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LOW IMPACT HYDRO INSTITUTE APPLICATION COMMENT RESPONSES BYRON WESTON HYDROELECTRIC PROJECT DALTON, MASSACHUSETTS

December 29, 2016
File No. 01.0019349.81



PREPARED FOR:

Crane & Co.
Dalton, Massachusetts

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December 29, 2016
File No. 01.0019349.81

Mr. James Beaudin
Crane & Co.
30 South Street
Dalton, MA 01226

Re: Low Impact Hydro Institute Application Comment Responses
Byron Weston Hydroelectric Project, FERC No. 13583

Dear Mr. Beaudin:

Per your request, GZA GeoEnvironmental, Inc. (GZA) has prepared responses to comments from the Low Impact Hydro Institute (LIHI) regarding Crane's application for LIHI certification.

We trust that the enclosed information meets the requirements of the LIHI, and that Crane will forward this package to the LIHI. If you have any questions regarding the responses or require additional information, please feel free to contact Derek Schipper at (781) 278-5792.

Very truly yours,

GZA GEOENVIRONMENTAL, INC.

Maria Firstenberg
Environmental Specialist

Derek Schipper, P.E.
Senior Project Manager

Chad W. Cox, P.E.
Principal-In-Charge



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INTRODUCTION & BACKGROUND

Crane & Co., Inc. (Crane) has submitted to the Low Impact Hydro Institute (LIHI) an application for certification of the Byron Weston Hydroelectric Project (FERC No. 13583) located on the East Branch of the Housatonic River in Dalton, MA. Crane received an Intake Review with comments from the LIHI dated November 2, 2015. The accompanying transmittal letter indicates that Byron Weston facility is qualified for LIHI certification and that the full Certification Review process can begin upon receipt of the additional information requested in the Intake Review comments. The Intake Review and the accompanying transmittal letter are included in **Appendix A**.

Because the original LIHI Application was submitted prior to January 1, 2016, Crane is entitled to continue this submittal using the 2014 process. This grandfathering policy expires on December 31, 2016.

The information requested in the Intake Review comments is provided in the following sections with further details referenced and attached in the appendices. Specific requests for additional information were made in red text in the review worksheet. For items where additional information was requested, these application questions and Intake Review comments are presented in full below in *italics*, with the request in **bold**. The response to the request follows. The numbering format from the Intake Review has been retained.

I. BACKGROUND INFORMATION REVIEW

11. Contacts for Resource Agencies and non-governmental organizations

WORD attachment Stakeholder Initial Consultation Letter contains a list of key resource agencies and nongovernmental organizations (NGOs) involved with the operations of the Project either during the relicensing process or thereafter. A review of this document shows that individual letters were sent to each stakeholder. However, no phone number or emails are provided.

Comment: Please provide phone numbers and emails for each person/organization contained in this referenced document.

The requested contact information is included in **Appendix B**.

II. CRITERIA INFORMATION REVIEW

A. FLOWS

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 bypassed reaches?

Comment: Applicant states YES. Please provide a reference to official FERC or agency documents that support your position. For example, a Minimum Flow Operating Plan developed or incorporated within the FERC license or Water Quality certification.



As required under Article 18 of the FERC exemption, a Run-of-River Operation Maintenance, and Monitoring Plan (ROR Operations Plan) for maintaining and monitoring run-of-river operation at the project was developed. This plan, dated October 9, 2012, was developed in order to comply with the Terms and Conditions of the FERC exemption provided by the Massachusetts Division of Fisheries and Wildlife (MADFW), the U.S. Department of Interior (Interior) Section and the Massachusetts Department of Environmental Protection (MassDEP) Water Quality Certification (WQC). MassDEP reviewed the ROR Operations Plan and found it satisfactory. The ROR Operations Plan and letter from MassDEP are included in **Appendix C**.

Additionally, the Byron Weston Pond level during the project's operation has been recorded since 2013. During this period, the average elevation of the pond was 1,116.5 feet North Atlantic Vertical Datum (NAVD 1988). This data is presented in Tables 1 through 4 and Chart 1 in **Appendix C**.

B. WATER QUALITY

1a. Is the Facility 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?

Comment: Applicant states YES. Please provide a reference to official FERC or agency documents that support your position. Please discuss aspects of the Water Quality Certification (WQC).

The East Branch of the Housatonic River is designated as a Class B water for its entire length in Massachusetts, and is therefore required to meet the minimum criteria listed within 314 CMR 4.05(3)(b) and 4.05(5).

The Facility was issued a WQC on September 23, 2011. The WQC contains 24 provisions to protect water quality in the impacted area. A copy of the WQC is included in Appendix D.

Provision #13 of the WQC requires the Facility to operate in an instantaneous run-of-river mode, with outflows equaling inflows at the project on an instantaneous basis and Provision #17 requires the Facility to submit a plan for monitoring run-of-river operation, including descriptions of the control mechanisms, the level of manual and automatic operation, data recording methodology, and an implementation schedule. As previously described, the ROR Operations Plan was developed in compliance with these provisions and was accepted by MassDEP.

Provision #18 of the WQC requires that a post-operation water quality monitoring study be conducted in an identical manner to the pre-operation study. The post-operation study was conducted in the fall of 2015. Study details and results are discussed under Water Quality question 1b.

1b. Is the Facility 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?

Comment: Applicant states YES. Please provide a reference to official FERC or agency documents that support your position. Is there a letter that supports this position?

A post-operation water quality study was conducted from September 4, 2015 through November 5, 2015, using the same format as the pre-operation study. The study used four in-situ water quality measuring instruments, spaced from the upstream to downstream of the Byron Weston No. 2 Dam, to record parameters including flow rate, water temperature, water barometric pressure, and dissolved oxygen, every 15 minutes for the duration of the study. Additionally, precipitation and daily high and low air temperatures were recorded.



GZA analyzed the data collected from the post-operation water quality study. Flow rates ranged from 14.7 to 284 cubic feet per second. Water temperatures at the four locations ranged from 40.3 to 72.4 degrees F and barometric pressures ranged from 26.6 to 29.3 inches of Hg. Dissolved oxygen levels of 8.1 to 14.1 mg/L. (Note that DO levels above 100 percent saturation occurred at locations immediately downstream of cascading flow over the spillway.) The data is summarized in Table 5 in **Appendix D**. Based on the study results, the Facility is in compliance with the water quality standards established under 314 CMR 4.05 for Class B warm water fisheries for temperature (not above 83 °F) and dissolved oxygen (not below 5.0 mg/L) between and downstream of the two dams (Byron Weston Dams No. 1 and No. 2).

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?*

Comment: Applicant states NO. Please provide a reference to official FERC or agency documents that support your position. There should be a letter from the USFWS or a state agency that documents this answer.

Yes¹ – Go to B3

According to the Massachusetts 2014 Integrated Waters List (IWL), the East Branch of the Housatonic River (MA21-02) is classified as a “Water Requiring a TMDL.” Specifically, the cause of impairment is fecal coliforms and PCB in fish tissue. Note that the PCB issue only applies downstream of the Government Mill Dam which forms a barrier to impacted sediments and upstream passage by aquatic wildlife from the impacted reaches. Government Mill Dam is downstream of Byron Weston Dam No. 2. The source of the PCB discharges has been identified as originating from the General Electric facilities in downstream Pittsfield. (See below) Page 166 from the IWL which shows this classification is included in **Appendix D**.

3. *If the answer to question B.2 is yes, has there been a determination that the Facility does not cause, or contribute to, the violation?*

Yes – Pass

Per the Housatonic River Watershed 2002 Water Quality Assessment Report published by MassDEP in September of 2007, the elevated PCB concentrations in fish tissue in the East Branch of the Housatonic River (MA21-02) are associated with operations at the General Electric Company site in Pittsfield. A PCB cleanup project is ongoing. Per the same report, fecal coliform and *E. coli* samples were collected from two locations, both downstream of the Facility. Elevated bacteria levels were highest furthest downstream and were associated with wet weather days. During past shoreline surveys, volunteers noted trash and inappropriate disposal of pet waste along this segment of the river. While the source of the elevated fecal coliform bacteria levels is unknown, it is suspected to be stormwater runoff from the area rather than from a specific source. Therefore, the Facility does not cause the elevated concentrations of PCBs in fish or the elevated levels of fecal coliforms. Refer to the report excerpt included in **Appendix D** for further details.

C. FISH PASSAGE AND PROTECTION

1. *Are anadromous and/or catadromous fish present in the Facility area or are they known to have been present historically?*

¹ The Applicant originally answered this question “No.” The answer has been updated to reflect the information in the 2014 IWL which was published in December of 2015 after the Intake Review was received.



Comment: Applicant states NO. Please provide a reference to official FERC or agency documents that support your position. There should be a letter from the USFWS or a state agency that documents this answer. May also be contained with the FERC license, FERC Environmental Assessment (EA) or WQC.

Letters from the MADFW and the USFWS, dated January 29 and February 1, 2010, respectively, indicate that anadromous and catadromous fish were not present within the Facility or its vicinity. Both letters acknowledge that a migratory fish restoration program targeting American eel (*Anguilla rostrata*), American shad (*Alosa sapidissima*), and river herring (*Alosa pseudoharengus*) was underway on the portion of the Housatonic River in Connecticut and that there were no plans to extend the project to the Massachusetts portion of the river. Both letters further acknowledge that fish passages were not required at the time, but could be in the future. These letters are included in **Appendix E**.

6. Is the Facility in Compliance with Mandatory Fish Passage Prescriptions for upstream and/or downstream passage of Riverine fish?

Comment: Applicant states NA. Please provide a reference to official FERC or agency documents that support your position. There should be a letter from the USFWS or a state agency that documents this answer.

No Mandatory Fish Passage Prescriptions were included in the FERC License or accompanying WQC, and were not requested by MADFW or USFWS during the licensing process. Item #13 of the FERC Exemption requires that the Facility “construct, operate, maintain, and evaluate upstream and downstream fish passage facilities when notified by the agencies that such facilities are necessary.” To date, the Facility has not been notified that such structures are necessary. A copy of the FERC Exemption is included in **Appendix E**.

