

Peter Drown Cleantech Analytics LLC 2665 Prosperity Avenue, #320 Fairfax, VA 22031

Wednesday, May 04, 2016

Dr. Michael J. Sale Executive Director Low Impact Hydropower Institute

Subject: Recertification Recommendation for the Benton Falls Hydroelectric Facility (FERC #5073)

Dr. Sale:

This letter contains my recommendation for Recertification of the Benton Falls Hydroelectric Facility (the "Facility"). Based on my review of the materials submitted by applicant, public records contained in the FERC database, and consultation with the individuals noted in this report, I believe the Facility continues to meet LIHI criteria and should be recertified for one new, five-year term with the 3 conditions contained herein.

Please let me know if you have any questions.

Sincerely,

Peter Drown, President Cleantech Analytics LLC



# I. Background:

The 4.5 MW Facility is located on mile 5.3 of the Sebasticook River in the town of Benton, ME. The Facility is owned and operated by Benton Falls Associates, L.P ("Benton Falls"). The Facility operates under a FERC License issued March 8, 1984, and subsequent License Amendments issued May 3, 1988 and January 25, 1989, and was originally certified as "Low Impact" on November 23, 2010. The Certificate contained the following three conditions:

**Condition 1:** Annually report to LIHI on (a) the number of Atlantic salmon and American shad passed upstream during the just completed upstream migration season, and (b) the number of American shad and Atlantic salmon that were found in the facility's trash racks or otherwise entrained, or found injured or dead downstream of the facility.

**Condition 2:** In the event that more than 100 American shad are passed upstream in any two years of the term of the certification, or any salmon are passed in any single year, BFA shall immediately engage in consultations with the federal and state resource agencies for the purpose of reaching agreement with the resource agencies on the design and implementation of one or more scientifically-valid downstream effectiveness studies to occur the next migration season, and shall report to LIHI whether agreement has been reached with the resource agencies on their design and implementation no later than March 1st of the year in which the effectiveness studies is not timely or otherwise required notwithstanding the occurrence of one or both events described above, BFA shall immediately report this position and its basis to LIHI.

**Condition 3:** BFA shall report to LIHI on the results of any effectiveness study conducted and any conclusions reached within two months of the conclusion of that study.

# II. Recertification Standards

Chapter 2, Section 2.25 of the Low Impact Hydropower Institute (LIHI)'s Certification Handbook (Updated April 2014) regarding Applications for Recertification ("Recertification Standards") provides that a request for renewal of a previously-issued LIHI certification ("re-certification") will be granted at the conclusion of the term of the existing certification, so long as (1) there have been no "material changes" at the facility that would affect the certification and (2) LIHI's certification criteria have not been revised since the previous certification was issued by LIHI."

The process also states that if no information is missing from the Re-Certification application package, and if the Application Reviewer has determined that there are no material changes or changes in LIHI's criteria, than the project is eligible for recertification action by the Executive Director.

# III. Adequacy of the Recertification Application Package

I relied on the following sources of information during the review of this Application. The Applicant provided a questionnaire with associated appendices that addressed each of the LIHI criteria. Much of this information was identical to that submitted in the original 2010 application, with the following updates:

- 2014 Fish and Eel Passage Facility Operating Report and 2015 Proposed Operating Plan this Report was reviewed by Maine DEP, Maine Department of Marine Resources (MDMR), U.S. Fish and Wildlife Service (USFWS), NOAA, and Maine Department of Inland Fisheries and Wildlife. Comments were incorporated into the report.
- Letter dated November 20, 2010 from Maine Historic Preservation Commission stating responsibilities



are discharged from Benton Falls Associates due to the discharge of the only remaining archaeological issue relating to long-term monitoring of erosion at a specific site, after no significant erosional damage was detected at the site.

Next, I reviewed the public record from 2010 – 2015 located on the FERC database. No issues of noncompliance or license violations were identified. The search revealed several additional sources of information:

- Previous years (2010 2015) Fish and Eel Passage Facility Operating Reports
- Form 80 Recreational Reports
- Minimum Flow Release Requirement Certifications

In addition, the following sources of information were reviewed:

- Letter dated February 4, 2014 from MDMR to LIHI to allow the applicant to comply with Condition 2. (See Material Changes below)
- LIHI Compliance Statements from 2010 2015

Finally, I also contacted several agencies, including the Maine Department of Marine Resources ("MDMR"), the Maine Department of Environmental Protection ("MDEP"), the National Marine Fisheries Service ("NMFS"), and the U.S. Fish and Wildlife Service ("USFWS") to solicit comments and determine whether any material changes or new and renewed issues of concern were relevant to the facility since original LIHI certification. MDMR noted that they are continuing to consult with the Owner regarding effectiveness of downstream passage for American Shad, but the study has been challenging due to the limited number of American Shad passing upstream. MDMR recommended LIHI recertify the facility. USFWS noted that there are no issues with the Projects and the Owner is an "exemplary licensee." (See Appendix A.) NMFS was contacted due to the endangered species listing of Atlantic Salmon (Gulf of Maine Distinct Population Segment.) Details of this conversation are discussed in Section IV below. MDEP initially noted that there are no "new or recurring material issues of concern relating to the facility," however a follow-up email noted the presence of impaired DO levels downstream of the Benton impoundment (see Section IV.)

# IV. There have been "material changes" at the facility that would affect recertification, and the applicant is taking steps to resolve.

In accordance with the Recertification Standards, "material changes" mean non-compliance and/or new or renewed issues of concern that are relevant to LIHI's criteria. Based on my review of materials provided, review of FERC's public records, and consultation with the noted individuals, I found that there are no areas of noncompliance, but there are several new issues concerning impaired Dissolved Oxygen levels and an ongoing ESA consultation.

# 1. Fish Passage Criteria

Fish passage is an important consideration at the Facility<sup>1</sup>, and the project is required to submit annual reports known as the *[Current Year] Fish and Eel Passage Facility Operating Report and [Next Year] Proposed Operating Plan* (the "Report", see Appendix B for latest plan,) in accordance with the terms of its FERC license, the Water Quality Certification, and the terms established via a 1998 settlement agreement to promote fish and eel passage at the Facility<sup>2</sup>. The Reports are produced in consultation with MDMR, USFWS, and NMFS, providing

<sup>&</sup>lt;sup>1</sup> Fish passage facilities consist of a permanent upstream fish lift facility designed to pass an annual population of 50,408 American Shad, 767,267 Alewives and 260 Salmon; downstream fish passage facility consisting of a surface bypass system and turbine screening; an upstream eel passage facility consisting of a ramp located at the dam spillway; and downstream eel passage consisting of a hinged screen on trash racks. All facilities were designed with consultation of relevant resource agencies, and functional designs were approved by FERC.

<sup>&</sup>lt;sup>2</sup> 1998 Agreement Between Members of the Kennebec Hydro Developers Group, the Kennebec Coalition, the National



the agencies opportunity to actively manage fish passage activities at the site. The annual Reports for all years of LIHI certification were evaluated as part of this recertification, and I confirmed that the applicant copied the Executive Director of LIHI during each submittal during certification period (2011 – 2014), meeting the LIHI reporting compliance as required in the condition #1 above. The applicant recorded annually the number of American Shad and Atlantic Salmon, as required, and does not recall any dead or injured Salmon or Shad during the past 5 years in the downstream reach. Any record of this event would be included in the annual Fish Passage reports.

# Downstream Passage Requirements

LIHI Condition #2 requires that if 100 American Shad or one Atlantic Salmon passed upstream in any given year, BFA shall engage in consultations with resource agencies regarding downstream effectiveness studies. The applicant has engaged in these consultations and attempted downstream effectiveness studies, despite the limited number of Atlantic Salmon and American Shad passing upstream. (In 2014, upstream fish counts revealed strong quantities of river herring (primarily alewives,) limited number of American Shad (26) and no Atlantic Salmon.) MDMR noted by letter to LIHI dated February 4, 2014: "Having passed only one adult Atlantic salmon in 2013 MDMR does not believe that downstream passage efficiency studies are warranted for Atlantic salmon at this time. Should Atlantic salmon numbers increase significantly in 2014 we will revisit downstream passage efficiency studies for this species." I contacted MDMR during this review, and they provided a written comment confirming they are continuing to work with the applicant on passage studies but passage for American Shad remains small, and therefore the efficacy of studies are limited. They also recommended the project be recertified. Downstream American eel passage studies were successfully conducted as noted in the annual reports.

Downstream fish passage effectiveness studies were conducted in 2014 and produced mixed results as only river herring passed in large numbers. The limited number of Atlantic Salmon and American Shad passage may be attributable to the small populations of those species located on the Sebasticook River. The Owner is continuing to consult with MDMR to conduct Shad downstream passage efficiency tests, per the LIHI conditions. In 2014, Shad passage was limited due to a malfunctioning exit flume attraction valve. Given the lack of data, the results were deemed inconclusive and the test was repeated in 2015. The 2015 test results are not yet available.

