provisions related to the Holyoke impoundment.</p>
<p>E. Threatened and Endangered Species Protection</p>	<p>PASS</p>	<p>FAIL</p>	
<p>1) Are threatened or endangered species listed under state or federal Endangered Species Acts present in the Facility area and/or downstream reach?</p>	<p>YES = Go to E2 NO = Pass, go to F</p>		<p>Yes. See Section 7 of this application for a discussion of threatened and endangered species protection measures.</p>
<p>2) If a recovery plan has been adopted for the threatened or endangered species pursuant to Section 4(f) of the Endangered Species Act or similar state provision, is the Facility in Compliance with all recommendations in the plan relevant to the Facility?</p>	<p>YES = Go to E3 N/A = Go to E3</p>	<p>NO = Fail</p>	<p>No recovery plan has been developed. See Section 7 of this application for a discussion of threatened and endangered species protection measures.</p>
<p>3) If the Facility has received authority to incidentally take a listed species through: (i) Having a relevant agency complete consultation pursuant to ESA Section 7 resulting in a biological opinion, a habitat recovery plan, and/or (if needed) an incidental Take statement; (ii) Obtaining an incidental Take permit</p>	<p>YES = Go to E4 N/A = Go to E5</p>	<p>NO = Fail</p>	<p>Yes. See Section 7 of this application for a discussion of threatened and endangered species protection measures.</p>

<p>pursuant to ESA Section 10; or (iii) For species listed by a state and not by the federal government, obtaining authority pursuant to similar state procedures; is the Facility in Compliance with conditions pursuant to that authority?</p>			
<p>4) If a biological opinion applicable to the Facility for the threatened or endangered species has been issued, can the Applicant demonstrate that:</p> <p>a) The biological opinion was accompanied by a FERC license or exemption or a habitat conservation plan? Or</p> <p>b) The biological opinion was issued pursuant to or consistent with a recovery plan for the endangered or threatened species? Or</p> <p>c) There is no recovery plan for the threatened or endangered species under active development by the relevant Resource Agency? Or</p> <p>d) The recovery plan under active development will have no material effect on the Facility's operations?</p>	<p>YES = Pass, go to F</p>	<p>NO = Fail</p>	<p>Yes. See Section 7 of this application for a discussion of threatened and endangered species protection measures.</p>
<p>5) If E.2. and E.3. are not applicable, has the Applicant demonstrated that the Facility and Facility operations do not negatively affect listed species?</p>	<p>YES = Pass, go to F</p>	<p>NO = Fail</p>	<p>Yes. See Section 7 of this application for a discussion of threatened and endangered species protection measures.</p>

F. Cultural Resource Protection	PASS	FAIL	
1) If FERC-regulated, is the Facility in Compliance with all requirements regarding Cultural Resource protection, mitigation or enhancement included in the FERC license or exemption?	YES = Pass, go to G N/A = Go to F2	NO = Fail	Yes. (Holyoke Project, FERC No. 2004). See Section 8 of this application for a discussion of cultural resources protection measures.
2) If not FERC-regulated, does the Facility owner/operator have in place (and is in Compliance with) a plan for the protection, mitigation or enhancement of impacts to Cultural Resources approved by the relevant state or federal agency or Native American Tribe, or a letter from a senior officer of the relevant agency or Tribe that no plan is needed because Cultural Resources are not negatively affected by the Facility?	YES = Pass, go to G	NO = Fail	Yes (Canal projects not included under FERC Project No. 2004). See Section 8 of this application for a discussion of cultural resources protection measures.
G. Recreation	PASS	FAIL	
1) If FERC-regulated, is the Facility in Compliance with the recreational access, accommodation (including recreational flow releases) and facilities conditions in its FERC license or exemption?	YES = Go to G3 N/A = Go to G2	NO = Fail	Yes (Holyoke Project, FERC No. 2004). See Section 9 of this application for a discussion of recreation resource measures.
2) If not FERC-regulated, does the Facility provide recreational access, accommodation (including recreational flow releases) and facilities, as Recommended by Resource Agencies or other agencies responsible for recreation?	YES = Go to G3	NO = Fail	Yes. (canal projects not included under FERC No. 2004).). See Section 9 of this application for a discussion of recreation resource measures.

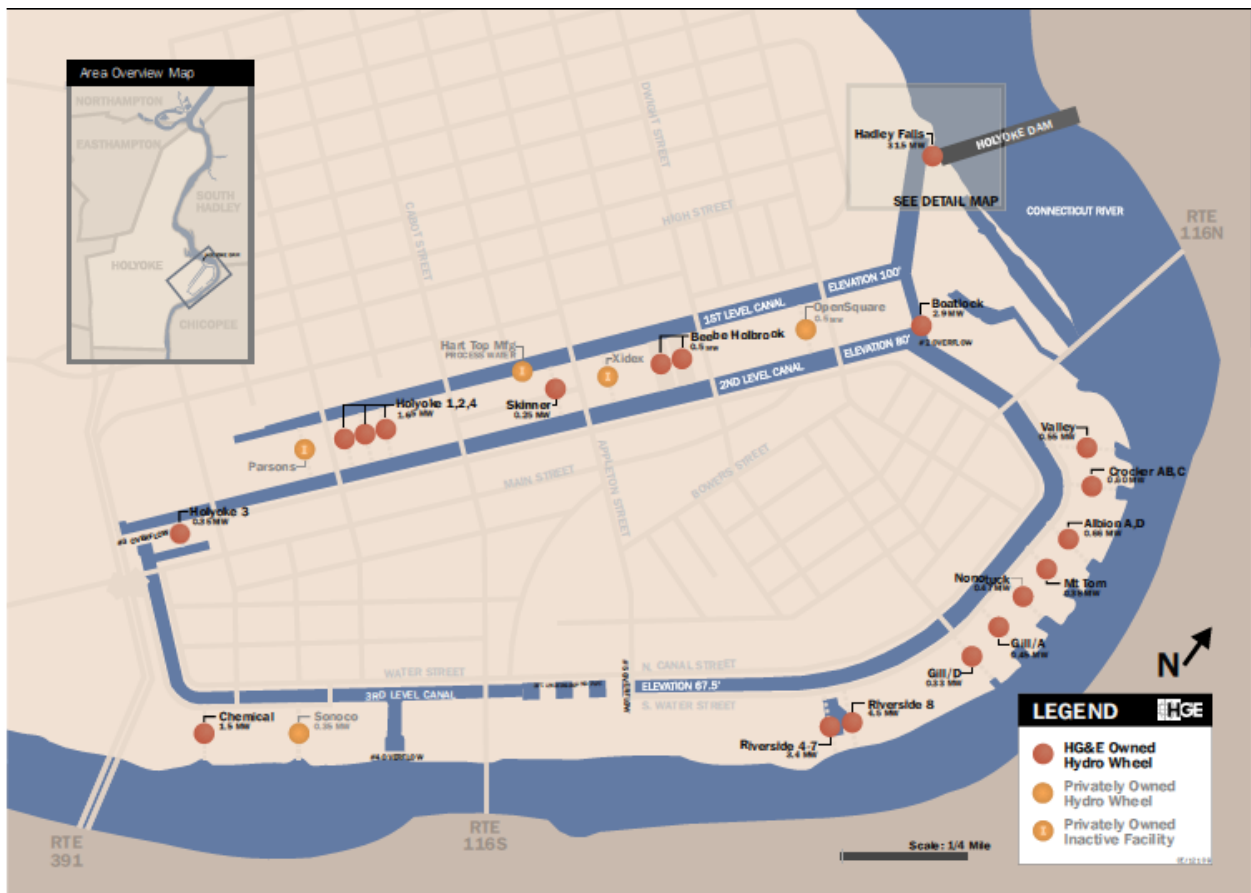
3) Does the Facility allow access to the reservoir and downstream reaches without fees or charges?	YES = Pass, go to H	NO = Fail	Yes. See Section 9 of this application for a discussion of recreation resource measures.
H. Facilities Recommended for Removal	PASS	FAIL	
1) Is there a Resource Agency Recommendation for removal of the dam associated with the Facility?	NO = Pass, Facility is Low Impact	YES = Fail	No. No resource agency has recommended removal of the Hadley Falls dam or decommissioning of any of the developments addressed in this Application.

Section 2

Project Descriptions and Maps

This Application for Low Impact Hydropower Certification is for the Holyoke Hydroelectric System, which includes seventeen developments under twelve separate FERC licenses. The Holyoke Project License (FERC No. 2004) includes the Hadley Falls Station and five of the canal stations. The remaining canal stations are separately licensed, as listed in Section 1, Table 1-1, of this Application. Only one of the stations, Hadley Falls, has a dam and an impoundment. The remaining stations are located on the Holyoke canal system (Figure 2-1). The following sections provide descriptions of each station.

FIGURE 2-1
CITY OF HOLYOKE'S SYSTEM OVERVIEW



2.1 Hadley Falls Station

The Hadley Falls Station is the largest generating station in the HG&E system. Hadley Falls is part of the Holyoke Project (FERC No. 2004), which passes Connecticut River flows by means of releases through the Hadley Falls generating station and the Holyoke Canal Gatehouse, both located at the Holyoke abutment of the dam.

Upstream and downstream eel and fish passages, and fish exclusion/protection facilities, are installed at the Projects. These facilities are discussed further in Section 5 of this Application.

2.1.1 Holyoke Dam

Holyoke Dam is oriented in the north-south direction and is of rubble masonry construction finished with ashlar granite. The structure is about 30 feet high above the foundation rock and 1,020 feet from abutment to abutment.

Five 3.5-foot-high, inflatable flashboard sections were installed on the spillway crest of the Holyoke Dam in 2001, replacing the previous wooden flashboards. The inflatable flashboard system extends across the entire crest, except at the south end adjacent to the powerhouse intake, where an approximately 25-foot-wide bascule gate with a permanent crest elevation of 94.60 feet is located. The inflatable flashboard system sections are automated with a programmable control system, but can also be operated manually if the need arises. They are programmed to sequentially deflate at the pond elevation settings such that the Holyoke pond will not drop below the minimum pond elevation.

2.1.2 Hadley Falls Station Units

There are four gated openings at the Hadley Falls Station leading to two 28-foot-diameter reinforced concrete penstocks extending to each unit. The majority of each penstock is buried. Hadley Unit 1 was installed in 1950 and has a 15.8 MW generator. Hadley Unit 1 is a full Kaplan (double regulated) turbine with a diameter of 14 ft, 2 in, and a hydraulic capacity of 4,500 cfs. Hadley Unit 2 was installed in 1983 and has a 15 MW generator. Hadley Unit 2 has a turbine with a fixed blade propeller with a 13 ft diameter, and a hydraulic capacity of 3,750 cfs.

Flows passed through the Hadley Falls Station are discharged into a 2,750-foot-long tailrace, a walled channel between the shore and the streambed.

2.1.3 Impoundment

The Hadley Falls Impoundment is a long narrow reservoir, extending approximately 25 river-miles from the Holyoke Dam upstream on the river with a surface area of approximately 2,290 acres. The elevation at the dam at normal maximum is 100.60 feet NGVD. The Impoundment is divided into an upper section (the portion upstream of the narrow section of the river adjacent to the local landmark known as Dinosaur Footprints) and a lower section (the portion between the narrows and the Holyoke Dam, 5 miles south of the narrows). The upstream end of this riverine reservoir is relatively shallow while deeper waters exist in the downstream section nearer the dam.