7. Is the Facility in compliance with Resource Agency recommendations for riverine, anadromous and catadromous fish entrainment protection, such as tailrace barriers?

Comment: Applicant states NA. Please provide a reference to official FERC or agency documents that support your position. There should be a letter from the USFWS or a state agency that documents this answer.

Provision #19 of the WQC, included in **Appendix D**, requires that full-depth trash racks with clear spacing of one inch or less and an approach velocity of ≤ 2.0 feet per second be installed to reduce entrainment or impingement of fish. The required trash racks were installed. Refer to Drawing No. SK-BW-184 in **Appendix E** for further details.

D. WATERSHED PROTECTION

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 average annual high water line for at least 50% of the shoreline, including all of the undeveloped shoreline?

Comment: The applicant is claiming that there exists a buffer zone dedicated for conservation purposes. Applicant states there is not Public Access to the impoundment at the project site. The property is owned by Crane & Company as justification. Please provide additional reference to official FERC or agency documents that support the position that this buffer zone has been officially dedicated to conservation purposes.

No² – Go to D2

² This question was previously answered “NA.” However, the answer had been modified in this response to more accurately reflect the existing conditions.



The Facility, located immediately adjacent to the river, uses the water power potential of the 30- foot-high, 90- foot-long, stone-masonry Byron Weston Dam No. 2 equipped with a 23- foot-high, 75-foot-long spillway. The dam creates a 0.94-acre impoundment with a normal water surface elevation of 1,116.7 feet NAVD 1988. In addition to the dam and impoundment, the Facility includes an intake structure equipped with trash racks and a headgate. The water passes through the headgate to a 6.5- foot-long, 6-foot-diameter penstock connected to a 50-foot-long, 9.5-foot-wide headrace canal. The headrace canal conveys flow to a 15-foot-long, 4.4-foot-diameter penstock leading to a 250- kilowatt turbine-generating unit within the Byron Weston Defiance Mill building. Water is then discharged into the East Branch of the Housatonic River through a new draft tube within the existing tailrace approximately 35 feet downstream of the dam.

The upstream impoundment of the Byron Weston Dam No. 2 extends approximately 700 feet upstream to the toe of the Byron Weston Dam No. 1. Byron Weston Dam No. 1 is a run-of-the-river masonry dam which is more than 20 feet high and fully extends across the channel and is also owned by Crane. The Dam No. 2 impoundment is fully owned by Crane. The impoundment banks on river right are formed by the vertical masonry walls of Crane mill buildings. There is no public access to the impoundment between Dam No. 1 and Dam No. 2. The impoundment banks on river left are heavily wooded, steep slopes, also owned by Crane. Due to this steep topography, there are no means of access for the public down the slopes. Refer to Drawings F-1 through F-4 in **Appendix F** for further details.

Furthermore, due to the historical use of the shoreline for mill facilities, the area immediately adjacent to the Facility including the shoreline has been previously developed with limited access to the river. Thus, such a buffer zone does not exist and is infeasible along this portion of the river. Public access to the impoundment is likewise not safe or feasible (see response to G.1 below).

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?

Comment: Applicant states the company has put 634 Acres of its property under a Conservation Restriction with Fisheries and Wildlife to ensure that the property remains protected and open to the Public in perpetuity. Please provide a reference to this document. For example, contained in supplemental document Appendix E, submitted with the LIHI application.

In 2015, Crane donated a 685-acre parcel that the company has held since the 19th century to the Berkshire Natural Resources Council. The undeveloped land, more commonly known as The Boulders, is located in parts of Dalton, Lanesborough and Pittsfield, and was already covered by a conservation restriction. While this property is not within the project watershed, it is close by and demonstrates Crane's commitment to environmental conservation.

3. Has the Facility owner/operator established through a settlement agreement with appropriate stakeholders, with 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)?

Comment: Applicant states agreement exists with the USFWS. Please provide a reference letter from the USFWS or a reference to a shoreline management plan.

The Dalton Conservation Commission (DCC) is responsible for administering and enforcing the Massachusetts Wetlands Protection Act (WPA) which protects the quality and quantity of surface and ground water, prevents flooding and storm damage, and protects wetlands-dependent wildlife and their habitat. Approval of projects by the DCC ensures that measures are taken to prevent erosion and damage to resource areas. A Request for Determination of Applicability was filed with the DCC on April 25, 2011. The DCC issued a negative determination On June 7, 2011, approving the project. The determination indicates that while the proposed work is within an area subject to protection under the WPA, the



work does not involve removing, filling, dredging, or altering the area and that, therefore, filing a Notice of Intent was not required. A copy of the determination is included in **Appendix F**.

The WQC has additional conditions which contribute to protection of the watershed. Condition 9 of the WQC requires the Facility to submit a plan to monitor and control erosion to keep impacted waters free from turbidity. Condition 10 requires the Facility to dispose of debris and remove sediments in a manner that will not impair water quality. It is GZA's opinion that these are specific watershed protection requirements and, if the Facility operates in accordance with these requirements, they meet the LIHI criteria for Watershed Protection.

E. THREATENED AND ENDANGERED SPECIES

1. Are threatened or endangered species listed under state or federal Endangered Species Acts present in the Facility area and/or downstream reach?

YES³ – Go to E2

GZA requested an Endangered Species Consultation with the U.S. Fish and Wildlife Service. The resulting Official Species List, included in **Appendix G**, includes the northern long-eared bat (*Myotis septentrionalis*) for Berkshire County in Massachusetts. This species has a Federal status of Threatened and a State status of Endangered within Massachusetts. The status of this species had not been established at the time of FERC exemption consultations; however, it is GZA's opinion that the ongoing operations of the facility are unlikely to adversely affect habitat utilized by the northern long-eared bat.

Additionally, a review of the Natural Heritage and Endangered Species Program (NHESP) GIS data layers show that no Estimated or Priority Habitat areas are mapped within the Facility or downstream reach. There are two Priority Habitat (PH) areas, PH 160 and PH 1491, which are shown approximately 300 feet east and 200 feet north (upstream) of the Facility, respectively. PH 160 appears to encompass an isolated wetland complex while PH 1491 appears to encompass a portion of the East Branch of the Housatonic River, a wetland complex, and upland areas. A response (NHESP Tracking No. 08-25116) from the Massachusetts Division of Fisheries and Wildlife (MADFW) dated April 30, 2010, indicates that two species of dragonfly, ocellated darter (*Boyeria grafiana*) and zebra clubtail (*Stylurus scudleri*), both with a state status of Special Concern⁴, are associated with these PH areas. At this time, PH for these species does not fall within the Facility or immediately downstream of the Facility. Therefore, Facility operations are unlikely to adversely affect critical habitat for these two species. The MADFW response letter, a map showing these PH areas relative to the Facility (**Figure 1**), and fact sheets for these species are included in **Appendix G**.

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?

N/A – Go to E3

A recovery plan for the northern long-eared bat has not been adopted as of the time of this writing. The final version of the *4(d) Rule for the Northern Long-Eared Bat* (4(d) Rule) was issued on January 14th, 2016. The rule includes restrictions on tree cutting in close proximity to known hibernacula and roost trees. A determination was released on April 25th, 2016,

³ At the time of the initial application filing, there were no endangered species listed under state or federal Endangered Species Acts present in the Facility area or the downstream reach. This answer is updated to reflect the addition of the Northern Long-eared Bat to the federal and state lists.

⁴ As of 2012, after the issuance of the response letter, the zebra clubtail was removed from the state list of rare species and no longer has a state status.



which acknowledges that white-nose syndrome (WNS) is the primary threat to this species rather than loss of critical habitat. Copies of the 4(d) Rule and the determination are included in **Appendix G**.

3) If the Facility has received authorization 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 pursuant to ESA Section 10; or (iii) For species listed by a state and not by the federal government, obtaining authorization pursuant to similar state procedures; is the Facility in Compliance with conditions pursuant to that authorization?

N/A – Go to E5

The facility has neither requested nor received authorization for an incidental Take of the northern long-eared bat. The 4(d) Rule states that “Incidental take resulting from otherwise lawful activities will not be prohibited in areas not yet affected by white-nose syndrome (WNS).” Cases of WNS have been reported in Berkshire County during the 2007-2008 hibernation period as indicated on the August 2, 2016 map of WNS in the United States included in **Appendix G**. However, cases of WNS have not been reported at the Facility.

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?

YES – Pass

The northern long-eared bat is a migratory species which utilizes a variety of habitats during the year depending on the season. Between early November and April, this species hibernates in crevices in portions of caves and abandoned mine shafts which have high humidity, constant temperatures, and little air flow. Individuals tend to return to the same hibernaculum from year to year although they are also known to sometimes use other hibernacula. Hibernacula are generally located within approximately 35 miles of summer foraging habitat. Between April and October, northern long-eared bats roost and forage in forested areas. Preferred roost sites include clusters of large, live or dead, hardwood trees with cavities or peeling bark. Preferred foraging sites include wooded areas around vernal pools or small ponds or along streams. Thus, transitional zones between forested uplands and wetlands represent prime summer roosting and foraging habitat. Further information about the northern-long-eared bat is presented in the Fact Sheets included in Appendix G.

The 4(d) Rule and subsequent statements focus on minimizing tree cutting near critical habitat and preventing further spread of WNS. Due to the developed nature of the Facility and the availability of wooded areas along portions of the East Branch of the Housatonic River, it is unlikely that this species would roost at the Facility. Furthermore, since the Facility operations do not include tree cutting, it is unlikely that these activities will adversely impact critical habitat for the northern long-eared bat.

F. CULTURAL RESOURCE PROTECTION

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?

Comment: Applicant states YES. Please provide a reference to official FERC or agency documents that support your position. Is there a cultural resources management plan (CRMP), historic protection management plan (HPMP) or correspondence with the states historical preservation office (SHPO)?