Due to the limited efficacy of passage studies to date, the Owner reached agreement with federal and state resource agencies (USFWS, NMFS, MDMR, NOAA, and IFW) to suspend fish tagging efforts, and resume again at a future date when determined appropriate by those agencies. The Owner will consult annually with these agencies as part of their Fish and Eel Passage Report to determine when this testing will resume.

# 2. Threatened and Endangered Species Consultation

On June 16, 2014, FERC designated the Applicant as the non-federal representative for the purpose of informal consultation with NMFS pursuant to section 7 of the ESA regarding federally-listed Atlantic Salmon (Gulf of Maine Distinct Population listing.) According to the 2014 Fish Passage Report, only one Atlantic Salmon was documented passing at Benton Falls over the past 5 years (in 2013.) I contacted Andrew Locke from Essex Hydro regarding the status of ESA consultation, and he informed me that he is well aware of the importance of this issue and understands the liability associated with Atlantic Salmon. He has initiated this consultation and has recently hired a regulatory attorney to assist with the process. I contacted Jeff Murphy from NMFS and he confirmed that the applicant had initiated the discussion, although is not aware of formal steps taken to advance the process. Atlantic Salmon do occasionally enter the Sebasticook River, however, in most years no adult salmon return. Mr. Murphy looks forward to continue working with the Applicant on the project as it moves through the ESA process. The Owner has recently begun drafting the Biological Assessment as the first



step in the ESA process. Condition #2 addresses this issue by requiring the Owner to continue consultations pursuant to the ESA process and report findings to LIHI.

# 3. Dissolved Oxygen (DO)

On March 8, 2016, Maine DEP emailed the Reviewer and noted that the latest Integrated Water Quality Monitoring and Assessment Report found an impairment in DO levels on the Main Stem of the Sebasticook River from Burnham Bridge to the Kennebec River, and stated the impairment is "likely due to the Benton impoundment." The Report noted the area is a "good candidate for monitoring to confirm or reject continued DO impairment." The Owner was informed of this finding and has initiated a process to work with MDEP to conduct water quality testing during low flow conditions. The Owner has submitted a draft testing plan to MDEP and as of the date of this report is currently awaiting comments. Condition #3 addresses this concern by requiring the Owner to conduct the test plan as approved by Maine DEP and provide results to LIHI.

# V. LIHI's certification criteria have not been revised since the previous certification has been issued by LIHI in 2010.

LIHI is in the process of revising its certification criteria and publishing a new Handbook, but the transition to the new certification processes will not be implemented until 2016. Facilities that have applied for recertification on or before December 31, 2015, are to be evaluated using the April 2014 version of LIHI's Certification Handbook. It is my understanding that LIHI's April 2014 criteria being applied to this recertification, or the Board's interpretation of one or more criteria, that are applicable to the circumstances of the Benton Falls Project, have not changed in meaningful ways since the date of the original certification.

# VI. Conclusion

In conclusion, I recommend recertification of the Benton Falls Hydroelectric Facility to one new, five-year term. While the data was not specifically reported annually to LIHI in response to the original Condition #1, the Owner has confirmed that no American Shad or Atlantic Salmon were entrained, injured or killed by facility operations in the past five years. I found the Applicant has met the LIHI conditions in terms of downstream effectiveness testing for American Eel and has been providing annual data on the numbers of eels and target anadromous species passed upstream. However, as directed by MDMR, to date, an insufficient number of American Shad and Atlantic Salmon occur in the river (for upstream passage) to warrant implementation of the downstream passage effectiveness testing commitments. As a result, Condition #1 noted below has been recommended. To ensure compliance with LIHI's Endangered and Threatened Species Criterion, Condition #2 is recommended to ensure appropriate studies and authorizations are in place given the endangered species status of the Atlantic Salmon – Gulf of Maine Distinct Population. Condition #3 is recommended after MDEP noted the presence of impaired DO levels downstream of the Benton impoundment.

- 1. To demonstrate compliance that fish are safely passing the facility during outmigration, downstream fish passage effectiveness testing for Atlantic Salmon and American Shad must be conducted. The Owner shall notify LIHI within 30 days of notification from the applicable resource agency(ies) that a sufficient number of individuals of Atlantic Salmon and/or American Shad have been passed upstream, or other appropriate trigger has occurred, and that downstream testing for that species must be conducted. The Owner shall provide LIHI the results of such testing along with assessment made by the MDMR, MIFWS, USFWS and/or NMFS as to whether or not they find that safe and effective passage is being provided by the current downstream passage methods. This data can be included in the annual Fish and Eel Passage Facility Operating Report and Proposed Operating Plan, if LIHI is copied on that plan.
- 2. As part of the Annual Compliance statement to LIHI, the Owner should include documentation of ongoing consultation with NMFS regarding Atlantic Salmon pursuant to the Endangered Species Act. The schedule



for these ESA consultations shall be set through agreement of the Owner and NMFS. LIHI shall be notified of this schedule within 30 days of its establishment. LIHI shall also be provided a copy of any studies or authorizations issued during the course of this certification period on this issue.

3. To contribute to water quality management on the lower Sebasticook River, the owner shall implement the MEDEP approved water quality sampling plan that evaluates the role of Benton Falls dam and impoundment in the nonattainment status of the river and report back to LIHI and MDEP on the findings. The owner shall obtain a letter from MDEP on their assessment of whether or not the Benton Falls facility is the cause of the nonattainment status, and submit that letter to LIHI within 30 days of its receipt.

Please contact me if you have any questions.

Sincerely,

Peter R. Drown, President Cleantech Analytics LLC



# Appendix A Agency and Applicant Communications

Date: April 22, 2016 Contact Person: Elise Anderson, Andrew Locke Title & Agency: Essex Hydro (Owner)

Gmail - Suggested conditions for Benton Fails Project



5/1/2016

Peter Drown <peter.drown@gmail.com>

### Suggested conditions for Benton Falls Project

Elise Anderson <eanderson@essexhydro.com> To: pbmwork@maine.rr.com, Peter Drown <peter.drown@cleantechanalytics.com> Cc: Andrew Locke <alocke@essexhydro.com> Fri, Apr 22, 2016 at 3:14 PM

Hi Pat and Peter,

I am writing with some updates on the Benton Falls fish passage and dissolved oxygen testing.

Shad tagging: We have reached consensus with the agencies regarding our proposal to suspend tagging efforts. We have proposed to consult with the resource agencies annually as part of our annual Fish and Eel Passage facility report as to whether they believe tagging efforts should be resumed at a future date. I have attached copies of the correspondence documenting this consensus with the agencies here.

Atlantic Salmon: We have begun drafting a Biological Assessment to initiate an endangered species act consultation with USFWS and NMFS. We plan to meet with the agencies this summer to discuss the draft and a plan for proceeding with obtaining a take permit if needed.

Dissolved Oxygen Testing: We have submitted a draft water quality testing plan to Maine Department of Environmental Protection's Division of Environmental Assessment, Bureau of Water Quality for their review and comment. We are awaiting these comments and preparing to carry out testing this summer during low flow conditions.

Please let us know if you have any questions or concerns. Thank you for taking the time to review.

Elise Anderson

----Original Message----From: pbmwork@maine.rr.com [mailto:pbmwork@maine.rr.com]

[Quoted text hidden]

[Quoted text hidden]

5 attachments USFWS Shad Approval.pdf 570K

MDMR MDEP Shad Approval.pdf

https://mail.google.com/mail/u0/?ui=28ik=4642cf94458view=pt8search=inbox&msg=1543f64d6276f4288.simi=1543f64d6276f428



From:	Brown, Michael
Sent:	Thursday, April 14, 2016 12:37 PM
To:	'Elise Anderson'
Subject:	RE: Follow up: Benton Falls Draft 2015 Fish and Eel Passage Facility Report and 2016
	Proposed Operating Plan

Elise,

Sorry, I thought that I had responded. We have no issues with delaying the tagging study.

Thanks,

Mike

From: Elise Anderson [mailto:eanderson@essexhydro.com] Sent: Thursday, April 14, 2016 12:36 PM To: Brown, Michael Subject: RE: Follow up: Benton Falls Draft 2015 Fish and Eel Passage Facility Report and 2016 Proposed Operating Plan

Hi Mike-

Sorry to be a pest, but I don't think I received a response back from you on this request below. Happy to chat if you have any issues with this suspension of Shad tagging.

Elise Anderson

From: Elise Anderson [mailto:<u>eanderson@essexhydro.com</u>] Sent: Wednesday, April 06, 2016 10:46 AM To: '<u>michael.brown@maine.gov</u>' Subject: RE: Follow up: Benton Falls Draft 2015 Fish and Eel Passage Facility Report and 2016 Proposed Operating Plan

Hi Michael,

Thanks for taking a look at our Benton annual fish report.