2.1.4 Bypass Reach

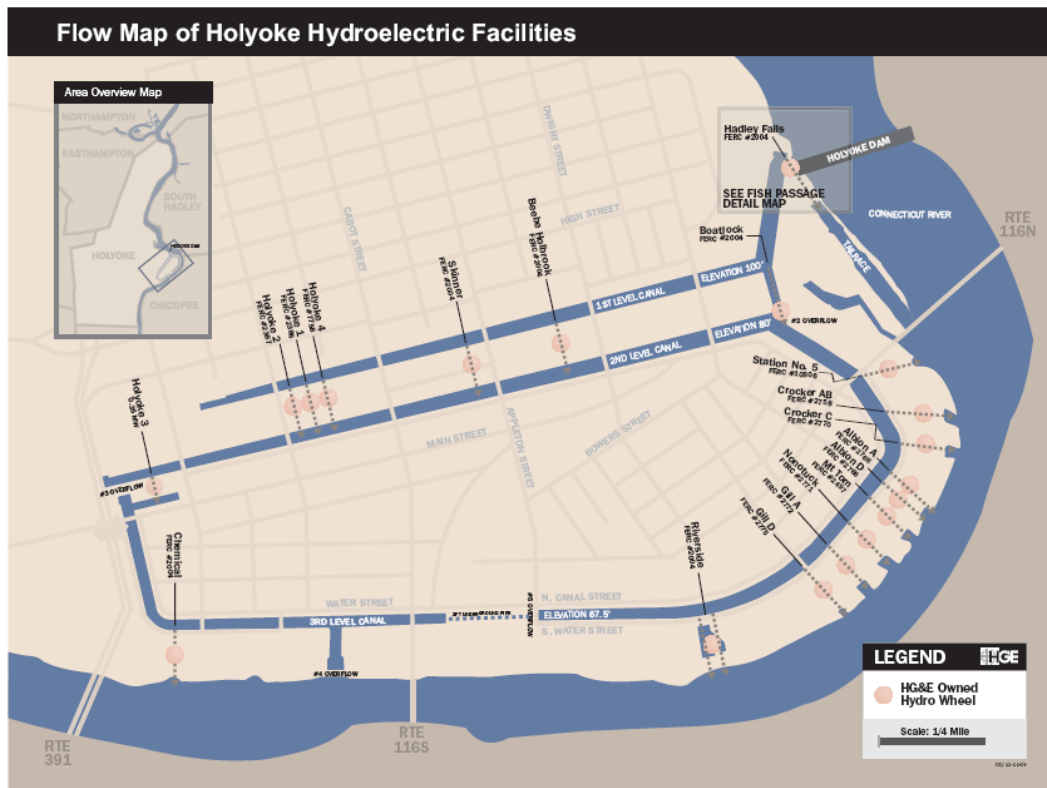
The Hadley Falls Bypass Reach is a wide, rocky section of river that extends approximately 3,000 feet from the Holyoke dam downstream to its confluence with the Hadley Falls Station tailrace and Second Level Canal (Valley Station) tailrace, and is comprised of three channels (i.e., the East Channel, the Center Channel, and the West Channel). The upper Bypass Reach, from the dam to the Route 116 Bridge, is characterized by shallow rocky areas with bedrock, boulder and cobble substrates. The reach is well scoured with little fines. The lower Bypass Reach, from the Route 116 Bridge downstream to the tailrace Canal, contains large deep pools. The No. 2 Overflow raceway is also part of the Bypass Reach. This is 2,500-foot long remnant channel that extends from Boatlock station downstream to the Hadley Falls tailrace. This raceway contains a mixture of cobble, gravel and sand substrates with pools, runs and riffles.

2.2 Holyoke Canal System Stations

The Holyoke Canal system consists of three levels, referred to as First, Second, and Third Level Canals (Figure 2-2). There are a total of eighteen hydroelectric generating stations currently in service on the Holyoke Canal system that are owned and operated by HG&E. The Canal system begins with the Canal gatehouse structure located between the Hadley Falls Station and the western shore. There is a downstream fish passage Louver facility, which begins 554 ft

downstream of the Canal gatehouse. The fish exclusion louver system is angled across the Canal and is 440 ft long. It ends at a bypass facility and pipe which transports migrating fish to the Hadley Falls Station tailrace. The gatehouse discharges water into the First Level Canal, a subsystem about 6,500 ft long, running through the City of Holyoke. The No. 1 Overflow structure, which is located immediately downstream of the gatehouse, discharges water directly back to the Hadley Falls Station tailrace, or to the fishlift attraction water.

**FIGURE 2-2
HG&E CANAL UNITS AND EXISTING FLOW SCHEME**



The First Level Canal discharges water into the Second Level Canal through nine generating stations located along its length; six of these stations are owned and operated by HG&E. The HG&E licensed Projects (all operational) on the First Level Canal are: Boatlock, Beebe-Holbrook, and Skinner (all covered in FERC No. 2004); Holyoke 1 (FERC No. 2386); Holyoke 2 (FERC No. 2387); and Number 4 Hydro (FERC No. 7758). The First Level Canal also includes two unlicensed projects—Aubin (also known as Anitec) and the out-of-service Parsons station; neither of these is owned or operated by HG&E.

The Second Level Canal includes nine in-service generating stations, the No. 2 Overflow structure that discharges into the Hadley Falls Station tailrace, the No. 3 Overflow, and a pipe that discharge to the Third Level Canal. The following stations on the Second Level Canal are located between the Second Level Canal and the Connecticut River about 3,500 ft north of the Boston & Maine Railroad bridge: Riverside (FERC No. 2004), Station No. 5 (FERC No. 10806), Albion Mill D (FERC No. 2766), Albion Mill A (FERC No. 2768), Mt. Tom Mill (FERC No. 2497), Nonotuck (FERC No. 2771), Gillmill A (FERC No. 2772), and Gillmill D (FERC No. 2775). Crocker Mill A and B (FERC No. 2758) and Crocker Mill C (FERC No. 2770), which are out of service and slated for decommissioning, are also located on the Second Level Canal. The Holyoke 3 station (FERC No. 2388) is located between the Second and Third Level Canals.

The Third Level Canal is supplied with water from the Holyoke 3 station and the No. 3 Overflow. It is about 4,000 ft in length, and is located largely at the low-lying southern end of the Canal system in the City of Holyoke, mostly parallel to the bank of the Connecticut River. The Third Level Canal includes the No. 4 Overflow structure located between the Canal and the Connecticut River. The Chemical (FERC No. 2004) and Sonoco (unlicensed and not owned by HG&E) stations are located between the Third Level Canal and the Connecticut River about 3,400 ft south of the railroad bridge.

2.2.1 Boatlock Station (FERC No. 2004)

The Boatlock station is located between the First and Second Level canals. The powerhouse structure is an L-shaped building with a concrete substructure and a brick superstructure with a length of 120 feet and widths of 42 feet and 60 feet. The power station dates from the early 1920's and houses one 700-kW unit, one 1,200-kW unit, and one 1,330-kW unit. All are vertical-axis Francis units.

2.2.2 Beebe-Holbrook Station (FERC No. 2004)

The Beebe-Holbrook station is also located between the First and Second Level canals, about 2,000 feet south of the Boatlock Station. The powerhouse is a concrete and brick structure with a length of 126 feet, a width of 42 feet and a height of 29 feet. The power station dates from the late 1940's and houses one 250 kW vertical-axis Francis unit.

2.2.3 Skinner Station (FERC No. 2004)

The Skinner station is located between the First and Second Level canals, about 1,600 feet south of the Beebe-Holbrook Station. The installation dates from 1924, and is housed in a non-project building. Water is delivered through a 150-foot long, 9-foot diameter steel penstock. There is one 300-kW, vertical-axis, and Francis unit.

2.2.4 Holyoke 1 (FERC No. 2386)

The Holyoke 1 Project, located between the First and Second Level canals, was constructed in 1893 to generate electricity using available flows and a 19.5-foot differential between two levels of the Holyoke Canal System. The Holyoke 1 station consists a brick powerhouse 38 feet wide and 50 feet long containing two 240-kW and two 288-kW turbine-generators with a total capacity of 1,056 kW; two steel penstocks 10 feet in diameter and 36.5 feet long; two tailraces 328.5 feet long and 20 feet wide; and appurtenant facilities.

2.2.5 Holyoke 2 (FERC No. 2387)

The Holyoke 2 Project, located between the First and Second Level canal, commenced operation in 1938. Project works consist of: an intake at the wall of the Holyoke first level canal; two parallel 9-footdiameter steel penstocks each 240 feet long; one surge tank about 17 feet high and 10 feet in diameter; a powerhouse 60 feet long, 40 feet wide and about 50 feet high, containing one vertical turbine-generator unit rated at 800 kW and 1,017 hp; two parallel brick arched tailrace conduits, each 9 feet wide, 10 feet high and 120 feet long, discharging into the Holyoke second level canal; one 4.8-kV transmission line, 800 feet long; and appurtenant facilities.

2.2.6 Holyoke 4 (FERC No. 7758)

The Holyoke 4 Project is also located between the First and Second Level canals. Project works consist of: two 7-foot-diameter, 76-foot-long penstocks drawing water from the first level canal of the Holyoke Canal System; a powerhouse with two 375-kW generating units with a total installed capacity of 750 kW (one of the generating units was destroyed in an October 2004 fire and is currently not operating); two 13-foot-wide, 300-foot-long tailraces discharging into the second level canal; a 25-foot-long, 4.8-kV transmission line; and appurtenant facilities.

2.2.7 Riverside (FERC No. 2004)

The Riverside Station is located between the Second Level canal and the Connecticut River about 3,500 feet north of the Boston & Maine Railroad bridge. The station has two distinct powerhouses of concrete and brick. Units 4, 5, 6, and 7 are housed in a structure 105 feet long, 58 feet wide and 24 feet high. Unit 4 is an 880-kW set and Unit 5 is a 600-kW set. Both are horizontal-axis Francis units. Unit 6 is also a horizontal-axis Francis unit, but it has been partially dismantled and placed in deactivated reserve status. It is rated 600-kW when active. Unit 7 is a 1,560-kW vertical-axis Francis set. Unit 8 is housed in a separate powerhouse of concrete and brick, with a length of 47 feet, a width of 35 feet, and a height of 31 feet. Unit 8 is vertical-axis propeller set, rated at 4,000 kW.

2.2.8 Station No. 5 (Valley) (FERC No. 10806)

Station No. 5 (Valley) Project is located between the Second and Third Level canals. Project works consisting of: a gated intake with trashracks located on the Second Level Canal of the Holyoke Water Power Company; two 75-foot-long, 6.5-foot-diameter, steel penstocks; a refurbished single-runner, vertical Kaplan turbine connected to a 790-kW generator; a 375-foot-long, 16.5-foot-wide by 11-foot-high arched brick-lined tailrace tunnel; (a steel gate where the tailwater empties into the Connecticut River; a 4.8-kilovolt, 370-foot-long interconnection with HG&E's underground service line, and appurtenant facilities.

2.2.9 Crocker Mill A and B (FERC No. 2758)

The Crocker Mill, located between the Second and Third Level canals, was constructed in 1864 and the present hydroelectric generating unit was installed in 1986. Project works consist of: a gated intake with submerged trashracks located on the second level canal; a 10-foot-diameter steel penstock 225 feet long; a 350-kW generating unit located in the Crocker Mill building; a 10-foot-wide by 8-foot-high arched brick-lined tailrace tunnel 230 feet long extending from the draft tube to an existing concrete outlet structure; a concrete gated outlet structure where tailwater empties into a channel that leads to the Connecticut River; a 13.8-kV transmission line 140 feet long that connects the project to an existing transmission line; and appurtenant facilities. The Crocker Mill units are currently not operating and are slated for decommissioning in 2010.

2.2.10 Crocker Mill C (FERC No. 2770)

The Crocker Mill, located between the Second and Third Level canals, was constructed in 1864 and the present hydroelectric generating unit was rebuilt in 1984. The project consists of: a gated intake with submerged trashracks located on the second level canal of the Holyoke Water Power Company; a 10-foot-diameter penstock 225 feet long; an existing 350-kilowatt (kW) generating unit located in the Crocker Mill building; a 10-foot-wide by 8-foot-high arched brick-lined tailrace tunnel 230 feet long extending from the draft tube to an existing concrete outlet structure; a concrete gated outlet structure where tailwater empties into a channel that leads to the Connecticut River; a 13.8-kilovolt transmission line 140 feet long that connects the project to an existing transmission line; and appurtenant facilities. The Crocker Mill units are currently not operating and are slated for decommissioning in 2010.