The Massachusetts Historical Commission (MHC) and the Dalton Historical Commission (DHC) were consulted during the FERC permitting process. In a letter dated December 15, 2009, the MHC acknowledged the project and recommended



consultation with the DHC. In a letter dated July 20, 2010, the DHC indicates that it is in full support of the project and that it believes the Byron Weston Defiance Mill building should be included in the Register of Historic Places. These comments indicate that the project will have no significant effects on cultural resources. Article 27 of the FERC exemption requires a Wheel Turbine Relocation Plan (Relocation Plan) be submitted to the MHC and DHC for the relocation and refurbishment of the McCormick Hercules wheel turbines. These letters, the Relocation Plan, and a subsequent letter from the DHC approving of the plan are included in **Appendix H**.

Currently, the wheel turbines are in storage at the Byron Weston Mill. Per the Relocation Plan, arrangements are being made to put the wheel turbines on display at the Crane Museum of Papermaking.

G. RECREATION

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?

Comment: Applicant states that due to the steep embankments and building location abutting the stream the property does not lend itself for Public Access. The impoundment is very small. Is this policy in agreement with the FERC exemption? If YES, Please provide refer to a Safety Plan or document that prohibits public access. If recreational opportunity is not available due to safety concerns, has the owner expressed willingness to provide some funding to support recreation at other location on the river?

The FERC exemption does not include recreation requirements. Due to the steep shoreline slopes, adjacent manufacturing facilities, small impoundment size, difficult accessibility, water quality issues, and presence of the run-of-river dam, the impoundment is not a favorable or safe location for recreation. Therefore, there is no public access to the impoundment between Dam No. 1 and Dam No. 2. However, Article 24 requires that a Public Safety Plan be developed which includes *“an evaluation of public safety concerns at the project site, including any designated recreation areas, and assess the need for the installation of safety devices or other safety measures. The submitted plan shall include a description of all public safety devices and signage, as well as a map showing the location of all public safety measures.”* A copy of the Public Safety Plan is included in **Appendix I**.

The Appalachian Trail, a 2,158-mile long hiking path that follows the Appalachian Mountains from Georgia to Maine, passes through the Town of Dalton in the immediate vicinity of the project. The trail passes along Depot Street and Main Street as shown below on Figure 2. The impoundment created by the Byron Weston No. 2 Dam is visible from the trail. However, the dam, its spillway, the area immediately downstream of the dam and the tailrace discharge area are not visible from the trail due to the obstructed view created by private properties and vegetation.



Figure 2 Location of Appalachian Trail With Respect to Project Boundary

Boating is allowed in the East Branch upstream of Crane's Byron Weston No. 1 Dam, upstream of the project.



Appendix A – Byron Weston Hydroelectric Project Intake Review with Transmittal Letter



Dr. Michael J. Sale, Executive Director
704 Potters Falls Road, Wartburg, TN 37887
865-719-4794, mjsale@lowimpacthydro.org

November 2, 2015

Mr. David Boino
Crane & Co., Inc.
30 South Street
Dalton, MA 01226

Subject: Intake Review for the Byron Weston Hydroelectric Project (MA)

Dear Mr. Boino:

I am writing to let you know that LIHI has completed our Intake Review for the Byron Weston Hydroelectric Project (FERC No. 13583) on the East Branch of the Housatonic River, near Dalton, Massachusetts. This Intake Review is the first step in LIHI's review process for applications for Low-Impact certification.

A copy of the completed Intake Review is attached to this letter. This review was performed by Mr. Gary Franc, whose job as intake reviewer is to determine if your application is missing information or is not ready for the full Certification Review for any other reason. As part of our Intake Review, we prepared a referenced list of missing information and initial issues that needs to be addressed as we start the next phase. My impression so far is that the Byron Weston facility is qualified for LIHI certification. You will see from Gary's report that there are several areas where additional information is recommended, but overall, the LIHI application package is in reasonably good shape.

After you have had an opportunity to look over the Intake Review, you may contact me or Gary with any questions you have about this report. Gary can be reached at 315-715-1556 and franclogic@verizon.net. I recommend that we set up a teleconference so that we can explain the missing information in more detail and help you understand how to revise your application. We are committed to helping you complete successful applications. Gary will be available to provide additional support.

The fee to undertake the full certification review of your application and bring it to LIHI's Governing Board for a certification decision will be \$9,120.00; this fee must be received by LIHI before we can initiate the full review of your application. An invoice for this fee will be sent separately from Dana Hall. The missing information discussed in the Intake Review should be submitted at the same time as payment of the application fee.

Once we receive a revised application, LIHI will review it again for completeness, then post the contents of your application, including newly submitted information, to LIHI's website for a sixty-day comment period. You will be notified of any public comments, and you will have a chance to respond to those if you wish. Both comments and any responses will also be posted to our website. We will also be contacting resource agencies and other potentially interested parties to alert them that the application is undergoing a full review by LIHI, and solicit any additional comments they may have.

During our Certification Review, LIHI will verify the information in the application and contact resource agencies as needed for confirmation. At the close of the public comment period, the Application Reviewer will prepare a report, including a certification decision recommendation, based on the Full Review. The report will be sent to me. Following my review and approval of the recommendation, the certification report and recommended action will be forwarded to the LIHI Governing Board for their determination as to whether or not the project meets the Low Impact criteria.

The Governing Board will deliberate and issue a preliminary certification decision. If Board's decision is to certify the project, there will be a 30-day appeal period during which any public commenters may appeal that decision to an independent Appeals Panel. If the preliminary decision is not to certify, you will have an opportunity to appeal the decision or to correct any deficiencies.

On behalf of the LIHI Governing Board, I want to reiterate LIHI's appreciation for your company's interest in the LIHI Certification Program. Please let me know if you have any questions.

Sincerely,

A handwritten signature in black ink that reads "Michael J. Sale". The signature is fluid and cursive, with the first name "Michael" being the most prominent part.

Michael J. Sale, Ph.D.
LIHI Executive Director

c: James A. Beaudin, Sr., Crane & Co.
Dana Hall, LIHI Deputy Director
Gary Franc, LIHI reviewer
Public Files

encl. Byron Weston Intake Review



Form version: April 2014

LOW IMPACT HYDROPOWER INTAKE REVIEW

Name of Project: Bryon Weston Hydroelectric Project, FERC No. 13583

Date submitted to LIHI: July 15, 2015

Name of Person Conducting Intake Review: Gary Franc

Date Intake Review Completed: October 20, 2015

I. BACKGROUND INFORMATION REVIEW:

Note: *Italicized text is based on or excerpted from the line-by-line instructions found in LIHI's Handbook, Part VII, and section D.*

Information	Complete? Y/N	MISSING INFORMATION (In Red)
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.	Y	Facility Owner/Operator: Crane & Co., Inc (CCI) 30 South Street, Dalton, MA 01226 LIHI Application Contact: David Boino - Manager of Engineering 413-684-6502 David.Boino@cranecurrency.com

Information	Complete? Y/N	MISSING INFORMATION (In Red)
3) Location of Facility including (a) the state in which Facility is located; (b) the river on which Facility is located; (c) the river-mile location of the Facility dam; (d) the river's drainage area in square miles at the Facility intake; (e) the location of other dams on the same river upstream and downstream of the Facility; and (f) the exact latitude and longitude of the Facility dam.	Y	a) The Project is located on the Bryon Weston Dam No. 2 in the community of Dalton, Massachusetts. b) East Branch of the Housatonic River. c) The development is located at river mile (RM) 7.97 upstream from the East Branch confluence with the main Housatonic River. d) The development has a 51.3 square mile drainage basin upstream of the dam. e) Upstream of the development is the Bryon Weston Dam No. 1 approximately 700-ft above Byron Weston Dam No. 2. Downstream of the development, the Upper Pioneer Dam is located at RM 6.87 and the Government Dam Project is located at RM 5.67. f) Dam: 42.472501"N 73.158074" W
4) Installed capacity.	Y	The Project has an authorized installed capacity of 0.25 MW.
5) Average annual generation.	N	The Project's average annual generation (AAG) output is reported as 938 MWh. (Annual plant factor of 43%).
6) Regulatory status.	Y	License Exemption issued by FERC on February 29, 2012
7) Reservoir volume and surface area measured at the normal maximum operating level.	Y	Impoundments storage volume is 3.1 acre-feet with a surface Area of 0.94 acres.
8) Area occupied by non-reservoir facilities (e.g., dam, penstocks, powerhouse).	Y	The Project's primary features include a dam (1,725 sq ft), inside mill headrace canal (4,750 sq ft) and a powerhouse (783 sq ft).
9) Number of acres inundated by the Facility.	Y	At normal maximum surface elevation the Project has a total surface area of 1.30 acres.

Information	Complete? Y/N	MISSING INFORMATION (In Red)
10) Number of acres contained in a 200-foot zone extending around entire reservoir.	Y	A total of approximately 3.5 acres are included within the 200-ft zone extending around the Project impoundment.
11) Contacts for Resource Agencies and non-governmental organizations	N	<p>WORD attachment Stakeholder Initial Consultation Letter contains a list of key resource agencies and non-governmental organizations (NGOs) involved with the operations of the Project either during the relicensing process or thereafter.</p> <p>A review of this document shows that individual letters were sent to each stakeholder. However, no phone number or emails are provided.</p> <p>Please provide phone numbers and emails for each person/organization contained in this referenced document.</p>
12) Description of the Facility, its mode of operation (<i>i.e.</i> , peaking/run of river) and photographs, maps and diagrams.	Y	Items provide in supplement application documents.
Questions for “New” Facilities Only: For Facilities that are considered “new” (<i>i.e.</i> , an existing dam that added or increased power generation capacity after August of 1998).		
13) When was the dam associated with the Facility completed?	N	The original Dam construction was completed in 1887.
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.	Y	October 3, 2013.
15) Did the added or increased power generation capacity require or include any new dam or other diversion structure?	Y	No new dam or diversion structures were included in the capacity enhancements.