I have one other thing to ask -- <u>Could you please respond to this email to document your acceptance of Benton</u> <u>suspending downstream passage effectiveness testing</u> as described in the attached letter (which was incorporated into the annual report. ) Your acceptance via email is needed for our files to satisfy a LIHI condition.

Thanks for your help - feel free to call with any concerns.

Elise Anderson

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From:	Howatt, Kathy
Sent:	Tuesday, April 19, 2016 1:53 PM
To:	'Elise Anderson'
Subject:	RE: Follow up: Benton Falls Draft 2015 Fish and Eel Passage Facility Report and 2016
	Proposed Operating Plan

Elise,

The Department has reviewed your request and concurs with the Maine Department Marine Resources regarding suspension of downstream passage effectiveness testing for American shad. We understand that Essex Hydro will consult annually with the resource agencies regarding resumption of such testing. Further, I understand that you are consulting directly with Barry Mower regarding DO sampling for the Sebasticook River. With regard to modifying the waterfowl nesting condition (Condition 5 of the Water Quality Certification, or WQC), you will need to submit an application for amendment in order to change the WQC, based on the results of the waterfowl survey recently completed. I have attached a link, below, to the amendment application form.

http://www.maine.gov/dep/land/dams-hydro/documents/hydromod.pdf

I have some time free on Friday this week if you'd like to discuss these issues, please let me know what time is best for you-I look forward to discussing them with you and answering any questions you might have. Kathy

Kathy Davis Howatt Hydropower Coordinator Bureau of Land Resources, Land Division Maine Department of Environmental Protection Phone: 207-446-2642 kathy howatt@maine.gov

Correspondence to and from this office is considered a public record and may be subject to a request under the Maine Freedom of Access Act. Information that you wish to keep confidential should not be included in email correspondence.

From: Elise Anderson [<u>mailto:eanderson@essexhydro.com</u>] Sent: Thursday, April 07, 2016 10:44 AM To: Howatt, Kathy Subject: RE: Follow up: Benton Falls Draft 2015 Fish and Eel Passage Facility Report and 2016 Proposed Operating Plan

Hi Kathy,

Thanks for taking a look at our Benton annual fish report.

I have one other thing to ask -- <u>Could you please respond to this email to document your acceptance of Benton</u> <u>suspending downstream passage effectiveness testing</u> as described in the attached letter (which was incorporated into the annual report.) Your acceptance via email is needed for our files to satisfy a LIHI condition.

Thanks for your help - feel free to call with any concerns.

Elise Anderson



From:	Sean McDermott - NOAA Federal
Sent:	Wednesday, April 06, 2016 11:14 AM
To:	Elise Anderson
Subject:	Re: Follow up: Benton Falls Draft 2015 Fish and Eel Passage Facility Report and 2016 Proposed Operating Plan

Elise,

NMFS concurs with suspending the shad tagging study at Benton for 2016. Annual consultation with the resource agencies will identify when the studies should resume. -Sean

On Wed, Apr 6, 2016 at 10:15 AM, Elise Anderson < eanderson@essexhydro.com > wrote:

#### Hi Sean,

You may remember Andrew and I discussed this with you on the call we had a few weeks ago. I am following up to request an email response of your approval to suspend Shad tagging at Benton immediately. We will consult the agencies prospectively as part of the annual Fish passage report and operating plan.

Documentation that you approve of this approach via email is acceptable - thanks in advance.

Thanks in advance.

Elise Anderson

Benton Falls Associates

c/o Essex Hydro Associates, L.L.C.

55 Union Street, 4<sup>th</sup> Floor

Boston, MA 02108

Tel: (617) 367-0032

Fax: (617) 367-3796

From: Elise Anderson [mailto:<u>eanderson@essexhydro.com</u>] Sent: Friday, March 25, 2016 8:59 AM



From:	Shepard, Steven
Sent:	Wednesday, April 06, 2016 10:54 AM
To:	Elise Anderson
Subject:	Re: FW: Follow up: Benton Falls Draft 2015 Fish and Eel Passage Facility Report and 2016 Proposed Operating Plan

The Service agrees that American shad tagging should be suspended. Steve

Steven Shepard, C.F.P. U.S. Fish & Wildlife Service 17 Godfrey Drive, Suite 2 Orono, Maine 04473 Voice: 207-866-3344 ext.1116 Cell: 207-949-1288 <u>steven shepard@fws.gov</u>

On Wed, Apr 6, 2016 at 10:50 AM, Elise Anderson <<u>eanderson@essexhydro.com</u>> wrote:

Hi Steve-

<u>Could you please respond to this email to document your acceptance of Benton suspending downstream</u> passage effectiveness testing as described in the attached letter (which was incorporated into the annual report.) Your acceptance via email is needed for our files to satisfy a LIHI condition.

Thanks for your help.

Elise Anderson

From: Elise Anderson [mailto:eanderson@essexhydro.com]

Sent: Friday, March 25, 2016 8:59 AM

To: 'gail.wippelhauser@maine.gov'; 'kathy.howatt@maine.gov'; 'steven.shepard@fws.gov'; 'sean.mcdermott@noaa.gov'; 'michael.brown@maine.gov'; 'Steven\_shepard@fws.gov'

Cc: Andrew Locke

Subject: Follow up: Benton Falls Draft 2015 Fish and Eel Passage Facility Report and 2016 Proposed Operating Plan



# Date: March 4, 2016 Contact Person: Jeff Murphy, Fishery Biologist Title & Agency: National Marine Fisheries Service (NMFS)

Spoke with Mr. Murphy to discuss the status of ESA consultations with the Applicant. Murphy mentioned that the Applicant had initiated the discussion, although is not aware of formal steps taken to advance the process. NMFS typically encourages owners to consult with the Agency regarding potential impacts to Endangered Species, and can conduct assessments to determine appropriate take permit when necessary. Atlantic salmon do occasionally enter the Sebasticook River, however, in most years no adult salmon return to the river. Mr. Murphy mentioned he looks forward to continue working with the Applicant on the project as it moves through the ESA process.

# Date: March 3, 2016 Contact Person: Andrew Locke Title & Agency: N/A - Owner, Essex Hydro

I spoke with Andrew Locke by phone to discuss status of Endangered Species consultation for Atlantic Salmon. Essex Hydro was designated as the non-federal representative to engage in these discussions in 2014, and Locke has opened initial discussions with the National Marine Fisheries Service (NMFS.) Locke mentioned that no Atlantic Salmon have been passed at the facility since 2013, when one was passed. Nevertheless, he is planning to continue with consultation with agencies pursuant to the Endangered Species Act, and has recently hired a regulatory analyst to manage the process. He understands the first step of this process is a Biological Assessment, which he is preparing to initiate. I mentioned we would likely include a condition that requires reporting to LIHI on the status of these consultations, and he agreed this should not be a problem. He also mentioned that he is continuing to work with agencies on the American Shad passage efficiency studies and may request a new method. I mentioned that LIHI would just need to be informed and he would likely need to provide agency approval of the new chosen method.



# Date: January 7, 2016 Contact Person: Steven Shepard Title & Agency: Maine Hydro Licensing Coordinator, U.S. Fish and Wildlife Service

Reviewer Comments: I also placed several calls to Mr. Shepard requesting to speak regarding these projects, to determine whether applicant met recertification criteria. I was unable to reach him by phone but received this email response. The eel passage issue applies to another project by the same owner.



Shepard, Steven <steven\_shepard@fws.gov> to Peter -

7:52 AM (9 hours ago) 👘 🔸 🔹



Peter

No concerns regarding compliance. Essex Hydro is an exemplary Licensee.

The only new (in process really) issue is the implementation of eel passage. I believe that is going well.

Steve

~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ Steven Shepard, C.F.P. Maine Hydro Licensing Coordinator U.S. Fish & Wildlife Service 17 Godfrey Drive, Suite 2 Orono, Maine 04473 Voice: 207-866-3344 ext.1116 Cell: 207-949-1288 steven\_shepard@fws.gov ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~

It is difficult to get a men to understand something, when his salary depends on his not understanding It-Upton Sincialr



# Date: December 31, 2015 Contact Person: Gail Wippelhauser Title & Agency: Marine Resources Scientist, Maine Department of Marine Resources

**Reviewer comments:** I also placed several calls to Ms. Wippelhauser, and spoke with her briefly. She directed me to these comments submitted directly to LIHI and confirmed the information contained therein.