2.2.11 Albion Mill D (FERC No. 2766)

The Albion Mill, located between the Second and Third Level canals, was constructed in 1877 and the present hydroelectric generating unit was installed in 1954 and rebuilt in 1983. Project works consist of: a gated intake with submerged trashracks located on the second level canal; a 190-foot-long, 9-foot-diameter steel penstock; a single runner, Francis turbine directly coupled to a 500-kilowatt (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-kilovolt (kV), 605-foot-long transmission line, and a 13.8-kV, 90-foot-long transmission line and appurtenant facilities

2.2.12 Albion Mill A (FERC No. 2768)

The Albion Mill, located between the Second and Third Level canals, was constructed in 1877 and the present hydroelectric generating unit was installed in 1954 and rebuilt in 1983. Project works consisting of: a gated intake with submerged trashracks located on the Second Level Canal; a 180-foot-long, 8-foot-diameter steel penstock; a single runner, Francis turbine directly coupled to a 312-kilowatt (kW) Westinghouse generator; a 260-foot-long, 16-foot-wide by 9-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-kilovolt (kV), 650-foot-long transmission line, and a 13.8-kV, 90-foot-long transmission line; and appurtenant facilities.

2.2.13 Mt. Tom Mill (FERC No. 2497)

Mt. Tom Project is located between the Second and Third Level canals. Project works consist of: a gated intake with submerged trashracks located on the Second Level Canal; a 230-foot-long 8-foot-diameter steel penstock; a single runner, Francis turbine directly coupled to a 500-kilowatt (kW) Westinghouse generator; a 205-foot-long, 9-foot-wide by 6-foot-high arched, bricklined tailrace tunnel; a concrete gated outlet structure where the tailwater empties into a channel that leads to the Connecticut River; a 0.6-kilovolt (kV), 240-foot-long transmission line, and a 13.8-kV, 90-footlong transmission line and appurtenant facilities.

2.2.14 Nonotuck (FERC No. 2771)

The Nonotuck Mill, located between the Second and Third Level canals, was constructed in 1880 and the present hydroelectric generating unit was rebuilt in 1984. Project works consist of: a gated intake with submerged trashracks located on the second level canal; a 10.5-foot-diameter penstock 225 feet long; a 500-kW generating unit located in Nonotuck Mill building; a two parallel 9-foot-wide by 9-foot-high arched brick-lined tailrace tunnel 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.

2.2.15 Gillmill A (FERC No. 2772)

The Gill Mill, located between the Second and Third Level canals, was constructed in 1880 and the present hydroelectric generating unit was manufactured in 1919 and rewound in 1979. Project works consist of: a gated intake with submerged trashracks located on the second level canal of the Holyoke Water Power Company; an 8-foot-diameter penstock 295 feet long; a 450-kW generating unit located within the Gill Mill building; a 16-foot-wide by 9-foot-high arched bricklined tailrace tunnel extending from the draft tube to an existing outlet structure; a concrete gated outlet structure where tailwater empties into a channel that leads to the Connecticut River;

a 13.8-kV transmission line 660 feet long that connects the project to an existing transmission line; and appurtenant facilities.

2.2.16 Gillmill D (FERC No. 2775)

The Gill Mill, located between the Second and Third Level canals, was constructed in 1880 and the present hydroelectric generating unit rebuilt in 1983. Project works consist of: a gated intake with submerged trashracks located on the second level canal of the Holyoke Water Power Company; a 12-foot-diameter penstock 295 feet long; a 450- kW generating unit located within the Gill Mill building; two parallel 7-foot-wide by 10-foot-high arched brick-lined tailrace tunnels extending from the draft tube to an existing outlet structure; a concrete gated outlet structure where tailwater empties into a channel that leads to the Connecticut River; a 13.8-kV transmission line 660 feet long that connects the project to an existing transmission line; and appurtenant facilities.

2.2.17 Holyoke 3 Station (FERC No. 2388)

The Holyoke 3 Project commenced operation in 1940 and is located between the Second and Third Level canals. Project works consisting of: an intake trashrack about 47 feet long and 11 feet high covering an opening in the Holyoke Second Level Canal; two headgates about 11 feet square; two low pressure brick penstocks each about 85 feet long and 93 square feet in cross section; 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; an open tailrace about 118 feet long, 29.7 feet wide, and 10 feet deep; 4.8-kV generator leads that connect directly to the 4.8-kV area distribution system; and appurtenant facilities.

2.2.18 Chemical (FERC No. 2004)

The Chemical Station is located between the Third Level canal and the Connecticut River about 3,400 feet south of the railroad bridge. The installation is housed in a non-project industrial building. Water is delivered through a masonry flume about 260 feet long and 22 feet wide. The building housing the generating units is constructed of concrete and brick. The two units were installed in 1935. Unit 1 is a vertical-axis Kaplan set rated at 800 kW. Unit 2 is a vertical-axis

fixed-blade set, also rated 800 kW. The tailwater is carried to the river by two covered masonry flumes, each about 125 feet long, 15 feet wide and 9.5 feet high.

Section 3

Project Operations and Flows Related Provisions

The HG&E Hydroelectric System is operated in a Run-of-River (ROR) mode in compliance with numerous flow requirements established under the Settlement and Amended License. In addition to ROR operations, the HG&E system is operated under specific flow prioritization requirements, and provides bypass reach flows, canal flows, and fish passage flows. In addition, there is a low flow contingency plan for system operations. Although these requirements are set forth in the license for the Holyoke Project, they each affect canal flows and operations, and the facilities located there. Specific requirements include:

- Revised License Article (LA) 405 and 2001 Water Quality Certification (WQC) Condition 9 require the Project to operate in ROR mode, and provided for modifying where ROR operations are monitored to facilitate less fluctuations in the mid impoundment area.
- Revised LA 406 and 2001 WQC Condition 11 require the release of certain seasonally adjusted flows in the Bypass Reach and Canal system, and required that plans be developed to provide measures to distribute the flows into the Bypass Reach, and to provide means for measuring, recording, and reporting flows in the Bypass Reach.
- Revised LA 407 requires HG&E to implement the Comprehensive Operations and Flow Plan (COFP) as approved by the Commission on June 24, 2003 (103 FERC ¶ 62,178), with modifications as required under the Settlement Agreement. 2001 WQC Condition 12 prescribes the method and priority of releasing flows from the Project and require the development of plans describing how the required releases will be made during low-flow and normal operational years.
- Revised LAs 406 and 408 and WQC Condition 13 required filing of a revised Comprehensive Canal Operations Plan (CCOP), which HG&E filed with FERC, after completing consultation with agencies, on June 20, 2005. The provisions of the CCOP are a subset of the flow and operations provisions contained in the revised COFP.
- Revised LA 406 and LA 407 required HG&E to file modifications to the original COFP consistent with the Settlement Agreement. Pursuant to revised LA 407, HG&E is to follow a detailed consultation process, as set forth in revised LA 420, prior to submitting

to FERC any modifications or revisions to the original COFP. Revised LA 420 (based on Section 3.3 of the Settlement Agreement) set forth the steps for consultation with resource agencies and certain stakeholders involved in the Settlement.

- Revised LA 406 (and 2001 WQC Condition 11) require minimum habitat flows and minimum zone-of-passage (ZOP) flows based on whether the fishlifts at the Project are operational. As specified in revised LA 406(a)(2) [and Section 4.5(b) of the Settlement], the fishlifts will be operational at the Project from April 1 through November 15 of each year, as refined by USFWS, NOAA Fisheries, MADEP on an annual basis, except that the fishlifts will not be operational during the period July 15 through September 15 each year until such time as: (i) NOAA Fisheries determines that upstream passage of shortnose sturgeon is appropriate, or (ii) MDFW and USFWS determine that resident fish passage is necessary.

Operations under each of the above-listed revised LAs is described below. Tables 3-1, 3-3, and 3-3 below provide a summary of Project operations over a range of flows for Habitat Flows and for Spring and Fall ZOP flows for fish passage seasons.

**TABLE 3-1
OPERATIONS PLAN, SPRING FISH PASSAGE FLOWS (U/S AND D/S)**

Total Project Q (cfs)	Percent of Time Flow is Exceeded	Pond Elevation (ft)	FLOWS (cfs)										Flow into Canal		Flow into Bypass Reach		CANAL UNIT DISPATCH ⁵													
			Bascule Gate w/ Weir ***	Attraction Water from Canal***	Canal Downstream Bypass Flows	Canal Flows ⁶	Hadley 1	Hadley 2	Rubber Dam 5 ¹	Rubber Dam 1 ²	Rubber Dam 3 ³	Rubber Dam 2 ⁴					Rubber Dam 4 ⁵	1			2			3						
													Holyoke 2	Parsons	Aubin	Boatlock		Beebe-Holbrook	Skinner	Holyoke 1	No. 3 Overflow	Holyoke 4	Holyoke 3	Riverside	All Harris	Station No. 5	Chemical (1 unit)/ No.4 Overflow	Sonoco		
550	99.5%	102.9			150	400								550	0	X												X	X	
1,390	98.4%	102.9	600		150	400					240**			550	840**	X											X	X	X	X
2,090	97.4%	102.9	600	440	150	400					500**			990	1300**	X											X	X	X	X
2,970	95.3%	102.9	600	440	150	400	880				500**			990	1300**	X											X	X	X	X
3,390	94.1%	102.9	600	440	150	400	1,300				500**			990	1300**	X											X	X	X	X
5,390	86.7%	102.9	600	440	150	400	3,300				500**			990	1300**	X											X	X	X	X
5,390	86.8%	102.9	600	440	150	2,400	1,300				500**			2,990	1300**	X	X	X	X								X	X	X	X
12,340	80.1%	102.9	600	440	150	2,400	4,500	3,750			500**			2,990	1300**	X	X	X	X								X	X	X	X
15,940	50.0%	102.9	600	440	150	6,000	4,500	3,750	500**					6,590	1300**	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
17,040	47.1%	103.5	700	440	150	6,000	4,500	3,750	900	0	200	200	200	6,590	2,400	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
18,240	44.5%	103.5	700	440	150	6,000	4,500	3,750	900	1,200	200	200	200	6,590	3,600	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
28,640	26.1%	104.2	800	440	150	6,000	4,500	3,750	1,100	1,500	8,300	1,000	1,100	6,590	14,000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
31,740	22.8%	103.7	700	440	150	6,000	4,500	3,750	900	1,200	6,900	6,800	400	6,590	17,100	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
36,740	18.2%	103.5	700	440	150	6,000	4,500	3,750	900	1,200	6,400	6,300	6,400	6,590	22,100	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
40,700	15.1%	104.0	700	0	150	6,000	4,500	3,750	1,000	1,400	7,800	7,600	7,800	6,150	26,500	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

¹ 37 ft long Rubber Dam 5 deflated or partially deflated at all flows, except extreme low flow events
² 50 ft long Rubber Dam 1 auto deflation set at pond EI 103.5
³ 278 ft long Rubber Dam 3 auto deflation set at pond EI 104.2
⁴ 273 ft long Rubber Dam 2 auto deflation set at pond EI 103.7
⁵ 278 ft long Rubber Dam 4 auto deflation set at pond EI 103.5
⁶ Flows through the canal system will be distributed by generation and/or inter-canal leakage.

#,### Canal flows increase to a minimum of 2000 cfs by reducing Hadley Falls Unit #1 flows for compliance with the Water Quality Certificate. This operational limitation may change after full depth louver evaluations are complete.

* Harris units include Gill, Nonotuck, Mt. Tom, Albion, and Crocker

** Nominal values based on instream flow measurements. For compliance purposes, WSEL's from the IFIM study will be used and the cfs values may vary.

*** Maximum value shown

Shaded rubber dam values are with bags deflated

3.1 Run-of-River Operations

HG&E operates the Hadley Falls Project in ROR mode to maintain the Impoundment elevation with a minimum Impoundment elevation of 100.4 NGVD and an allowable fluctuation of ± 0.2 ft, and the procedures for documenting ROR operations. The ROR operating procedures were developed in accordance with revised LA 405 and 2001 WQC Condition 9.

Monitoring and documentation of ROR operation is performed at the Project. Headpond fluctuations within ± 0.2 ft of the normal pond elevation of 100.6 ft NGVD are maintained by operating the Canal headgates, Hadley Falls Station, the Bascule Gate, and the Rubber Dam.