Information	Complete? Y/N	MISSING INFORMATION (In Red)
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)?	Y	No. The project operates in run-of-river mode.
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? (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.	Y	No. Resource Agencies, local town officials, and NGO’s are in support of the project.
18 (a) If the added or increased 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 for consideration; and (b) Are there any pending appeals or litigation regarding that authorization? If so, the facility is not eligible for consideration.	Y	The project is currently operating.

II. CRITERIA INFORMATION REVIEW:

Note: *Italicized text is based on or excerpted from line-by-line instructions found in LIHI's Handbook, Part VII, and section D.*

A. Flows	INFO LOCATION IN AP	MISSING INFORMATION	INITIAL ISSUE IDENTIFICATION
1) Is the Facility in <i>Compliance</i> with <i>Resource Agency Recommendations</i> 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 bypassed reaches?			Applicant states YES. Please provide a reference to official FERC or agency documents that support your position. For example, a Minimum Flow Operating Plan developed or incorporated within the FERC license or Water Quality certification.
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 bypassed reaches, that at a minimum meets Aquatic Base Flow standards or "good" habitat flow standards calculated using the Montana-Tennant method?	NA	NA	
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 appropriately protective of fish, wildlife, and water quality?	NA	NA	

B. Water Quality	INFO LOCATION IN AP	MISSING INFORMATION	INITIAL ISSUE IDENTIFICATION
1.a. Is the Facility 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?			<p>Applicant states YES.</p> <p>Please provide a reference to official FERC or agency documents that support your position. Please discuss aspects of the Water Quality Certification (WQC).</p>
1.b. Is the Facility 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?			<p>Applicant states YES.</p> <p>Please provide a reference to official FERC or agency documents that support your position. Is there a letter that supports this position?</p>
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?			<p>Applicant states NO.</p> <p>Please provide a reference to official FERC or agency documents that support your position. There should be a letter from the USFWS or a state agency that documents this answer.</p>
3) If the answer to question B.2 is yes, has there been a determination that the Facility does not cause, or contribute to, the violation?			NA

C. Fish Passage and Protection	INFO LOCATION IN AP	MISSING INFORMATION	INITIAL ISSUE IDENTIFICATION
<p>1) Are anadromous and/or catadromous fish present in the Facility area or are they know to have been present historically?</p>		.	<p>Applicant states NO.</p> <p>Please provide a reference to official FERC or agency documents that support your position.</p> <p>There should be a letter from the USFWS or a state agency that documents this answer. May also be contained with the FERC license, FERC Environmental Assessment (EA) or WQC.</p>
<p>2) 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?</p>			<p>NA</p>

<p>3) 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 no longer have a migratory run)?</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>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>			NA
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<p>4) 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 C.3.a 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>			NA
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<p>If C4 was not applicable:</p> <p>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</p> <p>b) If the Facility is unable to meet the fish passage standards in 5.a, has the Applicant either i) demonstrated, and obtained a letter from the U.S. 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, or ii) committed to the provision of fish passage measures in the future and obtained a letter from the U.S. Fish and Wildlife Service or the National Marine Fisheries Service indicating that passage measures are not currently warranted?</p>			NA
<p>6) Is the Facility in Compliance with Mandatory Fish Passage Prescriptions for upstream and/or downstream passage of Riverine fish?</p>			<p>Applicant states NA.</p> <p>Please provide a reference to official FERC or agency documents that support your position.</p> <p>There should be a letter from the USFWS or a state agency that documents this answer.</p>

<p>7) Is the Facility in compliance with Resource Agency recommendations for riverine, anadromous and catadromous fish entrainment protection, such as tailrace barriers?</p>			<p>Applicant states NA.</p> <p>Please provide a reference to official FERC or agency documents that support your position.</p> <p>There should be a letter from the USFWS or a state agency that documents this answer.</p>
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D. Watershed Protection	INFO LOCATION IN AP	MISSING INFORMATION	INITIAL ISSUE IDENTIFICATION
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 average annual high water line for at least 50% of the shoreline, including all of the undeveloped shoreline?		NA	<p>The applicant is claiming that there exists a buffer zone dedicated for conservation purposes.</p> <p>Applicant states there is not Public Access to the impoundment at the project site. The property is owned by Crane & Company as justification.</p> <p>Please provide additional reference to official FERC or agency documents that support the position that this buffer zone has been officially dedicated to conservation purposes.</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?		NA	<p>Applicant states the company has put 634 Acres of its property under a Conservation Restriction with Fisheries and Wildlife to ensure that the property remains protected and open to the Public in perpetuity.</p> <p>Please provide a reference to this document. For example, contained in supplemental document Appendix E, submitted with the LIHI application.</p>
3) Has the Facility owner/operator established through a settlement agreement with appropriate stakeholders, with 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)?		NA	<p>Applicant states agreement exists with the USFWS.</p> <p>Please provide a reference letter from the USFWS or a reference to a shoreline management plan.</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?			NA
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E. Threatened and Endangered Species Protection	INFO LOCATION IN AP	MISSING INFORMATION	INITIAL ISSUE IDENTIFICATION
1) Are threatened or endangered species listed under state or federal Endangered Species Acts present in the Facility area and/or downstream reach?			<p>Applicant states NO.</p> <p>Please provide a reference to official FERC or agency documents that support your position.</p> <p>Typically, a Federal or State environmental agency has a stated position here (i.e. USFWS).</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?			NA
3) If the Facility has received authorization to incidentally <i>Take</i> 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 pursuant to ESA Section 10; or (iii) For species listed by a state and not by the federal government, obtaining authorization pursuant to similar state procedures; is the Facility in Compliance with conditions pursuant to that authorization?			NA.

4.a. If a biological opinion applicable to the Facility for the threatened or endangered species has been issued, can the Applicant demonstrate that the biological opinion was accompanied by a FERC license or exemption or a habitat conservation plan?			NA
4.b. If a biological opinion applicable to the Facility for the threatened or endangered species has been issued, can the Applicant demonstrate that the biological opinion was issued pursuant to or consistent with a recovery plan for the endangered or threatened species?			NA
4.c. If a biological opinion applicable to the Facility for the threatened or endangered species has been issued, can the Applicant demonstrate that there is no recovery plan for the threatened or endangered species under active development by the relevant Resource Agency?			NA
4.d. If a biological opinion applicable to the Facility for the threatened or endangered species has been issued, can the Applicant demonstrate that the recovery plan under active development will have no material effect on the Facility's operations?			NA
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?			NA

F. Cultural Resource Protection	INFO LOCATION IN AP	MISSING INFORMATION	INITIAL ISSUE IDENTIFICATION
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?			<p>Applicant states YES.</p> <p>Please provide a reference to official FERC or agency documents that support your position.</p> <p>Is there a cultural resources management plan (CRMP), historic protection management plan (HPMP) or correspondence with the states historical preservation office (SHPO)?</p>
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 <i>Native American Tribe</i> , 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?	NA		NA

G. Recreation	INFO LOCATION IN AP	MISSING INFORMATION	INITIAL ISSUE IDENTIFICATION
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?			<p>Applicant states that due to the steep embankments and building location abutting the stream the property does not lend itself for Public Access. The impoundment is very small.</p> <p>Is this policy in agreement with the FERC exemption? If YES, Please provide refer to a Safety Plan or document that prohibits public access.</p> <p>If recreational opportunity is not available due to safety concerns, has the owner expressed willingness to provide some funding to support recreation at other location on the river?</p>
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?	NA		NA
3) Does the Facility allow access to the reservoir and downstream reaches without fees or charges?			NA
H. Facilities Recommended for Removal	INFO LOCATION IN AP	MISSING INFORMATION	INITIAL ISSUE IDENTIFICATION
1) Is there a Resource Agency Recommendation for removal of the dam associated with the Facility?		None	Dam removal has not been recommended by any agency.

III. SUMMARY OF MISSING INFORMATION AND INITIAL ISSUES IDENTIFIED DURING COMPLETENESS REVIEW

Note: Numbers in “Reference” column are cross-referenced to corresponding numbers above, where a complete description of the missing information or an apparent issue is provided.

ITEM	REFERENCE (enter applicable Background Information number and Criteria Information subsections (e.g., A.1)) AND BRIEF DESCRIPTION
Missing Information	Requests to provide evidence by supplying FERC or Agency correspondence can be satisfied by you providing a PDF copy of the correspondence or a FERC docket cross-reference that can be viewed or downloaded using the FERC elibrary feature. Please note that a PDF copy of all privileged documents (filed using CEII status to FERC) must be provide since the document cannot be viewed using the elibrary feature.
Initial Issues	<p>Although supplemental documents are contained as part of the overall application submittal, it is the applicant’s responsibility to support their statements within the application by providing references to the supplemental documents to help the LIHI reviewer in his/her review of the application.</p> <p>Assuming your positions can easily be documented as requested, satisfactory certification review can proceed. Please give particular attention to section - G. Recreation. Based on your current responses, it would be difficult to meet this criterion.</p>



Appendix B – Resource Agencies and Non-Governmental Organizations Contact Information

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Berkshire County Regional Planning Commission
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Pittsfield, MA 01201
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Cambridge Development Corporation
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Robert Bishop, Chairman
Dalton Conservation Commission
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Col. Christopher Barron, District Engineer Commander
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E-mail: cenan-pa@usace.army.mil

Brigadier General William H. Graham, Commander
North Atlantic Division
US Army Corps of Engineers
302 General Lee Avenue
Brooklyn, MA 11252
Phone: 312-226.0000
E-mail: DLL-CENADO-PA@nad02.usace.army.mil

Sir/ Madam
New England Water Science Center -
Massachusetts/Rhode Island Offices
US Geological Survey
10 Bearfoot Rd
Northborough, MA 01532
Phone: 508.490.5000

Mr. Jeffrey R Cueto
Vermont Department of Environmental Conservation
103 South Main Street
Waterbury, VT 05671-0401
Local Phone: 802-241-3808