------ Forwarded message ------From: Wippelhauser, Gail <<u>Gail.Wippelhauser@maine.gov</u>> Date: Thu, Dec 31, 2015 at 3:50 PM Subject: Benton Falls Project comments To: "comments@lowimpacthydro.org" <<u>comments@lowimpacthydro.org</u>>

The Benton Falls Project is in compliance with all federal license requirements for fish passage. The Maine Department of Marine Resources is continuing to consult with the Licensee on a study to determine the effectiveness of the downstream passage facility at this Project. The Licensee has attempted to conduct this study, but the number of American shad that pass upstream at the Project remains small, making the study of downstream passage a challenge. I recommend that the LIHI certification be renewed.

Gail Wippelhauser, Ph. D. Marine Resources Scientist Maine Department of Marine Resources #172 State House Station Augusta, ME 04333 Phone: 207-624-6349 Fax: 207-624-6501 email: gail.wippelhauser@maine.gov



# Contact Person: Nate Gray Title & Agency: Scientist, Maine Department of Marine Resources Date: February 8, 2014

**Reviewer Comments:** The following comment was provided to LIHI in 2014 prior to downstream effectiveness testing for American Shad.



# PATRICK KELIHER ACTING COMMISSIONER

STATE OF MAINE DEPARTMENT OF MARINE RESOURCES 21 STATE HOUSE STATION AUGUSTA, MAINE 04333-0021

# Low Impact Hydropower Institute:

Falls FERC No. 5073

February 8th, 2014

**Certification of Benton** 

Essex Hydro Associates LLC 55 Union Street # 4 Boston, MA 02108 Phone: (617) 367-0032 Attn. Dave Sherman

Mr. Sherman,

Based on our previous conversations, the Maine Department of Marine Resources (MDMR) will assist in downstream passage efficiency testing for adult post spawn adult American shad. American shad will be pit tagged on their ascent upriver to spawn. Pit tags will be externally mounted on the leading edge of the dorsal fin with either a modified "T' anchor spaghetti type tag or fish hook mounted pit tag. The handling of shad will be minimized utilizing this approach thereby limiting injury and stress to the fish prior to spawning. Detection will be in the form of a duplex antenna array deployed in both downstream bypass weirs. Data loggers will record any detection and identify the individuals tagged and time of passage. Shad will be tagged as captured by dip net at the excluder bars in the exit flume. Not all shad will be tagged. Preference for tagging will be towards males to limit stressing the pre-spawn females. As in years past MDMR personnel will be looking for any dead shad on the racks or other dam infrastructure.

Having passed only one adult Atlantic salmon in 2013 MDMR does not believe that downstream passage efficiency studies are warranted for Atlantic salmon at this time. Should Atlantic salmon numbers increase significantly in 2014 we will revisit downstream passage efficiency studies for this species.

Yours,

Nate Gray Maine Department of Marine Resources Scientist Sea Run Fisheries and Habitat Hallowell, Maine 207-624-6344 nate.gray@maine.gov



# Contact Person: Michael O'Connor Title & Agency: Licensing Project Manager, Maine DEP Date: January 22, 2016

**Reviewer Comments:** I reached out to Maine DEP several times to solicit comments regarding this project. The below email came in after the public comment period ended.

------ Forwarded message ------From: OConnor, Michael <<u>Michael.OConnor@maine.gov</u>> Date: Fri, Jan 22, 2016 at 8:52 AM Subject: Benton Falls Hydro LIHI Recertification To: "peter.drown@cleantechanalytics.com" <<u>peter.drown@cleantechanalytics.com</u>"

Good morning Peter,

Kathy Howatt forwarded me your email from 12/29/15 in regards to LIHI recertification of the Benton Falls Hydro Project.

I have reviewed our files on Benton Falls Hydro and did not see any areas of noncompliance over the last 5 years. I also did not see any new or recurring material issues of concern relating to the Facility.

Please let me know if you have any additional questions on the Project. I apologize for taking several weeks to respond to your questions.

Thanks, Mike

Michael O'Connor Licensing Project Manager Bureau of Land Resources Maine Department of Environmental Protection 207-441-1732 Michael.OConnor@maine.gov



### **Appendix B**

2014 Fish and Eel Passage Facility operating Report and 2015 Proposed Operating Plan

20150401-5262 FERC PDF (Unofficial) 4/1/2015 10:48:36 AM

#### **BENTON FALLS ASSOCIATES**

c/o ESSEX HYDRO ASSOCIATES, LLC 55 UNION STREET, 4TH FLOOR BOSTON, MASSACHUSETTS 02108 USA TELEPHONE: FAX: E-MAIL: +617-367-0032 +617-367-3796 bfa@essexhydro.com

April 1, 2015

Kimberly D. Bose, Secretary Federal Energy Regulatory Commission 888 First St. N.E. Washington, DC 20426

Mr. Andrew Fisk, Director Bureau of Land & Water Quality State of Maine Department of Environmental Protection Augusta 17 State House Station Augusta, Maine 04333

Re: <u>Benton Falls Associates Project No. 5073</u> 2014 Fish and Eel Passage Facility Operating Report and 2015 Proposed Operating Plan

Dear Ms. Bose and Mr. Fisk,

Please find enclosed the above referenced report. A draft copy of this report was forwarded for review to the Maine Department of Marine Resources, the US Fish and Wildlife Service, the Maine Department of Inland Fisheries and Wildlife, the Maine Department of Environmental Protection, and the National Marine Fisheries Service. Their comments have been incorporated into this final report and are attached in original form in Appendix 1.

Very truly yours,

BENTON FALLS ASSOCIATES By: Essex Hydro Associates, L.L.C.

A General Partner Teche

Andrew J. Locke President

cc: S. Shepard (USFWS)

- G. Wippelhauser (MDMR) S. McDermott (NMFS)
  - M. Sale (LIHI)



20150401-5262 FERC PDF (Unofficial) 4/1/2015 10:48:36 AM

# 2014 FISH AND EEL PASSAGE FACILITY OPERATING REPORT

# AND

# 2015 PROPOSED OPERATING PLAN

# BENTON FALLS HYDROELECTRIC PROJECT FERC NO. 5073-ME



# Contents

1.	1. Introduction		
2.	Pr	oject Features	4
2	2.1	Dam Structure	4
2	2.2	Fish Passage Facilities	4
2	2.3	Eel Passage Facility	5
3.	Op	perational Procedures – Fish Lift	6
3	3.1	Fish Lift	6
3	3.2	Fish Passage Modifications for 2014	8
3	3.3	2014 Fish Lift Operations Schedule	8
3	8.4	Unexpected Changes in 2014 Fish Passage Operations	8
3	5.5	Results of the 2014 Fish Passage Operations Plan	8
3	6.6	Future Fish Lift Modifications	. 10
3	3.7	2015 Proposed Operating Schedule	. 10
3	8.8	Effectiveness Studies	. 10
4.	Op	perational Procedures – Upstream Eel Passage	. 12
4	.1	Upstream Eel Passage	. 12
4	.2	Upstream Eel Passage Modifications for 2014	. 13
4	.3	2014 Upstream Eel Passage Operations Schedule	. 13
4	.4	Results of the 2014 Upstream Eel Passage Operations Plan	. 13
4	.5	Future Upstream Eel Passage Modifications	. 14
4	.6	2015 Proposed Operating Schedule	. 14
5.	Op	perational Procedures – Downstream Eel Passage	. 14
5	5.1	Downstream Eel Passage	. 14
5	5.2	Downstream Eel Passage Modifications for 2014	. 15
5	5.3	2014 Downstream Eel Passage Operations Schedule	. 15
5	5.4	Results of the 2014 Downstream Eel Passage Operations Plan	. 16
5	5.5	Future Downstream Eel Passage Modifications	. 16
5	6.6	2015 Proposed Operating Schedule	. 16
6.	A	gency Consultation	. 16
Ap	pen	dix 1	. 17



#### 1. Introduction

Benton Falls Associates ("Benton Falls" or "Licensee") is the licensee for the Benton Falls Hydro Project, FERC No. 5073-ME ("Project"), located in the town of Benton, Maine. Benton Falls submits this 2014 Fish And Eel Passage Facility Operating Report and 2015 Proposed Operating Plan (the "Report") in accordance with the terms of its FERC license, the water quality certification for the Project, and the terms of the 1998 Agreement Between Members of the Kennebec Hydro Developers Group, the Kennebec Coalition, the National Marine Fisheries Services, the State of Maine, and the US Fish and Wildlife Service (the "KHDG Agreement").

A draft of this Report was circulated to the Maine Department of Marine Resources ("MDMR"), the Maine Department of Inland Fisheries and Wildlife ("MDIFW"), the Maine Department of Environmental Protection ("MDEP"), the National Marine Fisheries Service ("NMFS"), and the U.S. Fish and Wildlife Service ("USFWS") prior to final publication. Copies of relevant correspondence and recommendations from these agencies are contained in the Appendix to this report. Where appropriate, we have modified the final report to incorporate agency comments or identify areas that require further agency consultation.