HG&E originally utilized a headpond sensor installed during the completion of the Rubber Dam as the primary source of tracking elevations. All of the original head pond sensors were located in the immediate vicinity of the dam and were subject to perturbations in water surface elevations resulting from operation of the headgates, Hadley units, Bascule Gate, and Rubber Dams. In addition, due to variations in flows to the Holyoke Impoundment caused by operations of upstream projects and a flow restriction that exists in the mid-Holyoke Impoundment, it was believed that monitoring at the dam was not resulting in the most stable headpond conditions, especially in the mid Impoundment. Pursuant to Revised LA 405(b) HG&E evaluated and tested a potential modification to the ROR provisions (contained in Article 405 of the 1999 License Order and Condition 9 of the 2001 WQC) to more effectively limit fluctuations in the Impoundment. After several years of monitoring flows at a point upstream of the dam near Rainbow Beach, it was determined that using this location to monitor and control headpond levels provided for more stable and favorable water levels in the mid Impoundment, where recreational use (e.g., marinas) is greatest. In addition, the federally threatened and state endangered Puritan tiger beetle, which inhabits the Rainbow Beach area, is believed to benefit from more stable water levels in that reach. In 2007 HG&E requested approval to change its headpond monitoring location. FERC subsequently approved this modified operations for a three year period.

The headpond sensor records head pond elevation data, which is archived. A headpond sensor located near the Canal Headgate abutment is also used as a backup source. All signals from these devices are sent to the Canal Gatehouse, which is manned 24 hours per day, year round. Station operators adjust and balance flows through the station, Canal Headgate and Bascule Gate, or utilize sections of the Rubber Dam, to maintain normal pond elevations, while also providing any minimum flows to the Canal, fishways and Bypass Reach that are also required by the License.

In certain emergency situations beyond HG&E's control (such as extreme runoff events, droughts, ice conditions, or equipment failure), ROR operations may be temporarily modified, as allowed by revised LA 405(d) and 2001 WQC Condition 9. Under such circumstances, HG&E will notify MADEP, MADFW, NOAA Fisheries, USFWS, and FERC within 24 hours of the incident. This notification will be followed within 30 days by a written report that details the situation and identifies ways to avoid future modifications.

Should Impoundment elevations fall below the levels required by the License, HG&E must file with FERC, USFWS, NOAA Fisheries, MADEP, and MADFW a report of the incident within 45 days of the incident pursuant to revised LAs 405(d) and 421, and 2001 WQC Condition 9(b).

3.2 Low Flow Contingency Plan and Flow Prioritization

3.2.1 Low Flow Contingency Plan

During periods of low flow in the river, HG&E provides the minimum Canal flow (as set forth in Section 3.3 below) first, and then provides the applicable Bypass Reach flow (i.e., Bypass Habitat Flow or Bypass ZOP Flow, as set forth in Section 3.4 below), all subject to maintaining the ROR requirements (as set forth in Section 3.1 above). During fish passage seasons, HG&E distributes flows pursuant to the flow prioritization schedule set forth in Section 3.2.2 below.

Should minimum flows drop below the levels required by the License, HG&E implements notification procedures.

3.2.2 Flow Prioritization During Fish Passage Seasons

Pursuant to 2001 WQC Condition 12 (summarized below in Table 3-4), the specific flow priorities for the various Project features during spring and fall fish passage seasons, between the Canal system and the Bypass Reach, are as follows:

**TABLE 3-4
MINIMUM PROJECT FLOW PRIORITIZATION DURING FISH PASSAGE**

Priority	Spring Passage	Fall Passage
1	Canal to 400 cfs (plus 150 cfs for Louvers)	Canal to 400 cfs (plus 150 cfs for Louvers)
2	Bypass Reach Habitat Flows	Bypass Reach Habitat Flows
3	Fishway Attraction Water Up to 440 cfs	Fishway Attraction Water Up to 440 cfs
4	Bypass Reach ZOP Flows	Bypass Reach ZOP Flows
5	Hadley Falls Station Unit 1	Hadley Falls to capacity, as long as Canal has at least 3,000 cfs
6	Canal to 2,000 cfs	
7	Hadley Falls to capacity	

Tables 3-1, 3-2, and 3-3 further explain the distribution of Spring and Fall ZOP flows for upstream and downstream fish passage seasons.

3.2.3 Flow Prioritization

To reduce entrainment of American eel HG&E was required to develop a plan, in consultation with the resource agencies, to change flow prioritization from the Hadley Falls units to the Canal during nighttime periods from October 1 through the later of: (i) the time when the River temperature reaches 5° C., or (ii) November 30, unless otherwise agreed to with the resource agencies. The plan includes prioritizing the Canal first and then regulating the Hadley Falls Station.

3.3 Canal Flows

Revised LAs 406(c) and (d), revised LA 408 and 2001 WQC Condition 13 specify the requirements for operating the Canal system. HG&E filed its Comprehensive Canal Operation Plan (CCOP) on June 20, 2005, and supplemented it October 11, 2005. The Plan was approved by FERC on January 11, 2006.

The final CCOP has three components: 1) the canal operations plan; 2) a plan for protection and monitoring of aquatic resources in the canal system; and 3) the plan to exclude sturgeon and other fish from the fish-lift attraction water system. The CCOP describes HG&E's methods for releasing and circulating the required 400 cfs minimum flow through the canal system downstream of the louver bypass and achieving and maintaining the minimum canal flow and protective requirements for aquatic resources, including mussels, during canal maintenance drawdowns. The plan for protection and monitoring of aquatic resources in the canal provides for enhancement of mussel habitat in the canal system by installing a weir at the beginning of the First Level Canal, providing minimum canal flows, and implementing a drawdown procedure, which ensures continual watered conditions in mussel habitat areas. The plan outlines two mitigation efforts to enhance mussel survival and habitat conditions in the canals and includes provision of minimum canal flow and shifting of annual maintenance drawdown from the summer to the fall. Finally, the plan for excluding sturgeon and other fish from the fish-lift attraction system consists of a fish exclusion device, which has been installed at the No. 1 Overflow, in consultation with the resource agencies per Water Quality Certificate Condition No. 13.

3.4 Bypass Flows

Bypass Flows are set forth under revised LA 406, and Conditions 11(a) and 11(b) of the 2001 WQC. HG&E is required to release seasonally-adjusted minimum flows into the Bypass Reach, correlated to the Texon Gage, for: (1) the protection and enhancement of water quality and aquatic and fisheries resources (Bypass Habitat Flows); and (2) effective flows for migratory fish passage (Bypass ZOP Flows). The Bypass Zone-of-Passage Flows are released whenever the

fishlifts are operational (as set forth in revised LA 406(a)(2)). The fishlifts are operational at the Project from April 1 through November 15 of each year, as refined by USFWS, NOAA Fisheries, MADEP on an annual basis, except that the fishlifts will not be operational during the period July 15 through September 15 each year until such time as: (i) NOAA Fisheries determines that upstream passage of shortnose sturgeon is appropriate, or (ii) MDFW and USFWS determine that resident fish passage is necessary.

3.5 Bypass Zone-of-Passage Flows

Pursuant to Revised LA 406(a)(1), for ZOP flows HG&E will release flows to the Bypass Reach sufficient to achieve the water surface elevation in the Bypass Reach that corresponds to the 1997 Barnes & Williams IFIM Study of 1300 cfs flow, as measured in the Bypass Reach. As confirmed in revised LA 406(a)(1), that ZOP flow is achieved for compliance purposes by flows corresponding to a water surface elevation of 62.85 +/- 0.1 feet NGVD at the Texon Gage.

3.6 Spring Upstream Fish Passage Flows

During spring fish passage season (generally April 1-July 15), while water is first dispatched to the Canal system, the amount that is allocated depends on the river flow (Table 3-1). When river flows are below 5,390 cfs, 400 cfs is circulated in the First Level Canal below the Louver bypass and is normally to be discharged through HG&E's Holyoke 2 station into the Second Level Canal. From there, the water passes through the Holyoke 3 or No. 3 Overflow and Riverside Stations. Flow split approximately evenly between the two stations, which in turn maximizes flow distribution throughout the Second Level Canal. Water discharged from Holyoke 3 station enters the Third Level Canal, while water discharged from Riverside Station flows back into the Connecticut River. In the Third Level Canal, water is discharged through the Chemical Station, Sonoco Station, and/or the No. 4 Overflow back into the river.

When river flows reach approximately 5,390 cfs, water in the Canal system is increased from 400 cfs to 2,400 cfs. Station dispatch is as noted above, but on the First Level Canal, Parsons (or

other units under HG&E control), Aubin and Boatlock stations are also brought online, if the stations are operational.

As river flows approach approximately 15,940 cfs, flows into the Canal system are increased to a maximum of 6,600 cfs — 6,000 cfs for generation and 600 cfs for fish passage operation. At this point all available generating stations on all three Canal levels are able to generate.

3.7 Fall Upstream Fish Passage Flows

During fall fish passage season (generally September 16 – November 15), water is first dispatched to the Canal system; the amount that is allocated again depends on the river flow (Table 3–2).

When river flow is below 12,940 cfs, 400 cfs of water is passed into the First Level Canal and dispatched through HG&E's Holyoke 2 station into the Second Level Canal. From there, water is passed through the Holyoke 3 and Riverside stations. Water from Holyoke 3 enters the Third Level Canal, while flows from Riverside are discharged into the Connecticut River. In the Third Level Canal, flow passes through the Chemical Station and/or the No. 4 Overflow back into the river.

When river flows reach approximately 15,940 cfs, flows into the Canal system is increased to the maximum of 6,600 cfs — 6,000 cfs for generation and 600 cfs for fish passage operation. At this point, all available generating stations on all three Canal levels are able to generate.

3.8 Bypass Habitat Flows

Pursuant to revised LA 406(b), for Habitat flows HG&E releases flows to the Bypass Reach sufficient to achieve the water surface elevations in the Bypass Reach that correspond to the 1997 Barnes & Williams IFIM Study of 840 cfs flow as measured in the Bypass Reach. As

confirmed in revised LA 406(b)(1), that Habitat flow is achieved for compliance purposes by flows corresponding to a water surface elevation of 62.3 +/- 0.1 feet NGVD at the Texon Gage.

The Habitat Flow described above was first established as the Interim Bypass Habitat Flow. As described in revised LA 406(b)(2), HG&E implemented a plan to evaluate the original Interim Bypass Habitat Flows and to determine whether there was a need to modify the West Channel or change the Interim Bypass Habitat Flows. By letter filed with FERC on March 28, 2005 (and accepted by FERC by order dated May 5, 2005)², HG&E confirmed that, after consultation with the resource agencies, the Interim Bypass Habitat Flow was agreed to become the Permanent Bypass Habitat Flow.

During the period of Habitat flows (generally July 16–September 15, and November 16–March 31), water is again first dispatched to the Canal system and the amount that is allocated depends on the river flow (Table 3–3).

When river flows are less than 11,290 cfs, 400 cfs enters the First Level Canal and is dispatched through HG&E's Holyoke 2 station into the Second Level Canal. From there, water is passed through the Holyoke 3 and Riverside stations. Water from Holyoke 3 enters the Third Level Canal, while water from Riverside discharges back into the Connecticut River. In the Third Level Canal, water is passed through the Chemical Station, Sonoco Station, and/or the No. 4 Overflow back into the river.

When river flows reach approximately 11,290 cfs but are below 15,090 cfs, flow in the Canal system is increased from 400 cfs to 2,200 cfs. Station dispatch is as noted above, but on the First Level Canal Boatlock Station is also brought online.

When river flows reach approximately 15,090 cfs, flows in the Canal system is increased to a maximum of 6,000 cfs. At this point all available generating stations on all three Canal levels are able to generate.

² See also HG&E's letter filed with the FERC on June 20, 2005.

3.9 Fish Passage Attraction Flows

3.9.1 Downstream Fish Passage Flows

Flows are required to operate the downstream fish passage facilities located in the First Level Canal and at Hadley Falls Station. The downstream fish passage flows for the Full Depth Canal Louver Facility, located in the First Level Canal, enter the First Level Canal through the Canal Headgates. The 150 cfs bypass flow is discharged through a gate specifically designed and installed as part of the Full Depth Canal Louver Facility. The gate is located at the downstream end of the facility and flows into a 3 ft diameter pipe that discharges into the Hadley Falls Station tailrace. The design flow of this gate and bypass pipe is constant since the Canal elevation does not vary and the bypass pipe is flowing full. Flows for this gate are recorded on the hourly log.