Bryan Redmond, Division Director
Vermont Department of Environmental Conservation
Drinking Water and Groundwater Protection Division
Main Building - 2nd Floor
One National Life Drive
Montpelier, VT 05620-3521
Phone: 802.585.4900
Email: bryan.redmond@vermont.gov

Alyssa B. Schuren, Commissioner
Agency of Natural Resources
Department of Environmental Conservation
Main Building - 2nd Floor
One National Life Drive
Montpelier, VT 05620-3520
Phone: 802.828.1556
Email: alyssa.schuren@vermont.gov



Appendix C – Supplemental Documentation for Flows

October 9, 2012
File No: 19349.50

Gerald L. Cross, Regional Engineer
Office of Energy Projects
Division of Dam Safety and Inspections
New York Regional Office
19 West 34th Street- Suite 400
New York, NY 10001-3006



Re: Byron Weston Hydroelectric Project
FERC Project No. 13583-001
Run of River Operations Maintenance and Monitoring Plan

Mr. Cross:

One Edgewater Drive
Norwood,
Massachusetts 02062
Phone: 781-278-3700
Fax: 781-278-5701
<http://www.gza.com>

On behalf of the project exemptee, Crane & Company (Crane), GZA GeoEnvironmental, Inc. (GZA) is hereby formally filing (via e-file and hard copy) the Run of River Operations Maintenance and Monitoring Plan (ROR Plan) for the Byron Weston Hydroelectric Project. A ROR Plan is required under Article 18 of the Exemption from Licensing.

A copy of this sediment and erosion control plan is being provided to the Massachusetts Department of Fish and Wildlife, U.S. Department of Interior and the Massachusetts Department of Environmental Protection for their review. If substantive comments are received the ROR Plan will be updated to reflect agency comments.

Thank you in advance for your assistance with the Byron Weston Hydroelectric Project.

Yours very truly,

GZA GEOENVIRONMENTAL, INC.

A handwritten signature in blue ink, reading "Kristina Ekholm".

Kristina Ekholm, P.E.
Assistant Project Manager

A handwritten signature in blue ink, reading "Chad Cox".

Chad Cox, P.E.
Associate Principal

Attachments:

Run of River Operations Maintenance and Monitoring Plan

CC:

FERC Washington (via e-file)

James Noel (Crane)

Massachusetts Department of Fish and Wildlife (Caleb Slater)

U.S. Department of Interior (Melissa Grader)

Massachusetts DEP Department of Watershed Management (Robert Kubit)

Byron Weston Hydropower Project
Crane & Company
FERC No. 13583-001

DRAFT RUN OF RIVER OPERATION MAINTENANCE AND MONITORING PLAN



October 2012

Owner:	Crane & Co.
Engineer:	GZA GeoEnvironmental, Inc.
Location:	Dalton, MA

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Figure 1: Aerial Photo of Project Limits

Figure 2: Flow Duration Curve

Figure 3: Turbine Efficiency Curve

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Appendix A: Limitations

I. INTRODUCTION

A. PURPOSE

The Byron Weston Dam No. 2 is an existing dam located on the East Branch of the Housatonic River in Dalton, MA. The dam and the adjacent mill structure on the right bank are owned by Crane and Co. (Crane). Crane has been granted a Small Hydroelectric Power Project Exemption from the Federal Energy Regulatory Commission (FERC, FERC No. 13583-001) and now intends to proceed with the construction of the project.

As required under Article 18 of the terms of the exemption, this Run-of-River Operation Maintenance and Monitoring Plan (ROR Operations Plan) provides information regarding a plan for maintaining and monitoring run-of-river operation at the project. This plan was developed in order to comply with the Terms and Conditions of the exemption provided by the Massachusetts Division of Fisheries and Wildlife (Massachusetts DFW), the U.S. Department of Interior (Interior) Section and the Massachusetts Department of Environmental Protection (Massachusetts DEP) Water Quality Certification (WQC).

This Run-of River (ROR) Operation Maintenance and Monitoring Plan has been prepared by GZA GeoEnvironmental, Inc. on behalf of the Owner and exemptee, Crane & Co. (Crane). Crane has reviewed the plan with respect to its more than 100 year history of owning and operating the Byron Weston Dam No. 2. Crane has historically operated the dam in run-of-river mode.

B. SITE DESCRIPTION

The Byron Weston Project will use the water power potential of the existing 30- foot-high, 90-foot-long, stone-masonry Byron Weston Dam No. 2. The dam structure includes a 23- foot-high, 75-foot-long spillway which comprises the majority of the dam. The dam creates a 0.94-acre impoundment with a normal water surface elevation of 1,116.7 feet North Atlantic Vertical Datum (NAVD 1988). In addition to the dam and impoundment, the project includes an existing intake structure equipped with existing trashracks and an existing headgate. The water passes through the headgate to an existing 50-foot-long, 9.5-foot-wide headrace canal. The headrace canal will convey flow to a new 15-foot-long, 4.4-foot-diameter penstock leading to a new 250-kilowatt turbine-generating unit within the existing Byron Weston Defiance Mill building. Water will then be discharged into the East Branch of the Housatonic River through a new draft tube within the existing tailrace approximately 35 feet downstream of the dam. The bypass reach created by the hydropower project is approximately 35 feet long and is configured such that it discharges backwater to the toe of the spillway.

An aerial photo showing the dam site and impoundment is presented as **Figure 1**.

II. OPERATING AND MONITORING REQUIREMENTS

A ROR Operations Plan is required under Condition 4 of the Massachusetts DFW and US Dept. of the Interior Terms and Conditions and Condition 17 of the Massachusetts DEP WQC. The conditions require that the plan include a description of the mechanisms and structures that will be used, the level of manual and automatic operation, the methods to be used for recording data on run-of-river operation, an implementation schedule, and a plan for maintaining the data for inspection by Interior, Massachusetts DFW, Massachusetts DEP and FERC.

III. AVAILABLE FLOWS AND TURBINE CHARACTERISTICS

Crane has established operating procedures for the project based upon the records of flows typically available at the site and based upon the operating parameters of the equipment to be installed.

A. AVAILABLE FLOWS

A flow duration curve has been developed for flows into the Byron Weston No. 2 Dam based upon data available from the USGS gauging station No. 01197000 in Coltsville, Massachusetts on the East Branch Housatonic River (see **Figure 2**). The available period of record utilized for developing the curve is March 8, 1936 through March 3, 2010. The gauge is located downstream of the Byron Weston No. 2 Dam; therefore, a drainage basin ratio was applied to the flows measured at the gauge to estimate the flows at the dam. The gauge has a drainage area of 57.6 square miles and the dam has a drainage area of 53.1 square miles; therefore, the ratio applied was 0.92.

B. TURBINE CHARACTERISTICS

Crane has procured a vertically oriented double regulated Kaplan turbine manufactured by Canadian Hydro Components Ltd. for installation at the project site. An efficiency curve for the turbine is included as **Figure 3**. Turbine flow characteristics are as follows:

Minimum Flow:	20 cfs
Rated Flow:	133 cfs
Maximum Flow:	170 cfs

The minimum flow of 20 cfs and the maximum flow of 170 cfs are available approximately 90 percent, and 15 percent of an average year, respectively.

IV. STRUCTURES AND MECHANISIMS FOR CONTROLLING FLOWS

The Byron Weston No. 2 dam has an approximately 75 foot long spillway with a fixed crest at El. 1116.7 ft. With the exception of flow through the hydropower intake and then through either the low-level outlet or the hydropower project, there are no means for flows to bypass the spillway. A new 12-inch low-level outlet pipe will be constructed off of the hydropower

penstock during project construction to provide for a means of dewatering the headrace canal and/or discharging flow from the impoundment in the event that the turbine is off-line.

Project flow control will be provided automatically through a Programmable Logic Controller (PLC) unit connected to a water level sensor within the impoundment (just upstream of the trashrack). The turbine wicket gates will be adjusted automatically based on a signal sent from the impoundment water level (pressure) sensor to the controller. If the controller senses a decrease in the impoundment level, the wicket gates will be closed to reduce flow to the turbine and stabilize the impoundment level. If the controller senses an increase in the impoundment level, the wicket gates will be opened to permit increased flow to be passed through the turbine. Wicket gate physical actuation and adjustment will be hydraulic with pressure provided by a hydraulic power unit (HPU) inside the powerhouse and linked to the PLC. The normal pool / stable level of the impoundment will be set to maintain a normal pool / stable level at the spillway crest elevation of 1116.7 feet.

Manual flow control for the purpose of dewatering the project is available via the timber slide gate at the headworks and via stop log slots for timber stop logs on the exterior of the tailrace discharge portal arch.

V. OPERATIONS METHODS

The Byron Weston Hydroelectric Project will be operated automatically. Although staff will periodically inspect the project and will be on-site elsewhere within the mill during normal business hours, no personnel will be staffed at the project. Operations will be performed automatically by the PLC. The system will be configured so that the PLC will be capable of sending and receiving signals from a remote mounted plant control via Ethernet connection. Crane staff will monitor the system remotely utilizing this system. The system will be programmed to shut the project down (i.e. close the wicket gates and route all flow over the spillway) in the event of a power outage, generator fault, or other incident that takes the system off-line. A battery backup is provided for operations capacity in the event of loss of external power. Note that the system can be manually overridden in the event of equipment failure or other need.

VI. OPERATIONS PLAN / RULES

The Byron Weston No. 2 Hydroelectric Project will be operated as an instantaneous run-of-the river project. Total flow rate into and out of the impoundment will not be altered by the proposed hydropower project or its operation. Flow out of the impoundment will continue to be equivalent to flow into the impoundment. The water will be returned to the river immediately downstream of Byron Weston Dam No. 2. Therefore, there is no significant bypass reach.

The project has not been designed to operate as a peaking facility. That is, the flow into and out of the impoundment will not be altered to optimize hydroelectric generation and the impoundment will not be cycled.