#### 2. Project Features

#### 2.1 Dam Structure

The Project works consist of: (1) a 500-foot-long dam with a west abutment, an L-shaped power house, a fishway bay, a 72-foot-long gated concrete section, a 50-foot-long concrete gravity spillway, 3-foot-high flashboards on the spillway section, a 175-foot-long non-overflow earth dike; (2) an 83-acre reservoir with a usable storage capacity of 200 acre-feet at the ogee crest; (3) a normal water surface elevation of 85 feet m.s.l. with the 3-foot-high flashboards installed; (4) the powerhouse, constructed integrally with the dam, consisting of two turbine generators, Unit #1, a Dominion Bridge Sultzer double regulated Kaplan turbine with a 2,800 mm diameter runner and a design hydraulic capacity of 1,765 cfs with a generator nameplate of 3,580 kW and Unit #2, an Escher Wyss double regulated Kaplan turbine with a 1,200 mm diameter runner and a design hydraulic capacity of 350 cfs with a generator nameplate capacity of 750 kW; (5) a 150-foot-long tailrace channel; (6) a substation; (7) a 170 foot long, 12 kV transmission line; and (8) appurtenant facilities. The difference in elevation between nominal headwater and tail water levels is approximately 28 feet.

#### 2.2 Fish Passage Facilities

Licensee's upstream fish passage facilities consist of a fish lift/elevator designed to pass American Shad, Alewife and Atlantic salmon and an upstream eel ramp to pass American eels. On January 3, 2005, Licensee filed with FERC functional design drawings for the permanent upstream anadromous fish passage facilities at the Project pursuant to the fish passage requirements established by the KHDG Agreement. Licensee consulted with state and federal resource agencies regarding the functional design documents and incorporated the recommendations of the resource agencies into the design. FERC approved the functional design drawings in an order issued January 24, 2005.

Construction of the permanent fish lift facility at the Project commenced in July 2005 and the facility became operational May 1, 2006 for the 2006 migration season. Beginning in in 2006 and through 2014 we have produced the Report for each migration year. This 2014 Report marks the ninth year of operating the fish lift facility.

The fish lift contains a 600-gallon hopper that operates on a minimum cycle time of approximately seven minutes. The fish passage system is designed to pass an annual population of:

- 50,408 American Shad
- 767,267 Alewives
- 260 Salmon

The fish passage system consists of an automatically adjusted entrance gate, a horizontally moving crowder system, a separation screen, a single hopper, an adjustable exit flume trip gate system, an elevated exit flume to the impoundment equipped with a viewing window, fish counter and blockage screens, a downstream migrant bypass pipe to

the tailrace, attraction flow piping, and a video monitoring system.

A total attraction flow of up to 60 cubic feet per second ("cfs") can be provided at the entrance gate with 30 cfs through the exit flume and 30 cfs through gravity flow piping from the impoundment. The fish lift has an operational passage range up to 4,500 cfs. A dedicated automated programmable logic controller ("PLC") normally controls the fish lift. The PLC is located in the Project's powerhouse building, but also can be operated remotely.

The downstream fish passage facility is designed to pass all species and consists of a surface bypass system (two 3-foot wide intakes leading to a bypass pipe that discharges to the project tailrace) and turbine screening to exclude eels. Flow from the transition basin leads fish back to the river downstream of the project powerhouse through a 24-inch pipe with a total capacity of 30 cfs. This pipe discharges fish into the tailrace area of the project's smaller turbine. This system is used to provide downstream passage during the fall migration season. By license the downstream bypass is operated from June 15 to November 30.

### 2.3 Eel Passage Facility

The Atlantic States Marine Fisheries Commission's Interstate Fishery Management Plan for American Eel ("the Plan") was adopted in 2000. The Plan calls for (1) maintaining and enhancing eel abundance in all watersheds where they now occur; (2) restoring eels to waters where they had historical presence; and (3) providing adequate escapement to the ocean of pre-spawning adult eels. To implement the Plan, MDMR made a recommendation on the appropriate location for upstream eel passage at the Project. The eel passage ramp is sited and operated to pass juvenile eels, or "elvers," which are the focus of the agencies' management objectives. Licensee installed an upstream eel ramp at the Project in the summer of 2001 and has operated it since that time.

Licensee's upstream eel passage facility consists of a ramp located at the eastern side of the concrete spillway at the dam. The ramp includes an entrance chute 14inches wide by 62-inches long, a 36-inch by 48-inch wide turn rest pool, a 14-inch wide by 36.5 foot long main ramp, a 14 inch by approximately 12 foot exit ramp and a water pump with associated piping. The ramp entrance is located at the eastern spillway toe at around elevation 63.0 with the entrance facing north (upstream). Due to the potential for damage during spillage events, the entrance and turn/rest pool portions of the ramp were constructed of wood, with a potential future modification being the installation of a hinged aluminum section. The main ramp section extends from the turn rest pool (around elevation 66.3') to the flashboard section of the spillway at approximately elevation 88'. The exit ramp portion extends from the spillway flashboards to the upstream edge of the abutment (around elevation 89'). The main ramp and exit ramp portions are constructed using standard aluminum electrical cable tray sections. All portions of the ramp have EnkaMat substrate. Attraction and transport water is supplied from an approximately 15 gallon per minute pump discharging through a spray bar located at the extreme upstream end of the ramp.



Eels exiting the ramp either can drop directly into the head pond or into a MDMR installed floating trap box. Normally the exit ramp is directed to the floating trap box.

After consultation with the resource agencies, in 2005 Licensee installed a hinged eel screen on the trash racks of Unit #1 to facilitate downstream passage of eels. Unit #1 has trash racks that have two different clear space openings. The top 7 feet of the racks have 0.5" bars with 3" opening. The 3" opening is then split with a 0.25" bar resulting in a 1.375" clear space opening. From the bottom of the 7 feet to the bottom of the racks is a second section with 3" clear space opening. This unit has a hinged overlay that is installed by September 1 and is raised on December 1. The overlay is made of grating bars that allow a clear spacing of 1.125". On August 29, 2009 a new trash rack with 1" clear space opening was installed on Unit #2 so it could also be run during downstream eel migration. These trash racks replaced racks with 2" clear space opening. MDMR, MDEP, USFWS, MDIFW, NMFS and the FERC approved the plans for the new racks before installation.

To improve the downstream monitoring process of eel and Alewife, in 2007 a Lowrance sonar system was installed in the head pond. The Lowrance sonar system model LMS-332 was originally placed near the downstream passage entrance to see if there was a method of observing eel using the passage. Although the Lowrance was not useful for observing eel, it has been useful in observing schools of downstream alewife. When large pools of alewives are observed the top opening sluice gate can be used to move the school downstream. In addition, a camera was braced above the entrance to the downstream bypass gate. Underwater lights were installed at the bottom eight feet of the eel screen. A dusk to dawn timer controlled operation of the lights and a beacon indicator was installed at the top of the dam to verify operation.

#### 3. <u>Operational Procedures – Fish Lift</u>

#### 3.1 Fish Lift

#### Annual Schedule

The Licensee operates the fish lift according to the following annual schedule:

#### <u>Start up</u>

 April 15 to April 30 - Conduct a visual inspection of all fish lift mechanical, electrical and structural components for signs of winter damage and repair as necessary. Energize and operate all fish lift mechanical and electrical systems. Repair and calibrate, as necessary. The final timing of the trial operation of the system will be dependent upon the presence of ice within the flume and collection chamber.

#### Seasonal Operations

May 1 to June 1 – Fish lifts made as often as necessary to provide upstream



passage of alewife without undue delay. This may require additional operational changes that increase the fish lift cycle to sufficiently move a large number of fish (over 1 million), such as suspending the use of the V-trap crowder or the hopper separation gate.

- June 1 to July 1 Fish lifts made hourly and operated according to specifications (full attraction flow and operation of the V-trap crowder and hopper separation gate).
- July 1 to Water Temperature Exceeds 24 degrees Celsius Fish lifts made hourly and operated according to specifications. Fewer lifts or operational changes may be required based on the results of camera monitoring at the fishway entrance.
- Water Temperature below 24 degrees Celsius (late summer or early fall) to November 1 – Fish lifts made hourly and operated according to specifications. Fewer lifts or operational changes may be considered based on the results of camera monitoring at the fishway entrance.

#### Winter Shutdown

- De-energize all mechanical and electrical systems and tag out for winter.
- Shut off the attraction flow valve and tag out for winter.
- Lower the entrance gate to full down position and tag out for winter.
- Dewater the exit flume by closing the Whipps gate. Open the drain valves to pass leakage if conditions warrant, and open the flume attraction flow shutoff valve.
- Place the hopper in the storage position and secure.
- Install Styrofoam or similar product in collection chamber to prevent ice damage.
- Notify the resource agencies of any problems encountered during the annual startup of the fish lift facility that would potentially cause a delay in commencement of operations the following year.