During October 2002, an exclusion device at the attraction water intake was installed. This exclusion device prohibits fish from entering the system that supplies attraction water to upstream passage facilities at the dam spillway and the Hadley Falls Station tailrace. The device is equipped with 1 inch clear opening screening; average water velocity at the screen is less than 2 ft/sec at full attraction water flow. The facility is capable of passing the maximum required flow of 420 cfs. Details on this exclusion device were included in HG&E's Threatened and Endangered Species Protection Plan, approved by FERC on June 6, 2003 (103 FERC ¶ 62,131).

HG&E is currently providing downstream fish passage flows at the Hadley Falls Station through the existing weir insert in the Bascule Gate and over Rubber Dam 5 (the section nearest the Bascule Gate). These facilities were designed primarily for surface oriented species such as Atlantic salmon and American shad. Flow is released through the insert and over Rubber Dam 5 (the section nearest the Bascule Gate). Flows of approximately 600 cfs are discharged through the weir on the west end of the dam and recorded on the hourly log. These flows contribute to the Bypass Reach minimum flows.

HG&E is currently working with resource agencies to finalize design specifications of an exclusion rack to be installed in front of the Hadley station intake, and a new downstream fish passage at the Holyoke Dam. Final engineering of the rack and bypass system will begin in 2010

and the system will be operational by 2013. Flows to be provided for downstream fish transport will be determined in consultation with agencies.

3.9.2 Upstream Fish Passage Flows

The upstream fish passage flows for the spillway and tailrace fishlifts attraction water systems are provided by the Canal drain gates located in the No. 1 Overflow structure in the First Level Canal. The attraction water at both lifts has been determined using standard gate discharge formulas, and flows recorded hourly into the log. Attraction water for the tailrace lift discharges into the Hadley Falls Station tailrace. Attraction water for the spillway lift discharges immediately downstream of the dam apron and contributes to the Bypass Reach ZOP and Habitat flows when in operation.

For eel passage, approximately 1 cfs of attraction water is provided to the two lifts on the Holyoke side during the evening hours. Eel passage attraction flow for the eel ladder on the South Hadley side of the Project is provided by its own attraction water system as part of the ladder design and construction.

3.10 Hadley Falls Station Flows

Flows that pass through the Hadley Falls Station Unit 1 and 2 are discharged to the station tailrace which enters the Connecticut River approximately one half mile below the dam. Generation flows through the Hadley Falls Station units are derived by the turbine manufacturer's data correlating generation to hydraulic flows. Hadley Falls Station generation records are continuously recorded, archived and recorded on the log. There are no minimum flow requirements through the Hadley Falls Station units under the new operating license.

Section 4

Water Quality

4.1 Compliance with Water Quality Certifications

All HG&E stations are in compliance with all conditions issued pursuant to the Clean Water Act Section 401 Water Quality Certifications for each project.

4.2 Holyoke Project and Connecticut River Monitoring

In general, water quality in the Connecticut River within the Holyoke Project area is good, meeting Commonwealth of Massachusetts Class B standards. Class B waters are designated as habitat for fish, other aquatic organisms and wildlife and are for primary and secondary contact recreation (e.g., swimming and boating). Overall, the Connecticut River meets Class B standards where land use is largely rural. Along the more heavily populated and industrialized reaches of the river, water quality degradation does occur. In Massachusetts, Class B standards are frequently violated by high fecal coliform concentrations, due primarily to combined sewer outflows from the towns of Holyoke, Chicopee, Springfield, and Ludlow. These reaches are listed as Category 5 (TMDL Needed) in the state's 2008 303(d) report for e. coli, PCB's in fish tissue and total suspended solids.

On August 10, 2001, FERC approved the Water Quality Monitoring Plan, in accordance with Article 404 of the Holyoke Project license. The objectives of the water quality monitoring conducted at the Project were to: (1) monitor the effects of project operation on project waters and the Connecticut River downstream of the Holyoke Project; (2) determine if bypass reach minimum flows required by this license are adequate to ensure that water temperature and dissolved oxygen meet State standards; and (3) monitor the effects of construction related activity on water quality.

Monitoring is conducted three times per year and reports were filed with FERC each year from 2000-2005 after consultation with resource agencies. Results were as follows:

- In 2000, all parameters measured were within the water quality standards for Class B waters, except for one higher fecal coliform reading, which was not project related.
- In 2001, all parameters measured were within the Class B water quality standards, except for higher water temperature readings in August. It was concluded that the high water temperatures measured in the vicinity of the Holyoke Dam were caused by low river flows and naturally high water temperatures that occur during August in the Connecticut River.
- In 2002, all parameters measured were within the Class B water quality standards, except for two incidents: (1) below threshold measurements of pH in May, and (2) higher than standard fecal coliform measurements in November 2002. It was determined that these were not project related.
- In 2003, all parameters measured were within the Class B water quality standards, except pH in November 2003. It was agreed that the pH readings were not related to project operations.
- In 2004, all measured parameters were within the required standards, except the August and November fecal coliform results were above the Class B standard of 200 units per 100 milliliters (ml). The resulting fecal coliform levels were 450 (per 100 ml) and 320 (per 100 ml), respectively. It was determined that these were not project related.
- In 2005, all measurements were within the accepted range for Massachusetts Class B Inland Warm-Water Fishery surface waters.

In 2006 HG&E consulted with the Massachusetts Department of Environmental Protection (MADEP), regarding the need for further reporting to FERC. MADEP agreed that further reporting to FERC was not necessary, stating that “[i]t is the Department's opinion that the Holyoke Project has not and is not expected to cause violations of state water quality standards

regarding temperature, pH, dissolved oxygen or fecal coliform.” FERC concurred, and issued a letter on October 5, 2006 eliminating further water quality reporting requirements for the Holyoke Project. However, HG&E is still required to file monitoring reports with the MADEP annually.

4.3 Canal Waters

The Holyoke canal is also a Class B waterway. The canal is not listed in the state’s 2008 303(d) report. HG&E monitors Temperature, dissolved oxygen and fecal coliform bacteria at two locations in the canal.

Section 5

Fish Passage & Protection

The Holyoke Dam is the first dam encountered by fish migrating up the Connecticut River to spawn. Providing safe and adequate passage has been a priority at the Holyoke Project since the late 1800s. Several fish passage ladders were installed between the mid 1800s and the mid-1900s. In 1955 the first fishlift was constructed at the Project. The fish passage facilities have undergone substantial modifications and improvements since that time. Today, the Holyoke Project provides excellent passage for migratory fish in the Holyoke Project area, include Atlantic salmon, American shad, blueback herring, alewife, stripped bass, American eel, sea lamprey and shortnose sturgeon, as discussed below.

5.1 Upstream Migratory Fish Passage Facilities

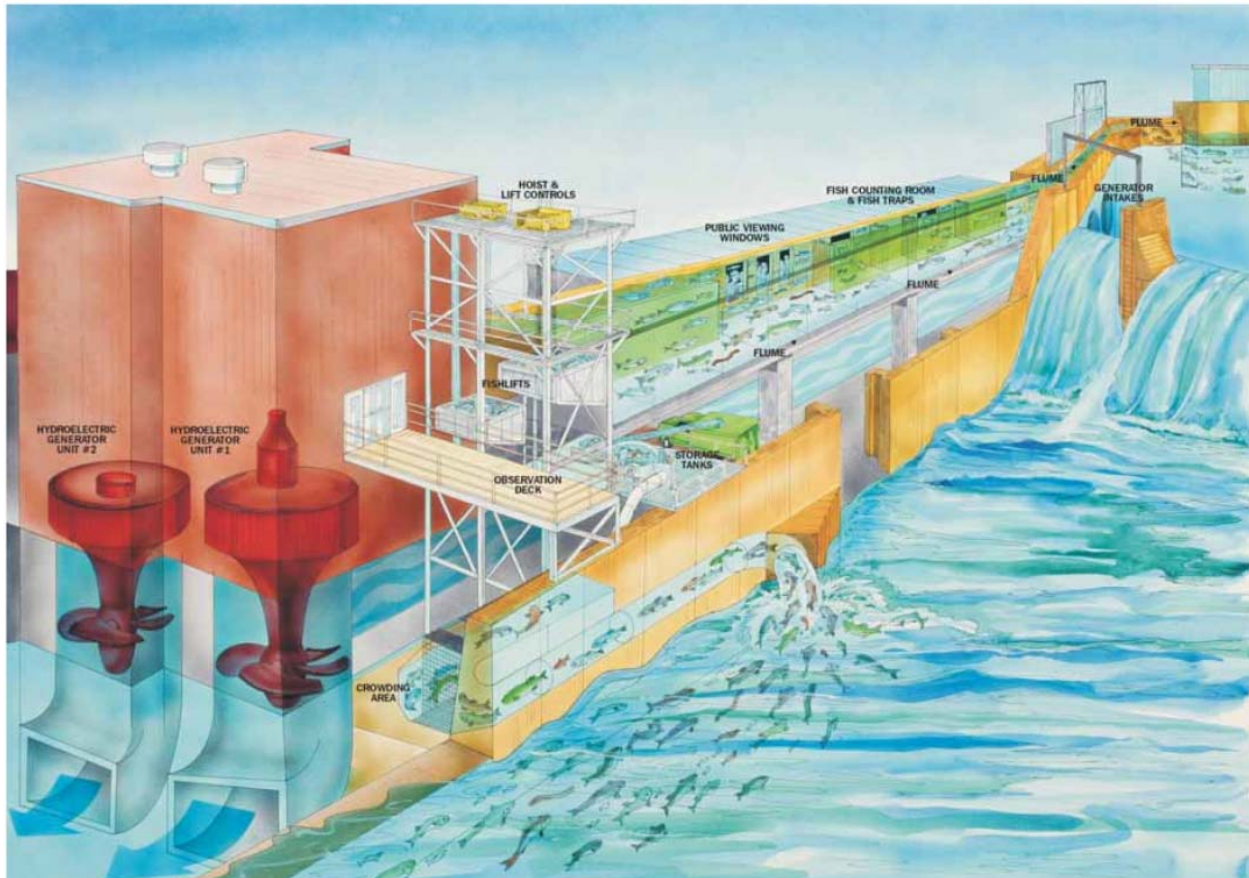
5.1.1 Fish Lift

The existing upstream fish passage facilities at the Hadley Falls Station consist of two fishlifts; one fishlift serves the Project tailrace and a second spillway fishlift serves the Project's Bypass Reach. An attraction water system draws water from the First Level Canal and serves both fishlifts. The two fishlifts discharge into a common exit flume, where a counting room is located between the lifts and the exit.

Pursuant to the LA 401 of the 1999 License Order and to the 2001 WQC, HG&E installed the Rubber Dam at the dam crest to allow better control of ZOP Flows released during the migration season and provide other flow enhancements. This Rubber Dam plays an important role in the overall Project operation including upstream fish migration.

HG&E also completed early in 2002 the installation of a backlit panel in the exit flume at the counting station. This was installed to aid in the enumeration and identification of fish passing by the viewing window during periods of high turbidity typically experienced during higher river flows. In October 2002, HG&E installed an exclusion device in the attraction water intake to prohibit shortnose sturgeon from entering the system that supplies attraction water to the upstream fish passage facilities at the fishlifts.

FIGURE 5-1
DIAGRAM OF UPSTREAM FISH PASSAGE FACILITIES



HG&E performed the following upstream fish passage facility enhancements prior to the filing of the Settlement: (1) installed the modified gate insert in the west tailrace entrance to improve flows for fish passage; (2) made modifications to the Holyoke (West) Channel in the Bypass Reach to reduce stranding of upstream migrants; (3) improved the “V Gate” in the tailrace entrance gallery to reduce shad milling; and (4) increased the elevation of the area above the Hadley Falls Station draft tubes to provide for operation up to 40,000 cfs river flow.