Operations will be performed in accordance with **Table 1**. As described in Section IV, the PLC will signal the turbine to close the wicket gates, maintain the gate position or open the gates in order to maintain the impoundment level.

WSEL AT BYRON WESTON NO. 2 DAM (FT)	TOTAL RIVER FLOW (CFS)	FLOW OVER BYRON WESTON NO. 2 DAM (CFS)	FLOW THROUGH TURBINE (CFS)	OPERATION	REMARK
NO GENERATION					
1116.7 --> 1116.90	0 --> 20	0 --> 20	0	NO TURBINE FLOW WICKET GATES CLOSED	ALL RIVER FLOWS FROM 0 CFS TO 20 CFS FLOW OVER DAM
RAMP UP – Start Up at Headwater Elevation 1116.90					
1116.75	20 --> 170	0	20 --> 170	WICKET GATES ADJUST TO MAINTAIN WSEL JUST ABOVE SPILLWAY CREST	ALL RIVER FLOWS THROUGH TURBINE
LEVEL GENERATION					
1116.7 --> H MAX	170 --> Q MAX	Q MAX - 170	170	WICKET GATES FULLY OPEN	170 CFS TO TURBINE ALL EXCESS FLOWS OVER DAM
RAMP DOWN					
1116.75	170 --> 20	0	20 --> 170	WICKET GATES ADJUST TO MAINTAIN WSEL JUST ABOVE SPILLWAY CREST	ALL RIVER FLOWS THROUGH TURBINE
GENERATION ENDS – Shut down at Headwater Elevation 1116.70					
1116.90 --> 1116.7	20 --> 0	20 --> 0	0	NO TURBINE FLOW WICKET GATES CLOSED	ALL RIVER FLOWS FROM 0 CFS TO 20 CFS FLOW OVER DAM

Table 1 Operations Plan

VII. DRAWDOWN

The Byron Weston No. 2 Hydroelectric Project will operate in ROR mode year round. Drawdown of the impoundment below the spillway elevation of 1116.7 ft would occur only under extraordinary circumstances such as a dam safety emergency, for unusual extensive dam repair activities, or for temporary bypassing of flow around to the spillway to allow for inspection of the spillway “in the dry”.

Extensive dam repair activities are not currently envisioned. Mass DFW, Interior, Mass DEP and FERC will all be notified in advance of any planned extensive repair activities requiring drawdown.

Maintenance and repairs to the hydropower plan will not require dewatering of the impoundment under most circumstances because the headrace can be isolated from the impoundment by closing the timber slide gate headgate. Likewise, the draft tube can be isolated from the tailrace by means of timber stop logs at the discharge portal arch.

Any temporary drawdown for the purpose of dry spillway inspection would typically be performed for less than one hour and would be expected to occur approximately one time per year. Any temporary drawdown would be made to a level not greater (deeper) than six inches below the spillway crest (i.e. elevation 1116.2 ft). Following a drawdown, a refill procedure shall be implemented wherein approximately 90 percent of flow (or the maximum discharge capacity of the low-level outlet) shall be bypassed to maintain downstream flows while the impoundment is refilled by the remaining inflow. This procedure shall be maintained until flow begins spilling over the spillway, at which time standard ROR operations shall resume.

VIII. METHODS FOR DATA RECORDING

Crane will program the PLC to continuously monitor the water level in the impoundment. The PLC will be programmed to digitally record the impoundment level to the PLC every hour. Approximately once per year (but more frequently if deemed necessary) Crane will transfer data and store it on a designated computer to allow for maintenance of historical water level readings.

IX. IMPLEMENTATION SCHEDULE

The equipment to be utilized in implementing the ROR plan (i.e. the impoundment water level sensor and the PLC) will be installed commensurately with turbine/ generator set. Crane currently envisions that this will be performed during 2013. The project will not be operated until the PLC and water level sensor have been installed and programmed for ROR operation. Proper ROR operations will be tested and verified during project commissioning.

X. PLAN FOR MAINTAINING DATA AVAILABILITY

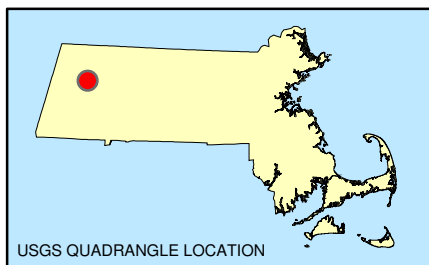
Crane will maintain water levels available for inspection by Mass DFW, Interior, Mass DEP and FERC. Records will be maintained by the Engineering Department of Crane's Currency

Division. Requests for data review should be made through Crane's Director of Environmental Engineering at the following address:

Crane & Co.
30 South Street .
Dalton, MA 01226

J:\19,000-20,999\19349\19349-50.KDE\Operations Plan\Byron Weston Hydropower Project
Run of River Operation Maintenance and Monitoring Plan (cox edits).docx

FIGURES



SOURCE : SCANNED USGS TOPOGRAPHIC QUADRANGLES
SCANNED BY THE MASSACHUSETTS EXECUTIVE OFFICE OF
ENVIRONMENTAL AFFAIRS, MASSGIS. DISTRIBUTED JUNE, 2001.

Data Supplied by :