After consultation with the resource agencies, Licensee reserves the right to modify the annual schedule based on experience gained in fish lift operation.

#### **Daily Operation**

Benton Falls personnel and MDMR operate the fish lift facility in conjunction with the automated control provided by the PLC. The fish lift is operated each day with varying cycle times based on the number of fish being lifted and consultation with MDMR and USFWS personnel.



In 2009, a significant increase in the passage of Alewives and the first observed presence of American Shad and Atlantic salmon resulted in USFWS requiring Benton Falls to modify the daily operating schedule as follows:

- May 1 to June 1 Operate the fish lift as often as necessary to provide upstream passage of alewife without undue delay. This may require operational changes that increase the fish lift cycle sufficiently, such as temporarily suspending the use of the V-trap crowder to move a large number of fish (over 2 million);
- June 1 to July 1 Operate the fish lift hourly and in accordance with the specifications (full attraction flow and operation of the V-trap crowder) or as otherwise directed by resource personnel;
- July 1 until water temperature exceeds 24 degrees Celsius Fish Lifts made hourly and operated according to specifications. Fewer lifts or other operational changes to be considered based on the results of camera monitoring or observation by agency personnel at the fishway entrance.
- Water temperature below 24 degrees Celsius (late summer/early fall) to November 1 – Operate the fish lift hourly in accordance with specifications. Consider fewer lifts or other operational changes based upon agency recommendations or results of camera monitoring or observation by agency personnel at the fish way entrance.

#### 3.2 Fish Passage Modifications for 2014

After consultation with MDMR and USFWS, no modifications to the fish lift were made prior to the start of the 2014 season.

#### 3.3 <u>2014 Fish Lift Operations Schedule</u>

Startup tests of the fish lift were performed between May 7 and May 8, 2014. At the direction of the MDMR, the fish lift was put into operation on May 7, 2014.

#### 3.4 Unexpected Changes in 2014 Fish Passage Operations

On June 9<sup>th</sup> MDMR personnel observed that the exit flume attraction flow control valve was malfunctioning. Several attempts were made by Benton and MDMR staff to fix the valve; however, it failed on June 19<sup>th</sup>. Repairs on the valve were not completed until July  $4^{th}$ .

#### 3.5 Results of the 2014 Fish Passage Operations Plan

The fish counts recorded in 2014 are supported by visual and video observations and provide a reliable indication that significant quantities of alewives, a limited number of American Shad and other species, and no Atlantic salmon were transported upstream by the fish lift.



#### **River Herring Passage Results**

The fish lift passed 2,378,906 river herring, primarily alewives, in 2014. This is approximately 106,414 more than were recorded in 2013 but 372,567 less than were recorded in 2011, the record upstream run. Figure 1 shows the daily river herring count during the upstream run.





The peak daily count occurred on May 18 when approximately 118,245 river herring were passed upstream. The counting array was used to record passage from May 7 until June 25, at which time it was removed per the direction of MDMR personnel. The counting array was removed to allow easier passage of larger species (American Shad) through the viewing windows area. After removing the counting tube array, MDMR personnel made visual counts of river herring.

#### Salmon, American Shad and Non Target Species Passage Results

From May 7 until July 30, 2 landlocked salmon, 26 American Shad and 0 Atlantic salmon passed upstream.

While the fish lift was designed to pass particular numbers of American Shad, Alewife and Atlantic salmon, resident species (i.e. smallmouth bass, landlocked salmon and white sucker) were also documented using the fish lift in 2014. A summary of all species observed in the fish lift during 2014 is included as Table 1 below.



Fish Species	Count
River Herring - (Alewife & Blueback Herring)	2,378,906
Smallmouth Bass	552
White Sucker	742
White Perch	54
American Shad	26
Pumpkinseed Fish	5
Redbreast Sunfish	17
American Eel	33,554
Largemouth Bass	0
Striped Bass	11
Brook Trout	9
Black Crappie	1
White Catfish	26
Brown Trout	0
Yellow Perch	10
Landlocked Salmon	2
Fallfish	1
Northern Pike	0
Atlantic Salmon	0
Carp	0
Sea Lamprey	2
Rainbow Trout	0
Lake Trout	0
Splake	2
Golden Shiner	0
Common Shine	0
Brown Bullhead	0

#### Table 1: Benton Falls 2014 Fish Species Count

# 3.6 Future Fish Lift Modifications

None proposed

# 3.7 2015 Proposed Operating Schedule

For 2015 Benton Falls plans to operate the fish lift in the same manner as 2014.

# 3.8 <u>Effectiveness Studies</u>

Benton Falls is required to conduct effectiveness studies of downstream passage facilities



at the project for Alewives, American Shad ("Shad") and Atlantic salmon ("Salmon").

#### <u>Alewife</u>

A successful alewife effectiveness test was conducted as part of the fish facility commissioning. The alewife effectiveness is demonstrated by the dramatic increase in alewife population that has been passed by the Benton Falls facility in recent years.

#### Atlantic Salmon

To date there has been no attempt to conduct efficiency tests for Salmon given the lack of a large enough population to test. Only four Salmon were passed in 2009 and one in 2013. In all the other years, including 2014, no Salmon were passed by the fish lift.

During this period, Benton Falls has maintained contact with the various resource agencies regarding possible next steps. In 2014, MDMR advised Benton by letter that the Salmon population is insufficient at this time to conduct an efficiency test. MDMR also advised that should Salmon numbers increase significantly in 2014, the question of efficiency studies should be revisited; given no Salmon were pass in 2014, MDMR and Benton have not revisited when an efficiency study should be run for Salmon.

In preparation for a future Salmon passage efficiency test, Benton staff met with representatives from NOAA National Marine Fisheries Service ("NMFS") in June of 2014 to discuss and outline the process for Benton to obtain a take permit. As a result of the meeting it was agreed that Benton would work with NMFS to develop a Species Protection Plan with the ultimate goal of obtaining a take permit. As a first step, on June 16, 2014 Benton Falls filed with FERC as the Commission's nonfederal representative for the purpose of initiating informal consultation pursuant to section 7 of the Endangered Species Act with NMFS. On June 19, 2014 FERC designated Benton as the Commission's nonfederal representative. Benton is currently working on developing a draft Biological Assessment to determine the Project's impact on Salmon.

#### American Shad

To date MDMR has expressed reservations about a Shad efficiency test because of the very small population that now exists in the Sebasticook River. Further, there is concern that because the species is resistant to human interference and handling, the conduct of an efficiency test might damage the existing population. With these concerns in mind, in late 2013, Benton, based on close consultation with MDMR, developed a plan to establish a baseline test of the Project's effectiveness as passing Shad downstream.

In 2014, working with Mr. Gray from MDMR, Benton conducted the efficiency test discussed in the 2013 Report<sup>1</sup>. During the 2014 period, 26 Shad were recorded passing

<sup>&</sup>lt;sup>1</sup> The proposed study will pit tag Shad on their ascent up-river to spawn. Pit tags will be externally mounted on the leading edge of the dorsal fin with either a modified 'T' anchor spaghetti type tag or fish hook mounted pit tag. The handling of Shad will be minimized utilizing this approach thereby limiting injury and stress to the fish prior to spawning. Shad will be tagged as captured by dip net at the excluder bars in the



upstream. The number of Shad that passed upstream in 2014 is significantly lower than 2012 and 2013. The cause of this decrease, as described in the explanation provided below by Mr. Gray, is the result of the malfunctioning exit flume attraction valve issue described in Section 3.4.

Failure of the exit flume attraction flow gate in turn lowered the efficiency of fishing operations. While the bulk of the river herring run had passed upstream, American shad were noted in number below the project but enough attraction flow was not available due to the failed gate operator. Only one American shad was PIT tagged for the efficiency study due to the fishways inability to attract additional shad to the collection chamber. Final repairs on the exit flume attraction flow valve were completed by July 4th but the American shad run had ended by this point.<sup>2</sup>

As noted above one Shad was tagged going upstream and was not recorded passing downstream. The 25 other Shad passed up stream were not tagged due to the focus on repairing the exit flume attraction flow gate and the expectation at the time that more Shad would be passed up stream that could be tagged; however, as noted above, by the time the exit flume attraction flow valve was fixed the Shad run had ended.

Given the lack of substantive data from 2014's test, the test results were deemed inconclusive. As such, MDMR and Benton have agreed to repeat 2014's test in 2015 in order to establish a larger set of test results. As in 2014, the goal of the test will be to establish a baseline set of data regarding Shad passage and from this data, establish a target Shad passage rate.

#### 4. Operational Procedures – Upstream Eel Passage

#### 4.1 Upstream Eel Passage

#### Annual Schedule

The Licensee operates the upstream eel ramp passage according to the following annual schedule.