Subsequent to the Settlement, HG&E has completed the following work:

- (i) Replacement of the tailrace lift tower, auxiliary equipment and hopper to accommodate 33 cubic feet per minute capacity;
- (ii) Replacement of the spillway tower, auxiliary equipment and hopper to accommodate 46 cubic feet per minute capacity;
- (iii) Increase the width of the spillway transport channel to an average width of 6 feet;
- (iv) Modifications to the exit flume to accommodate the new spillway lift location;
- (v) Increase the width of the fish exit channel up to a maximum of 14 feet between the lift towers and the fish counting station;
- (vi) Installation of a high capacity adjustable drain valve in the flume;
- (vii) Addition of a second fish trap and viewing window in the exit flume;
- (viii) Expansion of the fish counting station to include both fish traps;
- (ix) Modification of the fish trapping and hauling system to improve the work area and minimize hoisting and netting of fish; and
- (x) Modification of the attraction water supply system to provide up to 200 cfs at the spillway entrance and 120 cfs at each of the tailrace entrances.
- (y) Installed new backlit ponds for both new trap facilities in 2005 as part of the fishlift construction.

HG&E continues to work with agencies to address suggested improvements to the fish passage systems and operations that can be undertaken cost effectively.

5.1.2 Upstream Eel Ladders

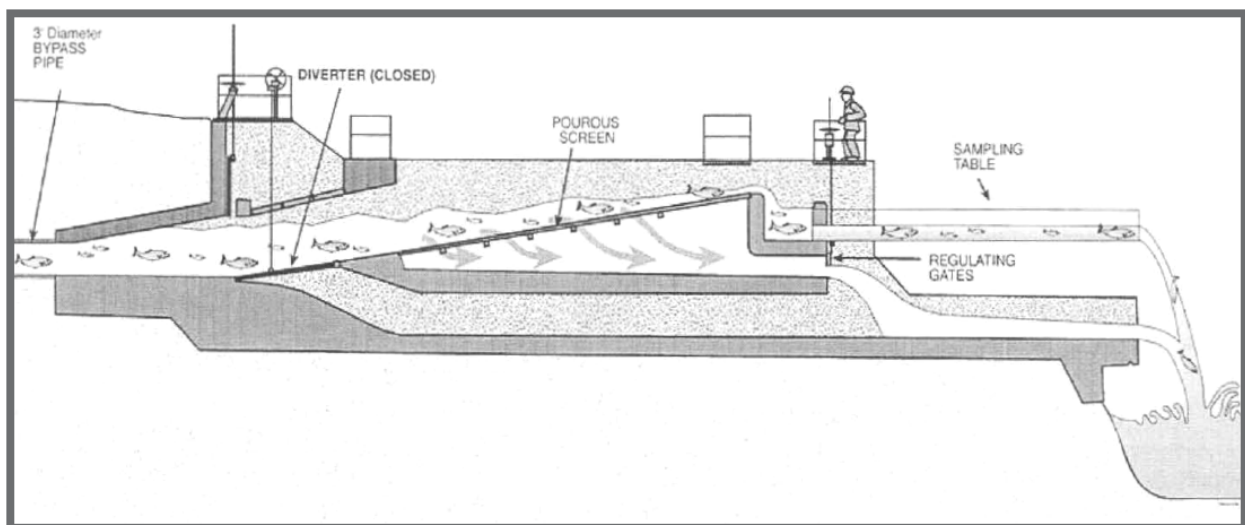
A permanent seasonal eel ramp on the South Hadley side of the Project was constructed in 2004 over the site of an old pool and weir fishway. HG&E is conducting ongoing studies to evaluate eel ramps within the spillway and tailrace fish lift structures as well as the spillway fishlift entrance on the Holyoke side of the dam. This work is being done under HG&E's Upstream Eel Passage Plan, in consultation with resource agencies.

5.2 Downstream Migratory Fish Passage Facilities

5.2.1 Canal Louver and Louver Bypass

The current primary downstream fish passage facilities at the Project are the Louver Bypass Facility (including the Full Depth Louvers and the Louver Bypass Discharge Pipe), and the Downstream Sampling Facility. The addition of the Full Depth Louver Bypass System (and Trash Rake) in October 2002 replaced an earlier Louver system(1993) that had been designed to guide and pass Atlantic salmon smolts, juvenile and adult American shad and blueback herring, all of which migrate close to the surface. In October 2002 modifications were made to guide bottom-oriented species to the bypass pipe and are described in further detail below. HG&E operates and maintains the Full Depth Louvers located in the Canal System. The purpose of the Full Depth Louvers is to create hydraulic conditions that guide approaching fish migrating downstream to the entrance of the bypass. The Downstream Fish Passage Louver facility begins 554 ft downstream of the Canal Gatehouse. The Louver extends across the First Level Canal at an angle and is 440 ft long. It diverts fish from the Canal into a pipe that bypasses the generating units and transports fish into the Hadley Station tailrace.

FIGURE 5-2
DIAGRAM OF DOWNSTREAM SAMPLING STATION OPERATION



5.2.2 Downstream Passage at Dam

HG&E is currently providing downstream fish passage flows at the Hadley Falls Station through the existing weir insert in the Bascule Gate and over Rubber Dam 5 (the section nearest the Bascule Gate). These facilities were designed primarily for surface oriented species such as Atlantic salmon smolts, American shad and Clupeids. Flow is released through the weir and over Rubber Dam 5 (the section nearest the Bascule Gate). Minimum flow requirements, as measured at the Texon gage, during ZOP periods are met by passing water through both the Rubber Dam 5 and the bascule gate.

5.2.3 Exclusion Rack

HG&E is currently working with the resource agencies to finalize design specifications of an exclusion rack to be installed in front of the Hadley station intake, and a new downstream fish passage facility at the Hadley Dam. Final engineering of the rack and bypass system will begin in 2010 and the system is planned to be operational by 2013. Flows to be provided for downstream fish transport will be determined in consultation with the resource agencies.

Section 6

Watershed Protection

HG&E filed a Comprehensive Recreation and Land Management Plan (CRLMP), pursuant to Article 418 of the license for the Holyoke Project No. 2004 on May 1, 2003. The plan was supplemented on July 14, 2003 and approved by FERC by Order dated March 31, 2004. Article 418 requires the licensee to file, for Commission approval, a CRLMP that includes a Recreation Plan, a Land Management Plan, and a Buffer Zone Management Plan. The land management Plan and Buffer Zone Management Plans are discussed below. Component of the Recreation Plan are discussed in Section 9 of this Application.

6.1 Land Management Plan

6.1.1 Conservation Restrictions

To meet the requirements for the Land Management Plan under article 418, HG&E proposed to place CRs on the entire Log Pond Cove parcel and a portion of the Cove Island parcel in perpetuity. HG&E proposed to designate the Massachusetts Division of Fisheries and Wildlife (MADFW) as the holder of the Log Pond CR; however, MADFW declined. Instead, the City of Holyoke Conservation Commission agreed to be the holder of this CR and the CR was executed and submitted to the State for approval in December 2007. In May 2009, HG&E received notification from the Commonwealth of Massachusetts, Executive Office of Energy and Environmental Affairs (EOEEA) indicating that although the Mayor and City Council approved the CR and the conservation commission was willing to accept it, the City of Holyoke could not convey a CR to the conservation commission on the basis of merger.

The Log Pond CR was designed to protect environmentally sensitive areas and resources by placing restrictions on future use and development. The CR specified the type of recreational activities and the associated land management activities to be implemented by HG&E. Despite the lack of a formal CR, HG&E plans to ensure continued riverfront access, maintain the property as existing open space, and allow recreational activities consistent with resource protection.

HG&E had also proposed to place a CR on lands it owns on Cove Island, with the Massachusetts Department of Conservation and Recreation (MADCR) as the co-holder. However, as report to the FERC in October 2007, MADCR has informally notified HG&E that it is no longer interested in being a co-holder of this CR. In addition, the Town of South Hadley has informed HG&E that it is also not interested in being a co-holder if the MADCR doesn't participate. HG&E is working to achieve closure on this matter and has requested formal notification from MADCR to confirm its position on the matter.

On December 13, 2001, HG&E accepted a CR on lands now owned by the Town of South Hadley and the Trustees of Mount Holyoke College (amended May 27, 2008) covering a buffer zone of approximately 60.6 acres in the Bachelor Brook/Stoney Brook area within the Holyoke Project boundary on lands which HG&E does not own. The lands in the Bachelor Brook/Stony Brook area covered by the CR are within a 200-foot-plus buffer of the high water level of the river, except as to lands owned by Mount Holyoke College where a 100-foot buffer zone is applicable. HG&E filed the CR and CR Amendment with the FERC on December 12, 2008, pursuant to the FERC's order issued October 31, 2008 (125 FERC ¶ 62,116). HG&E monitors this area to ensure that the conditions of the CR are being met.

6.1.2 Permitting Program

Through the Permitting Program, HG&E is fulfilling its obligation under the CRLMP to monitor recreational activity along the Holyoke Impoundment. Through the Permitting Program HG&E strives to balance the many competing demands for public use of the lands and waters of the Connecticut River within the Project area. The activities that fall under HG&E's Permitting Program include boat docks, boat ramps and water withdrawals. Prior to commencing any dock or ramp construction (including new construction or modification/expansion of an existing facility) an applicant must submit to HG&E an application for permission for this work. This application must be submitted concurrently with the applicant's submittal of a Massachusetts DEP Waterways permit. Prior to commencing a water withdrawal within the Holyoke Project Boundary that exceeds an average of 100,000 gallons per day throughout a calendar year and is subject to regulation by the Massachusetts Water Resources Commission, an applicant must submit to HG&E an application for permission for this work. This application must be submitted

with the applicant's submittal for a permit under the Water Management Act, M.G.L. Massachusetts Chapter 21 G. The full Program description is available on the HG&E website. To date, HG&E has issued 2 permits for dock construction.

6.1.3 Buffer Zone Management Plan

HG&E had developed and administers a Buffer Zone and Riparian Management Plan to comply with license article 418 and Water Quality Certificate Condition 19. In this plan, HG&E has designated a minimum 200-foot buffer zone along the Connecticut River within and adjacent to the project boundary on Log Pond Cove, Cove Island³, and all other HG&E-owned property. Within the shoreline buffer zone HG&E: limits shoreline construction; limits tree/vegetation removal; uses native species when plantings are necessary for screening or to prevent erosion; leave woody debris in place along shoreline for fish habitat; and allows no development, vegetation removal, or shoreline alterations in areas containing threatened or endangered species.

HG&E has also facilitated a meeting with MADCR, CRWC, PVPC, the Town of South Hadley Conservation Commission, the Holyoke Conservation Commission, and the Natural Resources Conservation Service and local conservation districts to develop a mission statement and planning tools to educate landowners on riparian buffer management. HG&E provides \$500 per year to CRWC, a non-profit group with the mission of protecting and enhancing the Connecticut River. HG&E also plans to evaluate the effectiveness of this riparian buffer land management education initiative every six years, consistent with the recreation monitoring required for the Form 80 review.

³ A 50-foot setback is required for existing dwellings on Cove Island. There are restrictions for vegetation removal within that 50-foot setback to prevent destruction to riparian habitat and to reduce the potential for shoreline erosion. The remainder of the shoreline on Cove Island is under the 200-foot buffer.

Section 7

Threatened and Endangered Species Protection

In accordance with License Article 416 HG&E filed its Threatened and Endangered Species Plan (T&E Plan) on July 15, 2002. The Plan was approved by FERC Order dated June 3, 2003. The T&E Plan includes provision related to the federally listed threatened bald eagle (*Haliaeetus leucocephalus*)⁴ and Puritan tiger beetle (*Cicindela puritana*), endangered shortnose sturgeon (*Acipenser brevirostrum*), and mussels including, but not necessarily limited to, the state listed endangered yellow lampmussel (*Lampsilis cariosa*) and dwarf wedge mussel (*Alismidonta heterodon*).

While preparing this application, HG&E consulted with the United States Fish and Wildlife Service (USFWS) and the Massachusetts Division of Fish and Wildlife Natural Heritage Program (MADFW) regarding threatened and endangered species in the project areas. The USFWS response is provided in Appendix B. MADFW has not yet responded but we anticipate they may submit comments during the Public Comment period of the LIHI Certification process.

7.1 Bald Eagle

The T&E Plan includes measures to enhance bald eagle nesting sites (i.e., by erecting eagle nest platforms) and to protect and enhance eagle perching and feeding activities. HG&E installed three bald eagle nesting platforms in 2003 in order to enhance the return of this species to the project area, and conducted annual monitoring from 2004 to 2008 to observe whether eagles were using the platforms.