0 100 200 400 600
Feet



PROJ. MGR.: KDE
DESIGNED BY: KDE
REVIEWED BY: CWC
OPERATOR: KDE

DATE: 08-17-2012

AERIAL PHOTO OF PROJECT LIMITS

BYRON WESTON HYDROELECTRIC PROJECT
DALTON, MASSACHUSETTS

JOB NO.
01.00019349.50

FIGURE NO.
1

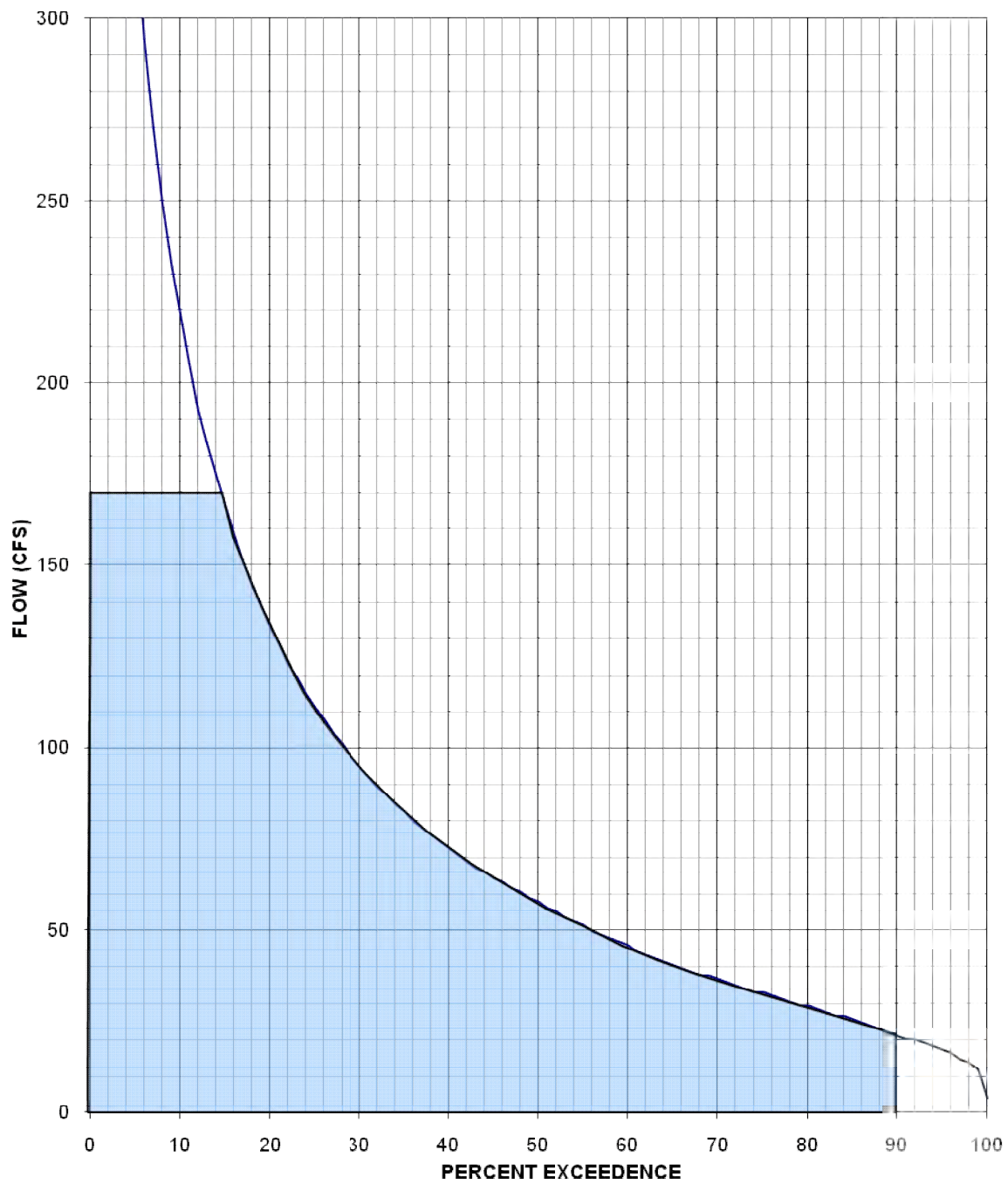


FIGURE 2 FLOW DURATION CURVE

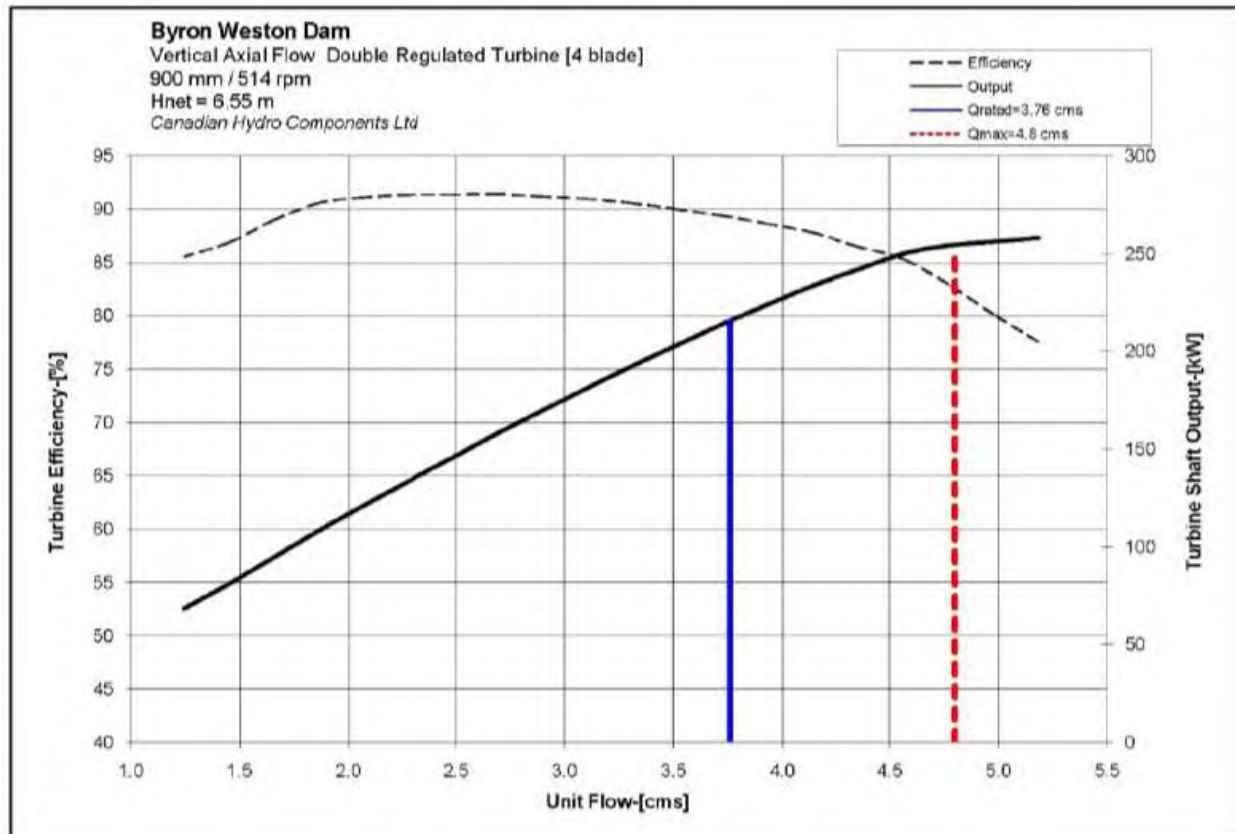


FIGURE 3 TURBINE EFFICIENCY CURVE

Notes:

$$\frac{\text{cms}}{.02832} = \text{cfs}$$

$$3.76 \text{ cms} = 133 \text{ cfs}$$

$$4.8 \text{ cms} = 170 \text{ cfs}$$

APPENDICES

APPENDIX A - LIMITATIONS

1. This Report has been prepared for the exclusive use of Crane & Company (Crane) for specific application to Crane's Byron Weston Hydroelectric Project, in accordance with generally accepted engineering practices. No other warranty, express or implied, is made
2. In preparing this report, GZA has relied on the existing hydrologic and hydraulic computer simulation software and other information provided by others. Although there may have been some degree of overlap in the information provided by various sources, GZA did not attempt to independently verify the accuracy or completeness of all information reviewed or received during the course of the study.
3. In the event that any site development or other changes are planned in the sediment and erosion control plan shall not be considered valid unless the changes are reviewed and recommendations of this Report modified or verified by GZA.
4. It is recommended that GZA be retained to provide further engineering and construction services during construction and/or implementation of sediment and water control measures recommended in this report. This is to allow GZA to observe compliance with the concepts and recommendations contained herein, and to allow the development of design changes in the event that conditions differ from those anticipated.
5. In preparing this report, GZA has relied upon topographic survey data prepared by others. GZA did not independently verify the accuracy of that data.



Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

Central Regional Office • 627 Main Street, Worcester MA 01608 • 508-792-7650

DEVAL L. PATRICK
Governor

TIMOTHY P. MURRAY
Lieutenant Governor

RICHARD K. SULLIVAN JR.
Secretary

KENNETH L. KIMMELL
Commissioner

Chad Cox, P.E.
GZA GeoEnvironmental, Inc.
One Edgewater Drive
Norwood MA 02062

November 6, 2012

RE: Byron Weston Hydroelectric Project FERC #13583
Comments to Draft Run of River Operations Maintenance and Monitoring Plan

Dear Ms. Ekholm,

The Draft Run of River Operations Maintenance and Monitoring Plan for the Byron Weston Hydroelectric Project dated October 2012 has been reviewed by the MA Department of Environmental Protection and found satisfactory.

We have no comments to add. If there are any questions, please contact me at 508-767-2854.

Sincerely,

Robert Kubit, P.E.

Cc: Caleb Slater/MADFW
Melissa Grader/USFWS

TABLE 1: BYRON WESTON POND LEVEL 2013

File No. 19349.81

Page 1 of 23

Byron Weston Hydroelectric Project
Dalton, Massachusetts

12/28/2016

DateTime	Pond Level	Kilowatts
10/29/13 8:01:11 PM	1116.43	35
10/30/13 4:47:18 AM	1116.33	31
10/30/13 1:33:26 PM	1116.31	27
10/31/13 3:51:49 PM	1116.52	32
11/1/13 12:37:56 AM	1116.45	57
11/1/13 9:24:04 AM	1116.45	78
11/1/13 6:10:11 PM	1116.46	104
11/2/13 2:56:19 AM	1116.46	80
11/2/13 11:42:26 AM	1116.48	63
11/2/13 8:28:34 PM	1116.31	52
11/4/13 3:19:12 PM	1116.35	48
11/5/13 12:05:19 AM	1116.36	31
11/7/13 1:28:12 PM	1116.51	73
11/7/13 10:14:20 PM	1116.46	80
11/8/13 3:46:35 PM	1116.49	64
11/9/13 12:32:43 AM	1116.42	49
11/9/13 9:18:50 AM	1116.37	35
11/11/13 1:55:36 PM	1116.35	25
11/11/13 10:41:43 PM	1116.44	37
11/12/13 7:27:51 AM	1116.49	31
11/12/13 4:13:58 PM	1116.47	26
11/13/13 1:00:06 AM	1116.42	26
11/13/13 9:46:14 AM	1116.42	26
11/13/13 6:32:21 PM	1116.49	17
11/14/13 3:18:29 AM	1116.42	18
11/14/13 12:04:36 PM	1116.49	14
11/14/13 8:50:44 PM	1116.37	16
11/18/13 12:31:59 PM	1116.48	71
11/18/13 9:18:07 PM	1116.36	50
11/19/13 6:04:15 AM	1116.50	40
11/19/13 2:50:22 PM	1116.43	26
11/20/13 8:22:37 AM	1116.46	42
11/27/13 6:59:01 AM	1116.55	140
11/27/13 3:45:09 PM	1117.40	74
12/3/13 12:03:10 PM	1116.49	72
12/3/13 8:49:17 PM	1116.35	60
12/4/13 5:35:25 AM	1116.47	55
12/4/13 2:21:32 PM	1116.33	46
12/4/13 11:07:40 PM	1116.30	45
12/5/13 7:53:48 AM	1116.33	42
12/5/13 4:39:55 PM	1116.47	42

TABLE 1: BYRON WESTON POND LEVEL 2013

File No. 19349.81

Page 2 of 23

Byron Weston Hydroelectric Project
Dalton, Massachusetts

12/28/2016

DateTime	Pond Level	Kilowatts
12/6/13 1:26:03 AM	1116.42	57
12/6/13 10:12:10 AM	1116.45	64
12/11/13 12:57:56 PM	1116.47	60
12/11/13 9:44:04 PM	1116.44	38
12/12/13 6:30:11 AM	1116.30	57
12/12/13 3:16:19 PM	1116.40	64
12/13/13 12:02:26 AM	1116.47	42
12/13/13 8:48:34 AM	1116.32	44
12/13/13 5:34:42 PM	1116.32	52
12/14/13 2:20:49 AM	1116.35	44
12/14/13 11:06:57 AM	1116.49	43
12/14/13 7:53:04 PM	1116.42	25
12/15/13 4:39:12 AM	1116.47	18
12/15/13 1:25:19 PM	1116.49	36
12/15/13 10:11:27 PM	1116.40	39
12/16/13 6:57:35 AM	1116.40	38
12/16/13 3:43:42 PM	1116.44	41
12/17/13 12:29:50 AM	1116.40	34
12/17/13 9:15:57 AM	1116.47	25
12/17/13 6:02:05 PM	1116.35	40
12/18/13 2:48:12 AM	1116.40	38
12/18/13 11:34:20 AM	1116.42	39
12/18/13 8:20:28 PM	1116.30	35
12/19/13 5:06:35 AM	1116.42	32
12/19/13 1:52:43 PM	1116.49	33
12/19/13 10:38:50 PM	1116.40	33
12/20/13 7:24:58 AM	1116.32	32
12/20/13 4:11:05 PM	1116.42	33
12/21/13 12:57:13 AM	1116.42	42
12/21/13 9:43:21 AM	1116.42	52
12/21/13 6:29:28 PM	1116.49	81
12/22/13 3:15:36 AM	1116.52	94
12/23/13 2:20:06 PM	1117.74	91
12/23/13 11:06:14 PM	1117.73	79
12/24/13 7:52:21 AM	1117.51	84
12/24/13 4:38:29 PM	1117.36	85
12/25/13 1:24:36 AM	1117.12	83
12/25/13 10:10:44 AM	1116.86	90
12/25/13 6:56:51 PM	1117.00	90
12/26/13 3:42:59 AM	1116.83	93