May 1 to May 31: Start up

- Conduct a visual inspection of ramp structure and components for signs of winter damage. Repair as necessary.
- Install the lower entrance ramp and pumping system.

exit flume (not all Shad will be tagged). Preference for tagging will be towards males to limit stressing the prespawn females. American Shad returning downstream will be detected using a duplex antenna array deployed in both downstream bypass weirs. Data loggers will record any detection and identify the individuals tagged and time of passage.

<sup>&</sup>lt;sup>2</sup> Description provided by Nate Gray, Maine Department of Marine Resources, email dated March 30 2015.



• Operate all ramp mechanical and electrical systems. Repair and calibrate, as necessary.

#### June 1 to September 15: Daily operation

- Check the ramp on a regular basis and correct deficiencies as necessary.
- Contact MDMR staff if any problems may cause an interruption in daily operations. Record interruptions to operations for future reference.

The Licensee reserves the right, after consultation with MDMR, to modify the operating schedule based on factors and/or actual experience gained in upstream eel passage operation.

#### 4.2 Upstream Eel Passage Modifications for 2014

After consultation with MDMR, Benton Falls was not required to complete any modifications in 2014.

#### 4.3 2014 Upstream Eel Passage Operations Schedule

The ramp was prepared for 2014 operations during the month of May 2014. It was then monitored on a regular basis from June 19 through September 9, 2014.

#### 4.4 <u>Results of the 2014 Upstream Eel Passage Operations Plan</u>

In 2014 the Benton Falls eel passage operated for 83 days from June 19 to September 9 during which time approximately 33,554 eel passed upstream.

Since 2001, MDMR has annually installed a floating trap box in the head pond at the top of the ramp to record upstream migrants. MDMR tends the floating trap box three to seven times per week during the migration season. Once counted and measured, the eels are released into the Benton Falls head pond.

The following table provides a summary of upstream migrating eels passed at the Project from 2001 through 2014.



Year	Startup Date	Shutdown Date	Operating Days	Eels Passed <sup>3</sup>
2001	6/6	8/24	55	229,536
2002	6/18	9/13	53	22,437
2003	6/26	9/2	15	6,421
2004	7/15	8/12	29	2,409
2005	7/13	8/29	38	469
2006	6/30	8/30	57	522
2007	7/13	8/31	38	546
2008	6/11	9/8	58	18,395
2009	7/21	9/30	72	12,288
2010	5/31	10/10	133	11,828
2011	5/10	8/26	108	34,980
2012*	6/14	8/25	73	206,040
2013	6/4	7/11	37	97,481
2014	6/19	9/9	83	33,554

\*The large amount of upstream eel passage in 2012 was likely the result of abnormally high water flows.

### Table 1 Number of Upstream Migrating Eels Passed at the Benton Falls Project

#### 4.5 Future Upstream Eel Passage Modifications

Benton Falls is prepared to rehabilitate the ramp prior to the upstream eel passage in 2015.

#### 4.6 2015 Proposed Operating Schedule

For 2015 Benton Falls plans to operate the upstream eel passage in the same manner as 2014.

# 5. **Operational Procedures – Downstream Eel Passage**

#### 5.1 Downstream Eel Passage

#### Annual Schedule

The Licensee operates the downstream eel screen on an annual basis according to the following schedule:

<sup>&</sup>lt;sup>3</sup> Counts provided by MDMR.



#### August 15 to August 31: Start up

- Conduct a visual inspection of the Unit #1 eel screen and components for signs of damage. Repair as necessary.
- Operate all eel screen mechanical and electrical systems to ensure the Unit #1 screen can be lowered into place. Repair and calibrate, as necessary.
- Lower the screen to ensure proper operation.

#### September 1 to November 30: Daily operation

- Maintain the Unit #1 eel screen in its lowered position. If the Unit #1 eel screen is raised, limit operation of Unit #1 to daytime hours.
- Operate the trash rake as trash conditions dictate or, at a minimum, on a daily basis to ensure regular removal of trash from the trash racks and to determine if any eels have been entrained on either of the eel screens.
- If eel entrainment is detected, reduce Unit #1 and Unit#2 output during nighttime operation and contact DMR staff to report eel entrainment.
- Record eel entrainment and modification of operations.

#### November 30: Shutdown

- Raise the Unit #1 eel screen into the winter storage position.
- Perform any required maintenance and equipment repair. Licensee will notify MDMR staff of any problems encountered during the annual installation of the eel screen that would potentially cause a delay in commencement of operations.

Licensee, after consultation with MDMR, reserves the right to modify the annual schedule and operating plans based on actual experience gained in eel screen operation.

### 5.2 Downstream Eel Passage Modifications for 2014

No modifications to the downstream passage were requested for 2015.

#### 5.3 2014 Downstream Eel Passage Operations Schedule

The screen was put in place August 8, 2014. The screen remained in place until November 19, 2014 at which time it was raised into its winter storage position.

Unit #1 and Unit #2 trash racks were raked on a daily basis during the eel migration season.



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### 5.4 <u>Results of the 2014 Downstream Eel Passage Operations Plan</u>

Benton Falls' personnel regularly monitored the facilities cameras and sonar during the 2014 downstream migration season. Although alewife passage was indicated on the cameras, eel passage results continue to be inconclusive.

No entrained eels were discovered during 2014 operations.

#### 5.5 Future Downstream Eel Passage Modifications

Aside from minor cosmetic repairs to the ramp, no modifications are planned for the Downstream Eel Passage in 2015.

#### 5.6 <u>2015 Proposed Operating Schedule</u>

For 2015 Benton Falls plans to operate the Downstream Eel Passage in the same manner as 2014. The Unit #1 overlay screen will be removed November 30 unless river ice buildup occurs at an earlier date. Removal of the eel screen from Unit #1 earlier than November 30 would be decided in consultation with MDMR.

#### 6. <u>Agency Consultation</u>

During the creation of this Report, Benton Falls consulted with the following agencies for feedback and suggestions on 2014 operations:

- U.S Fish and Wildlife Service
- NOAA National Marine Fisheries Service
- Maine Department of Environmental Protection
- State of Maine Department of Marine Resources
- Maine Department of Inland Fisheries & Wildlife

Appendix 1 contains the feedback and suggestions that were received as a result of this process. The only substantive comments received were from the Maine Department of Marine Resources and have been incorporated into the Report.



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#### Appendix 1

- 1. Copy of email requesting comments from agencies
- 2. State of Maine Department of Marine Resources comments Comments have been incorporated into report
- 3. Maine Department of Environmental Protection comments
- 4. U.S. Fish and Wildlife Service comments NO COMMENT
- 5. NOAA National Marine Fisheries Service comments- NO COMMENT
- 6. Maine Department of Inland Fisheries and Wildlife comments NO COMMENT



#### Steve Hickey

From:	Wippelhauser, Gail
Sent:	Tuesday, March 10, 2015 12:35 PM
To:	'Steve Hickey'; Steve Hickey; Keliher, Patrick; Howatt, Kathy; Brown, Michael;
	sean.mcdermott@noaa.gov; steven_shepard@fws.gov
Subject:	RE: Benton Falls Associates Draft Report - 2014 Fish and Eel Passage Facility Report and
12.5	2015 Proposed Operating Plan

Steve:

The Maine Department of Marine Resources has reviewed the draft report for the 2014 season. We have three comments.

Instances of unexpected or unscheduled changes in operation such as the following which appears in the first paragraph on page 12 should appear at the beginning of the report, perhaps in a stand along section.

 While the specific reason for the drop-off in upstream Shad passage is unknown, unexpected mechanical errors with 1) the exit flume attraction valve from June 13 until July 4 and 2) water passing over the spillway of the dam when the main turbine was offline; may have disrupted the Shad's path to the fish lift. Benton staff used their best efforts to correct these issues as quickly as possible.

Please confirm that eels are passed upstream via the fishlift and the dedicated eel passage, and verify the numbers in the report.

 According to the text on page 9 "A summary of all species observed in the fish lift during 2014 is included as Table 1 on the following page". Table 1 indicates that 33,554 American eel were passed upstream. According to the text in section 4.4 "In 2014 the Benton Falls eel passage operated for 83 days from June 19 to September 9 during which time approximately 30,062 eel passed upstream", but the table shows that 33,554 eels were passed upstream

Please explain why only 1 of 26 American shad passed upstream was tagged for the efficiency test.

Thanks you for the opportunity to comment on the report.