During the 2004-2008 field monitoring period, HG&E reported on-going use of at least one of the nests and sixteen eagles fledged at the HG&E sites. HG&E provided annual reports to the USFWS, the Conte Refuge, MDFW, and FERC on nest use and the number of eaglets successfully fledged. The annual monitoring concluded in 2008 and FERC has approved no

⁴ The bald eagle was removed from the federal threatened species list in 2007. However, the species remains listed as endangered by the state of Massachusetts, so activities related to this species were completed pursuant to the T&E Plan.

additional monitoring by HG&E. It is anticipated that the state will include these nests in its ongoing monitoring activity.

HG&E continues to observe trees along the impoundment, record any problems, and act accordingly to protect perching and feeding trees. To protect perching and feeding trees, the T&E Plan also specifies that HG&E will not remove trees within the impoundment that are actively used by bald eagles.

7.2 Puritan Tiger Beetle

The T&E Plan requires that HG&E cooperate with the USFWS, MDFW, and MDCR to continue educating the public and policing recreational activities at Puritan tiger beetle habitat sites (particularly at Rainbow Beach), and to develop other protective measures. HG&E's protection and enhancement measures include: displaying signs at marinas and public boat launches to educate the public about protected areas; constructing interpretive displays at both the fish viewing facility and the Norwottuck Rail Trail; designing and providing brochures to the public at the fish viewing facility at the Holyoke Dam as well as marinas on the impoundment; continuing work with USFWS and MDFW to provide in-kind services, such as historic water level elevation data, impoundment maps and hydrology information, as requested, to better understand the beetle's habitat requirements; providing support staff and sharing in the research expenses; requesting a no wake zone at Rainbow Beach from the MDCR and providing no-wake signage at Rainbow Beach.

HG&E works with the USFWS, Conte Refuge, MDFW, and MDCR to maintain existing signs; provide researchers with hydrology information of the Connecticut River within the project area; provide resources to aid in research, translocating, and monitoring tiger beetles. As set forth in the T&E Plan, HG&E provided an annual report on Puritan tiger beetle activities within the project area from 2003-2007. The final report for 2007 was filed in 2008 and FERC subsequently issued a letter on August 1, 2008 indicating that HG&E had satisfied all license reporting requirements related to this species. Although it has fully complied with the License reporting requirements for this species, HG&E continues to support research in the project area

on this species by providing annual stipend for research assistants, maintaining the rainbow beach kiosk and continuing support for translocation.

In consultation with agencies, HG&E has taken additional steps to minimize the potential for projects impacts on the Puritan tiger beetle by modifying project operations to minimize water level fluctuations in the Rainbow Beach area, where this species occurs (See discussion of Run-of-River operations in Section 3 of this Application). By relocating the impoundment water level monitoring point closer to Rainbow Beach, HG&E is now able to maintain a more constant headpond in that mid-impoundment area.

7.3 Yellow Lamp Mussel and Dwarf Wedge Mussels

The T&E Plan, and the Comprehensive Canal Operations Plan (CCOP) (See discussion in Section 3 of this Application) include measures to protect and enhance the yellow lamp mussel and dwarf wedge mussel. HG&E has installed a concrete weir at the beginning of the first level canal to provide protection of mussel populations during canal maintenance drawdowns; monitors habitat; provides minimum canal flows; and implements specific drawdown procedures to maintain watered conditions in mussel habitat areas. In addition, HG&E has also moved the annual maintenance drawdown to October, which minimizes drawdown effects on mussel populations.

HG&E surveys the canal system to document the populations and the location of drawdown pools supporting mussel populations. This survey has been conducted regularly since 2003 and will continue pursuant to the T&E Plan and CCOP until at least 2014. Yellow lamp mussels have been documented to occur in the canal. HG&E's operational measures, including drawdown procedures and minimum canal flows, were specifically developed to protect and enhance the habitat for this species.

7.4 Shortnose Surgeon

Pursuant to Section 4.7 of the Settlement, HG&E agreed to interim downstream fish passage

measures and to a multi-year program of additional research to address a permanent solution at the Project for downstream passage and exclusion of diadromous fish (including in particular the federally endangered shortnose sturgeon). As contemplated in the Settlement and prior to FERC approval of the Settlement, National Marine Fisheries Service (NMFS) issued a Biological Opinion on January 27, 2005 (2005 BiOp), finding that action under the proposed Settlement was not likely to jeopardize the continued existence of the Connecticut River population of shortnose sturgeon or the species as a whole (2005 BiOp, page 62). In the Incidental Take Statement (ITS) with the 2005 BiOp, NMFS authorized the incidental taking of shortnose sturgeon due to injury and mortality from attempts at downstream and upstream passage, as well as from harassment, trapping, capturing or collecting at downstream and upstream passage facilities. Appendix D of the 2005 BiOp contained the limits of takes at the Holyoke Project which were exempted by the ITS, with such limits correlated to the downstream fish passage provisions of the Settlement, in particular to completion of downstream fish passage modifications. The 2005 BiOp contemplated completion of construction and commencement of operations of the downstream passage and exclusion facilities by Spring 2010.

HG&E and the resource agencies/stakeholders⁵ have been working collaboratively since 2001 to address the necessary modifications to the Project's facilities to enhance "safe and successful" fish pass (including for, in particular, shortnose sturgeon). On April 30, 2008, with the CCT's concurrence, HG&E filed a request to extend certain dates under the Settlement relating to downstream fish passage and to reinitiate formal consultation with NMFS toward a modification of the schedule in the 2005 BiOp. Under the proposed revised schedule, construction of the new guidance/exclusion facility for downstream fish passage would be completed by 2013, rather than 2009 as contemplated in the Settlement and the 2005 BiOp.

Research and analysis since 2001 has included: (i) five years of flume studies at the Conte and Alden laboratories; (ii) eight-plus years of computational fluid dynamic (CFD) studies by Alden; (iii) three-years of SNS radio tracking studies; and (iv) desk-top analysis of downstream fish

⁵ NMFS; U.S. Fish and Wildlife Service; Massachusetts Department of Environmental Protection; and Commonwealth of Massachusetts, Division of Fisheries and Wildlife (referred to jointly as "Resource Agencies"); Trout Unlimited; and the Connecticut River Watershed Council (collectively referred to as the Cooperative Consultation Team, CCT).

passage efficiency at the Project based on the flume testing data. The studies and analysis performed have provided additional data on: (i) the flows that shortnose sturgeon would experience at the Project under a number of different potential enhancements to the Project's downstream fish passage facilities (the CFD analysis), (ii) how shortnose sturgeon might interact with various potential bypasses (the flume studies), and (iii) how shortnose sturgeon currently interact with the Project (the radio tracking studies and the desk-top analysis). All such studies were done in close consultation with the CCT.

Based on that extensive research/analysis and in continuing consultation with NMFS and other CCT members, HG&E is now very close to agreement on the facilities that would enhance the downstream and upstream fish passage at the Project as contemplated under the Settlement. HG&E anticipates filing its application to amend the FERC Project No. 2004 License to construct and operate these new downstream and upstream fish passage enhancements pursuant to the revised schedule as included in the April 2008 filing.

Specifically, HG&E anticipates proposing a new full-depth bar rack and trash raking system (for exclusion) to be located immediately upstream of the existing intakes at the Hadley Falls Station (*i.e.*, in front of Hadley Unit #1 and Unit #2). In addition, HG&E anticipates proposing a new near-bottom bypass and a new surface bypass located at the end of the new rack structure at the existing Rubber Dam #5 location. The apron of the dam below the location of the current Rubber Dam #5 will be excavated for a new plunge pool to diffuse energy from the new surface bypass. To further enhance upstream fish passage, HG&E also anticipates proposing to modify the entrance to the spillway fishlift, downstream of the dam, to align the entrance walls and to add a ramp up to the floor of the entrance. Final design of this system will begin in 2010, and the rack and bypasses at the dam are expected to be operational by April 2013.

Following completion of installation, HG&E will undertake a multi-year monitoring of the new facilities in 2013-17 which will provide valuable information on the use of the facilities by shortnose sturgeon (and other diadromous and resident fish). Furthermore, the shortnose sturgeon population survey and the analysis of the manner in which downstream migrating shortnose sturgeon approach the Project (to be performed in 2014, based on agreed-upon plans

developed in 2013) will provide additional valuable information. These measures are likely to enhance the safe and successful passage of shortnose sturgeon, and other diadromous and resident fish, downstream of the Project without injury or significant impairment to essential behavioral patterns.

In addition to the ongoing discussions toward reaching agreement on the appropriate downstream passage and exclusion facilities and in compliance with the 2005 BiOp, the Settlement, the Amended License and the T&E Plan, HG&E has been conducting radio-tracking surveys of shortnose sturgeon on the Connecticut River upstream of the projects. HG&E provides upstream passage for shortnose sturgeon via its fish lift, and provides downstream passage via a passage at the head of the canal system. Sturgeon and other fish are excluded from entering the remainder of the canal by a louver system. Although data is not available to determine the passage effectiveness, testing of the louver system has determined that it is effective at excluding sturgeon from the canal.

The original T&E Plan approved following issuance of the 1999 License required that HG&E work with stakeholders to reconvene the shortnose sturgeon work group to assist in developing and directing research efforts; implement the recommendations of the work group; modify the louvers in the Holyoke canal system and have the full depth louvers functional; fund Alden Lab's modeling of the angled bar rack; install an exclusion rack, conduct research to determine the success of the full depth louvers and any Hadley Falls guidance system, and submit annual reports to the Commission on the above items. HG&E has completed all measures specified in that T&E Plan, with the exception of the installation of the exclusions rack. Upon completion of the new downstream fish passage facilities, HG&E will amend the T&E Plan as needed.

Section 8

Cultural Resource Protection

8.1 Holyoke Project (FERC No. 2004)

In accordance with Article 420 of the Holyoke Project license, a Cultural Resources Management Plan (CRMP) was filed on September 8, 2000. The licensee supplemented the filing on October 19, 2000. The CRMP implements the Programmatic Agreement (PA) executed on July 27, 1999. FERC issued an Order Modifying and Approving the CRMP on June 27, 2001. The Hadley, Boatlock, Riverside, Beebe-Holbrook, Skinner and Chemical stations are addressed by the Holyoke Project CRMP. HG&E files an annual report with the SHPO and FERC documenting all activity under the CRMP.

The CRMP describes all the previously recorded prehistoric sites and areas which are highly archaeologically sensitive within the Holyoke Project's Area of Potential Effect (APE). The CRMP further describes the historical resources within the APE. The licensee's CRMP identifies the buildings and structures within the Holyoke Canal System listed in the National Register of Historic Places (National Register) in 1980. The CRMP also describes additional project features identified in a 1997, which are contributing elements of a larger Holyoke Hydropower System Historic District considered eligible for the National Register. Also listed in the National Register in 1992 and identified in the CRMP were buildings and structures associated with the South Hadley Canal District.

In accordance with the CRMP, HG&E evaluates proposed actions that could have an effect on archaeological or historic resources by first consulting the Holyoke Project Cultural Resources Reconnaissance Survey to determine if the proposed action will involve any historic or archaeological resources. If there are resources involved, HG&E verifies if the action is listed in the CRMP as an action that does not require consultation with the SHPO. If the action is not listed, HG&E consults with the SHPO to determine if there is a need for further studies to identify historic properties. If historic properties are identified, the consultation proceeds to a discussion of ways to avoid, minimize or mitigate potential adverse effects.

HG&E also monitors all historic structures and features in conjunction with routine maintenance, recreation monitoring and shoreline condition assessments.

8.2 Holyoke No. 4 Hydroelectric Project (FERC No. 7758)

The Holyoke 4 project is within the Holyoke Canal Historic District, which is listed in the National Register of Historic Places. By letter filed with FERC on April 6, 2005, the Massachusetts State Historic Preservation Officer (SHPO) found that relicensing the Holyoke No. 4 Project would have no adverse effect on historic properties. The SHPO noted that if changes are proposed at Holyoke 4, the project is sufficiently connected to the Holyoke Project No. 2004 such that the procedures contained within that project's CRMP will provide the SHPO the opportunity for review and comment. Therefore, Article 403 of the Holyoke No. 4 Project license requires that HG&E use the procedures established in the Holyoke Project CRMP to identify and protect historic resources and consult with the SHPO prior to conducting any alterations at the Holyoke No. 4 Project.