Gall Wippelhauser, Ph. D. Marine Resources Scientist Maine Department of Marine Resources #172 State House Station Augusta, ME 04333

Phone: 207-624-6349 Fax: 207-624-6501 email: gail.wippelhauser@maine.gov

From: Steve Hickey [mailto:shickey@essexhydro.com] Sent: Monday, March 02, 2015 4:57 PM To: Steve Hickey; Keliher, Patrick; Wippelhauser, Gail; Howatt, Kathy; Brown, Michael; <u>sean.mcdermott@noaa.gov</u>; <u>steven shepard@fws.gov</u> Subject: RE: Benton Falls Associates Draft Report - 2014 Fish and Eel Passage Facility Report and 2015 Proposed Operating Plan

Please find attached a copy of the Benton Falls Associates Draft Report - 2014 Fish and Eel Passage Facility Report and 2015 Proposed Operating Plan. We are required to submit a final draft of the report to the Federal Energy Regulatory Commission on March 31st,



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2015. Any comments you have regarding the report would be appreciated prior to Friday, April 27, 2015 so they can be included in the final draft of the report. If you do not choose to comment, a note will be included in the final report that your agency had no comments. A copy of the report has been attached to this email.

Thank you,

Stephen Hickey Benton Falls Associates c/o Essex Hydro Associates, L.L.C. 55 Union Street, 4th Floor Boston, MA 02108 tel: 617-367-0032 fax: 617-367-3796



#### Steve Hickey

From:	Gray, Nate
Sent:	Monday, March 30, 2015 4:40 PM
To:	Steve Hickey
Subject:	RE: Benton Falls Associates Draft Report - 2014 Fish and Eel Passage Facility Report and
-	2015 Proposed Operating Plan

Steve,

Here it is in a nutshell: And no "because"

During the course of fish passage operations it was noted by MDMR personnel that the exit flume attraction flow control valve was malfunctioning. This was first noted in the operations log on June 9<sup>th</sup>. MDMR personnel brought this to the attention of the dam operator. Several attempts were made to fix the gate control operator by cleaning the valve gate blade, loosening the packing nuts on the gate blade seal, and lubricating the valve operator ACME thread shaft. None of these attempts at repair were successful. The exit flume attraction valve continued to decline in operation until it completely failed on 6/19. Subsequent diagnosis revealed that the drive distribution from the limitorque had failed at the power head by snapping all the ring bolts. Further diagnosis revealed a sloppy installation of adapter components by the installing contractor which eventually lead to the exit flume attraction gates complete failure. Failure of the exit flume attraction flow gate in turn lowered the efficiency of fishing operations. While the bulk of the river herring run had passed upstream, American shad were noted in number below the project but enough attraction flow was not available due to the failed gate operator. Only one American shad was PIT tagged for the efficiency study due to the fishways inability to attract additional shad to the collection chamber. Final repairs on the exit flume attraction flow valve were completed by July 4<sup>th</sup> but the American shad run had ended by this point.

From: Steve Hickey [mailto:sjh@essexhydro.com] Sent: Monday, March 30, 2015 11:33 AM To: Gray, Nate Subject: FW: Benton Falls Associates Draft Report - 2014 Fish and Eel Passage Facility Report and 2015 Proposed Operating Plan

Nate, I left you a message earlier today for you assistance responding to Gale's request for further information. I have highlighted her comment below. We need to submit the report to the FERC by Wednesday April 1 so your timely response would be appreciated.

Thank you, Steve

Stephen Hickey 617-367-0032

From: Wippelhauser, Gail [mailto:Gail.Wippelhauser@maine.gov] Sent: Tuesday, March 10, 2015 12:35 PM

To: 'Steve Hickey'; Steve Hickey; Keliher, Patrick; Howatt, Kathy; Brown, Michael; <u>sean.mcdermott@noaa.gov</u>; steven shepard@fws.gov

Subject: RE: Benton Falls Associates Draft Report - 2014 Fish and Eel Passage Facility Report and 2015 Proposed Operating Plan

Steve:





The Maine Department of Marine Resources has reviewed the draft report for the 2014 season. We have three comments.

Instances of unexpected or unscheduled changes in operation such as the following which appears in the first paragraph on page 12 should appear at the beginning of the report, perhaps in a stand along section.

While the specific reason for the drop-off in upstream Shad passage is unknown, unexpected mechanical
errors with 1) the exit flume attraction valve from June 13 until July 4 and 2) water passing over the spillway of the
dam when the main turbine was offline; may have disrupted the Shad's path to the fish lift. Benton staff used their
best efforts to correct these issues as quickly as possible.

Please confirm that eels are passed upstream via the fishlift and the dedicated eel passage, and verify the numbers in the report.

 According to the text on page 9 "A summary of all species observed in the fish lift during 2014 is included as Table 1 on the following page". Table 1 indicates that 33,554 American eel were passed upstream. According to the text in section 4.4 "In 2014 the Benton Falls eel passage operated for 83 days from June 19 to September 9 during which time approximately 30,062 eel passed upstream", but the table shows that 33,554 eels were passed upstream

Please explain why only 1 of 26 American shad passed upstream was tagged for the efficiency test.

Thanks you for the opportunity to comment on the report.

Gail Wippelhauser, Ph. D. Marine Resources Scientist Maine Department of Marine Resources #172 State House Station Augusta, ME 04333 Phone: 207-624-6349 Fax: 207-624-6501 email: gail.wippelhauser@maine.gov

From: Steve Hickey [mailto:shickey@essexhydro.com] Sent: Monday, March 02, 2015 4:57 PM To: Steve Hickey; Keliher, Patrick; Wippelhauser, Gail; Howatt, Kathy; Brown, Michael; <u>sean.mcdermott@noaa.gov;</u> steven shepard@fws.gov Subject: RE: Benton Falls Associates Draft Report - 2014 Fish and Eel Passage Facility Report and 2015 Proposed Operating Plan

Please find attached a copy of the Benton Falls Associates Draft Report - 2014 Fish and Eel Passage Facility Report and 2015 Proposed Operating Plan. We are required to submit a final draft of the report to the Federal Energy Regulatory Commission on March 31st, 2015. Any comments you have regarding the report would be appreciated prior to Friday, April 27, 2015 so they can be included in the final draft of the report. If you do not choose to comment, a note will be included in the final report that your agency had no comments. A copy of the report has been attached to this email.

Thank you,

Stephen Hickey Benton Falls Associates c/o Essex Hydro Associates, L.L.C. 55 Union Street, 4th Floor Boston, MA 02108 tel: 617-367-0032 fax: 617-367-3796

2



#### Steve Hickey

From:	Howatt, Kathy
Sent:	Monday, March 30, 2015 3:33 PM
To:	Steve Hickey
Subject:	RE: Benton Falls Associates Draft Report - 2014 Fish and Eel Passage Facility Report and
89.047-00.000	2015 Proposed Operating Plan

Steve,

On March 2, 2015 the Department received a draft 2014 Fish and Eel Passage Facility Report and the 2015 Proposed Operating Plan for the Benton Falls Hydroelectric Project (FERC5073). The Department defers to fish and wildlife resource agencies for evaluation and comment on the reported results of facility operation. There are no modifications proposed for the fish life or operating plans, and therefore the Department has no comment at this time.

Kathy Davis Howatt Hydropower Coordinator, DLRR Maine Department of Environmental Protection 207-446-2642 kathy.howatt@maine.gov

From: Steve Hickey [mailto:sjh@essexhydro.com] Sent: Wednesday, March 25, 2015 8:46 AM To: Steve Hickey; Keliher, Patrick; Howatt, Kathy; Brown, Michael; <u>sean.mcdermott@noaa.gov</u>; <u>steven\_shepard@fws.gov</u> Subject: FW: Benton Falls Associates Draft Report - 2014 Fish and Eel Passage Facility Report and 2015 Proposed Operating Plan

Dear all,

Please remember that any comments you have on the attached report are requested on or before SPM this Friday, March 27, 2015. If you do not choose to comment, a note will be included in the final report that your agency had not comments. Thank you and please contact me with any questions.

Stephen Hickey Benton Falls Associates 617-367-0032

From: Steve Hickey [mailto:<u>shickey@essexhydro.com</u>] Sent: Monday, March 02, 2015 4:57 PM To: Steve Hickey; <u>patrick.keliher@maine.gov</u>; <u>Gail.Wippelhauser@maine.gov</u>; <u>Kathy.Howatt@maine.gov</u>; <u>Michael.Brown@maine.gov</u>; <u>sean.mcdermott@noaa.gov</u>; <u>steven shepard@fws.gov</u> Subject: RE: Benton Falls Associates Draft Report - 2014 Fish and Eel Passage Facility Report and 2015 Proposed Operating Plan

Please find attached a copy of the Benton Falls Associates Draft Report - 2014 Fish and Eel Passage Facility Report and 2015 Proposed Operating Plan. We are required to submit a final draft of the report to the Federal Energy Regulatory Commission on March 31st, 2015. Any comments you have regarding the report would be appreciated prior to Friday, April 27, 2015 so they can be included in the final draft of the report. If you do not choose to comment, a note will be included in the final report that your agency had no comments. A copy of the report has been attached to this email.