8.3 Other Canal Projects

The canal stations that are not part of the Holyoke Project License are not subject to the CRMP. However, similar to Holyoke No. 4 discussed above, these projects are sufficiently connected to the Holyoke Project No. 2004 such that the procedures contained within that project's CRMP provide the SHPO the opportunity for review and comment. HG&E voluntarily follows the CRMP provisions for all of its stations.

Section 9

Recreation

HG&E filed a Comprehensive Recreation and Land Management Plan (CRLMP), pursuant to Article 418 of the license for the Holyoke Project No. 2004 on May 1, 2003. The plan was supplemented on July 14, 2003 and approved by FERC by Order dated March 31, 2004. Article 418 requires the licensee to file, for Commission approval, a CRLMP that includes a Recreation Plan, a Land Management Plan, and a Buffer Zone Management Plan. The land management Plan and Buffer Zone Management Plans are discussed in Section 6 of this application. Components of the Recreation Plan are discussed below.

None of the licenses for the canal stations that are licensed separate from the Holyoke Project (FERC No. 2004) require development of recreational access or recreation monitoring. This is due to their locations on the canal and within a densely developed commercial and light industrial area. In addition, many of the projects are located within building owned by others and have no land associated with them suitable for recreational use. However, as noted in section 9.1.8 of this Application, HG&E is voluntarily working with local planning organizations to assist with development of a canal walk.

Public recreational opportunities in the Holyoke Project area include three boat launches, numerous private launch areas, several private boat clubs, formal and informal bank fishing areas, informal swimming areas, four marinas, dispersed unregulated camping areas, a fish lift viewing area and informal hunting areas. Approximately 100 privately owned docks exits on the Holyoke impoundment. There is a takeout for canoe portage also.

The three formal boat launch facilities in the project area are all operated by the state and are available to the public free of charge. HG&E provides sanitary facilities at two of these sites.

9.1 Recreational Facilities Owned, Operated and Supported by HG&E

Of the above-mentioned facilities HG&E owns and operates the Robert E. Barrett Fish Viewing Facility and the Holyoke (Slim Shad) Point Recreation Area. In addition HG&E is in the

process of developing new facilities at Riverside Park and the Canal Gatehouse Park, in cooperation with the Town of South Hadley. HG&E is also supporting development of the Holyoke Canal Walk. Finally, HG&E offers annual support of the River Ranger in cooperation with MADCR.

9.1.1 Robert E. Barrett Fish Viewing Facility

HG&E operates the Robert D. Barrett fishway viewing facility at Hadley Falls Station. The viewing facility is open for six weeks in May and June, free of charge. The facility's educational and interpretive programs provide significant benefits to the public. Approximately 10,000 visitors tour the site each year, including school children, members of youth and adult civic organizations and the general public. Pursuant to the CRLMP Recreation Plan, HG&E has recently enhanced the facilities, educational programs and exhibits at the viewing facility.

9.1.2 Holyoke (Slim Shad) Point Fishing Access

Holyoke Point, known locally as Slim Shad Point, was historically an informal HG&E-owned fishing access point downstream of Hadley Falls Station. The CRLMP Recreation Plan includes provisions for improving this to a formal facility with additional amenities including an ADA complaint fishing access platform, designated ADA parking, an ADA accessible toilet facilities, site grading, signage and landscaping. Development of this site is timed to occur when an unrelated coal tar cleanup projects that is underway in the river nearby is completed. Currently it is anticipated that this site will be complete in 2010.

9.1.3 Cove Island

Cove Island is a 51.8-acre peninsula located along the Connecticut River. Approximately 11 acres of that land are currently developed as camps. For those 11 acres, HG&E issues annual permits for 10 years that address transfers, setbacks, and other terms. The permit holders are required to meet state Title 5 regulations. The remaining acreage of Cove Island remain open for public activity, and the overall management of Cove Island will be revisited in 2011 (7 years after approval of the CRLMP).

9.1.4 Canoe Portage

There are currently three options for portaging the Holyoke Dam, and an additional option that will be available upon completion of other recreation facilities in the project area. Currently, boaters can take out at Brunelle's Marina or at Bicentennial Park and request transportation from HG&E to a point below the Holyoke Dam. Boaters can also portage themselves from Bicentennial Park 1.5 miles to the Chicopee Boat Ramp. While Brunelle's Marina is privately owned, there is no fee to take out at that location. Bicentennial Park is operated by the Town of South Hadley on land that is partially leased from HG&E. There is no fee to use of the take out at this location either. HG&E provides portage signage at Brunelle's Marina.

9.1.5 Riverside Park

The CRLMP Recreation Plan includes plans for development of Riverside Park and trails connecting the site to the Canal Gatehouse Park. Riverside Park will consist of two levels with seasonal viewpoints, interpretive signage, benches, landscaping, picnic tables, trash receptacles, and an ADA compliant Port-o-John.

Plans for this site have been developed, however construction is pending resolution of the disposition of the Texon Building. The Texon Building is currently located on land that will be used for Riverside Park and for the trails connecting the park to the Route 116 Bridge area. HG&E has had to undertake significant negotiations over the past several years to resolve issues related to removal of this building, and is currently pursuing final approvals to do so. HG&E anticipates that work can begin on Riverside Park in 2010.

9.1.6 Canal Gatehouse Park

While not part of the license or 401 WQC requirements, the CRLMP Recreation Plan includes provisions for development of Canal Gatehouse Park. Canal Gatehouse Park will be located at the South Hadley end of the Holyoke dam, between the historic gate house and the Texon Building, and will include portions of the historic canal. Major components of the park will include viewing areas, interpretive signage and walkways. Construction of the park is in progress.

9.1.7 River Ranger

In administering the recreational uses at the project, HG&E has assisted in funding a seasonal river ranger under with the MADCR. Monitoring, education, and surveillance of Rainbow Beach, the Connecticut River Water Trail, Red Rock Complex, Hadley Cove and Sandy Beach, and Hockonum Flats, which are not owned by HG&E, are part of the duties and patrol of the river ranger.

9.1.8 Holyoke Canal Walk and Connecticut River Bike/Walk Trail

The Holyoke Planning Board, in conjunction with the PVPC, is planning to develop walking trails along the Holyoke canals. Providing canal walks for public access is a major element in the redevelopment of the Holyoke Canal District. Although not required by any license conditions, HG&E proposes to make land available for access, where appropriate and available, and provide in-kind services for development of this walkway.

9.1.9 Other Recreation Related Activities

As required by LA 418, the CRLMP Recreation Plan also includes a channel marking program, installation of additional informational signage at recreation facilities in the project area and support for the annual Shad Derby.

9.2 Future Recreation Needs

The CRLMP Recreation Plan addresses the future recreation needs of the Holyoke impoundment. HG&E monitors recreation use and reassesses recreational needs and report the results, per Commission regulations, by filing a FERC Form 80 at 6-year intervals throughout the life of the project license. HG&E also conducts an annual monitoring tour to inventory the visual impacts to natural resources due to recreational activity, which is documented by digital photography. The monitoring report and images are distributed to parties upon request. Finally, HG&E has developed and implements a permit program to monitor uses of the project area (see Section 6 of this Application for more information on the permitting program).

APPENDICES

APPENDIX A

**LIST OF KEY RESOURCE AGENCIES AND NGOS INVOLVED IN
LICENSE PROCEEDINGS AND SETTLEMENT AGREEMENT**

John Warner
U.S. Department Of The Interior
U.S. Fish and Wildlife Service
70 Commercial Street
Concord, MA 03301

Pat Scida
U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
55 Great Republic Drive
Gloucester, MA 01930

Robert Kubit
Commonwealth of Massachusetts
Department of Environmental Protection
627 Main Street, 2nd Floor
Worcester, MA 01608

Joe Iagalla
Commonwealth of Massachusetts
Department of Conservation and Recreation
136 Damon Road
Northampton, MA 01060

Robert McCollum
Commonwealth of Massachusetts
Department of Environmental Protection
Western Region
436 Dwight Street
Springfield, MA 01103

Caleb Slater
Commonwealth of Massachusetts
Department of Fisheries and Wildlife
1 Rabbit Hill Road
Westborough, MA 01581

Don Pugh
Trout Unlimited
10 Old Stage Road
Wendell, MA 01379

Andrea Donlon
Connecticut River Watershed Council
15 Bank Row
Greenfield, MA 01301

Town Administrator
The Town of South Hadley, Massachusetts
116 Main Street
South Hadley, MA 01075

Chris Curits
Pioneer Valley Planning Commission
60 Congress Street
Springfield, MA 01104-3419

Josh Knox
Trustees of the Reservation
80 Race Street
Holyoke, MA 01040

Evelyn Jiminez
Commonwealth of Massachusetts
Department of Conservation and Recreation
PO Box 484
Amherst, MA 01004

Richard Harris
Town Planner
Town of South Hadley
116 Main Street
South Hadley, MA 01075

Brona Simon
Commonwealth of Massachusetts
Historic Preservation Officer
Massachusetts Historical Commission
220 Morrissey Boulevard
Boston, MA 02125

APPENDIX B

**UNITED STATES FISH AND WILDLIFE SERVICE COMMENT LETETR
REGARDING THREATENED AND ENDANGERED SPECIES**

Rec'd 3/22/10



United States Department of the Interior



FISH AND WILDLIFE SERVICE

New England Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5087
<http://www.fws.gov/newengland>

March 16, 2010

Paul S. Duchenev
City of Holyoke Gas & Electric Department
99 Suffolk Street
Holyoke, MA 01040-5082

Dear Mr. Duchenev:

This responds to your letter dated February 16, 2010, requesting that we review 14 hydroelectric projects proposed for certification under the Low Impact Hydropower Institute for information on the presence of federally-listed endangered or threatened species. The projects are located in Holyoke, Massachusetts on the Connecticut River, and within the canal system that traverses Holyoke. Our comments are provided in accordance with the Endangered Species Act (87 Stat. 884, as amended; 15 U.S.C. 1531, *et seq.*).

As stated in your letter, the federally-listed threatened Puritan tiger beetle is located within the area affected by hydroelectric facilities owned and operated by the Holyoke Gas and Electric Department (HGE). HGE has consulted with our office in the past to determine the potential effects from the operation of the dam at Holyoke on Puritan tiger beetles located at Rainbow Beach, Northampton, Massachusetts. As a result of informal consultation, HGE adjusted flows to minimize water level fluctuations at Rainbow Beach, and has partnered with this office and the Silvio O. Conte National Fish and Wildlife Refuge on research and outreach activities to promote the recovery of the species. Based on the information provided in your letter, we understand that there will be no changes to the operation of the hydroelectric projects. Therefore, we anticipate that the proposed certification is not likely to adversely affect Puritan tiger beetles.

No other federally-listed or proposed threatened or endangered species under the jurisdiction of the U.S. Fish and Wildlife Service are known to occur in the vicinity of the project area. The yellow lamp mussel referenced in your letter as a rare, threatened or endangered species (RTE) is a state-listed species; we recommend that you contact the Massachusetts Natural Heritage and Endangered Species Program for their review for potential impacts. The National Marine Fisheries Service has jurisdiction over the shortnose sturgeon.

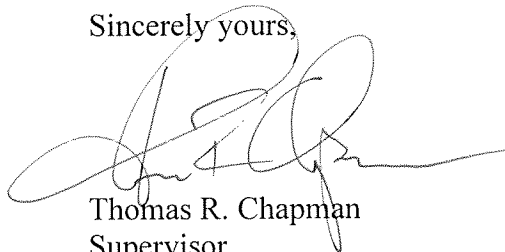
Paul S. Duchenev
March 16, 2010

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Preparation of a Biological Assessment or further consultation with us under section 7 of the Endangered Species Act is not necessary at this time. Should project plans change or additional information on listed or proposed species becomes available, this determination may be reconsidered.

Thank you for your cooperation. Please contact Ms. Susi von Oettingen of my staff at 603-223-2541, extension 22, if we can be of further assistance.

Sincerely yours,

A handwritten signature in black ink, appearing to read 'Tom Chapman', written over a circular stamp or seal.

Thomas R. Chapman
Supervisor
New England Field Office