TABLE 2: BYRON WESTON POND LEVEL 2014

File No. 19349.81

Page 3 of 23

Byron Weston Hydroelectric Project
Dalton, Massachusetts

12/28/2016

DateTime	Pond Level	Kilowatts
1/10/14 12:00:17 PM	1116.53	74
1/10/14 8:46:24 PM	1116.32	93
1/11/14 5:32:32 AM	1116.46	97
1/11/14 2:18:39 PM	1116.99	102
1/11/14 11:04:47 PM	1117.88	90
1/12/14 7:50:55 AM	1118.17	47
1/12/14 4:37:02 PM	1117.82	54
1/13/14 1:23:10 AM	1117.48	63
1/13/14 10:09:17 AM	1117.19	100
1/13/14 6:55:25 PM	1117.09	110
1/14/14 3:41:32 AM	1117.00	108
1/14/14 12:27:40 PM	1117.00	107
1/14/14 9:13:48 PM	1117.50	85
1/15/14 5:59:55 AM	1117.45	79
1/15/14 2:46:03 PM	1117.33	97
1/15/14 11:32:10 PM	1117.24	102
1/16/14 8:18:18 AM	1117.12	100
1/16/14 5:04:25 PM	1117.02	100
1/17/14 1:50:33 AM	1116.95	104
1/17/14 10:36:41 AM	1116.90	103
1/17/14 7:22:48 PM	1116.85	107
1/18/14 4:08:56 AM	1116.78	104
1/18/14 12:55:03 PM	1116.76	107
1/18/14 9:41:11 PM	1116.71	107
1/19/14 6:27:18 AM	1116.66	107
1/19/14 3:13:26 PM	1116.66	110
1/19/14 11:59:34 PM	1116.64	110
1/20/14 8:45:41 AM	1116.61	110
1/20/14 5:31:49 PM	1116.59	108
1/21/14 2:17:56 AM	1116.33	102
1/21/14 11:04:04 AM	1116.49	107
1/21/14 7:50:11 PM	1116.33	106
1/22/14 4:36:19 AM	1116.40	91
1/22/14 1:22:26 PM	1116.47	99
1/22/14 10:08:34 PM	1116.35	80
1/23/14 6:54:42 AM	1116.47	60
1/23/14 3:40:49 PM	1116.29	88
1/24/14 12:26:57 AM	1116.33	61
1/24/14 9:13:04 AM	1116.33	35
1/24/14 5:59:12 PM	1116.36	63
1/25/14 2:45:19 AM	1116.48	48
1/25/14 11:31:27 AM	1116.48	56
1/25/14 8:17:35 PM	1116.43	59
1/26/14 5:03:42 AM	1116.36	58
1/26/14 1:49:50 PM	1116.38	56
1/26/14 10:35:57 PM	1116.39	57
1/27/14 7:22:05 AM	1116.32	61
1/27/14 4:08:12 PM	1116.37	65

TABLE 2: BYRON WESTON POND LEVEL 2014

File No. 19349.81

Page 4 of 23

Byron Weston Hydroelectric Project
Dalton, Massachusetts

12/28/2016

DateTime	Pond Level	Kilowatts
1/28/14 12:54:20 AM	1116.46	53
1/28/14 9:40:28 AM	1116.49	34
1/28/14 6:26:35 PM	1116.30	52
1/29/14 3:12:43 AM	1116.34	44
1/29/14 11:58:50 AM	1116.30	39
1/29/14 8:44:58 PM	1116.34	42
1/30/14 5:31:05 AM	1116.39	36
1/30/14 2:17:13 PM	1116.22	33
1/30/14 11:03:21 PM	1116.28	32
1/31/14 7:49:28 AM	1116.39	34
1/31/14 4:35:36 PM	1116.57	37
2/1/14 1:21:43 AM	1116.46	35
2/1/14 10:07:51 AM	1116.42	35
2/1/14 6:53:58 PM	1116.47	38
2/2/14 3:40:06 AM	1116.38	37
2/2/14 12:26:14 PM	1116.46	36
2/2/14 9:12:21 PM	1116.32	49
2/3/14 5:58:29 AM	1116.39	49
2/3/14 2:44:36 PM	1116.62	42
2/3/14 11:30:44 PM	1116.58	41
2/4/14 8:16:51 AM	1116.50	41
2/4/14 5:02:59 PM	1116.48	39
2/5/14 1:49:06 AM	1116.40	38
2/5/14 10:35:14 AM	1116.53	38
2/5/14 7:21:22 PM	1116.48	44
2/6/14 4:07:29 AM	1116.48	46
2/6/14 12:53:37 PM	1116.37	40
2/6/14 9:39:44 PM	1116.30	39
2/21/14 12:24:47 PM	1116.68	38
2/21/14 9:10:55 PM	1116.82	40
2/22/14 5:57:02 AM	1116.85	37
2/22/14 2:43:10 PM	1116.90	41
2/22/14 11:29:17 PM	1116.90	40
2/23/14 8:15:25 AM	1116.90	38
2/23/14 5:01:32 PM	1116.90	41
2/24/14 1:47:40 AM	1116.87	40
2/24/14 10:33:48 AM	1116.34	98
2/24/14 7:19:55 PM	1116.37	83
2/25/14 4:06:03 AM	1116.49	78
2/25/14 12:52:10 PM	1116.40	95
2/25/14 9:38:18 PM	1116.31	68
2/26/14 6:24:25 AM	1116.35	49
2/26/14 3:10:33 PM	1116.28	79
2/26/14 11:56:41 PM	1116.31	44
2/27/14 5:28:56 PM	1116.67	41
2/28/14 2:15:03 AM	1116.55	38
3/12/14 1:23:21 PM	1116.67	42
3/12/14 10:09:28 PM	1116.88	42

TABLE 2: BYRON WESTON POND LEVEL 2014

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Byron Weston Hydroelectric Project
Dalton, Massachusetts

12/28/2016

DateTime	Pond Level	Kilowatts
3/13/14 6:55:36 AM	1116.81	41
3/13/14 3:41:43 PM	1116.85	39
3/14/14 12:27:51 AM	1116.71	41
3/14/14 9:13:58 AM	1116.81	40
3/14/14 6:00:06 PM	1116.83	40
3/15/14 2:46:14 AM	1116.73	39
3/15/14 11:32:21 AM	1116.69	40
3/15/14 8:18:29 PM	1116.71	42
3/16/14 5:04:36 AM	1116.66	42
3/16/14 1:50:44 PM	1116.73	42
3/16/14 10:36:51 PM	1116.64	42
3/17/14 7:22:59 AM	1116.42	46
3/17/14 4:09:06 PM	1116.30	63
3/18/14 12:55:14 AM	1116.28	43
3/19/14 11:59:44 AM	1116.49	54
3/19/14 8:45:52 PM	1116.21	40
3/20/14 5:31:59 AM	1116.49	93
3/20/14 2:18:07 PM	1116.47	113
3/20/14 11:04:15 PM	1116.52	91
3/21/14 7:50:22 AM	1116.30	90
3/21/14 4:36:30 PM	1116.28	89
3/22/14 1:22:37 AM	1116.29	96
3/22/14 10:08:45 AM	1116.49	88
3/22/14 6:54:52 PM	1116.46	103
3/23/14 3:41:00 AM	1116.46	102
3/23/14 12:27:08 PM	1116.44	93
3/23/14 9:13:15 PM	1116.29	90
3/24/14 5:59:23 AM	1116.34	63
3/24/14 2:45:30 PM	1116.27	85
3/24/14 11:31:38 PM	1116.34	76
3/25/14 8:17:45 AM	1116.37	35
3/25/14 5:03:53 PM	1116.33	61
3/26/14 1:50:01 AM	1116.47	56
3/26/14 10:36:08 AM	1116.31	50
3/26/14 7:22:16 PM	1116.35	45
3/27/14 12:54:31 PM	1116.43	88
3/27/14 9:40:38 PM	1116.47	52
3/28/14 6:26:46 AM	1116.47	45
3/28/14 3:12:54 PM	1116.52	106
3/28/14 11:59:01 PM	1116.90	105
3/29/14 8:45:09 AM	1116.93	103
3/29/14 5:31:16 PM	1117.36	96
3/30/14 2:17:24 AM	1117.97	82
3/30/14 11:03:31 AM	1118.49	44
4/1/14 3:40:17 PM	1117.66	26
4/2/14 12:26:24 AM	1117.68	22
4/2/14 9:12:32 AM	1117.47	27
4/2/14 5:58:39 PM	1117.63	28

TABLE 2: BYRON WESTON POND LEVEL 2014

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Byron Weston Hydroelectric Project
Dalton, Massachusetts

12/28/2016

DateTime	Pond Level	Kilowatts
4/3/14 2:44:47 AM	1117.65	27
4/3/14 11:30:55 AM	1117.51	26
4/3/14 8:17:02 PM	1117.67	23
4/4/14 5:03:10 AM	1117.60	25
4/4/14 1:49:17 PM	1117.53	27
4/4/14 10:35:25 PM	1117.53	28
4/5/14 7:21:32 AM	1117.53	30
7/18/14 7:13:37 PM	1116.70	53
7/19/14 3:59:44 AM	1116.55	54
12/9/14 5:07:18 PM	1117.86	115
12/11/14 9:44:04 PM	1117.14	220
12/12/14 6:30:11 AM	1116.97	203
12/15/14 1:25:19 PM	1116.35	224
12/16/14 6:57:35 AM	1116.81	16
12/20/14 4:11:05 PM	1117.07	39
12/21/14 12:57:13 AM	1116.97	38
12/21/14 9:43:21 AM	1116.95	39
12/21/14 6:29:28 PM	1116.92	41
12/22/14 3:15:36 AM	1116.92	39
12/23/14 2:20:06 PM	1116.50	214
12/23/14 11:06:14 PM	1116.50	236
12/24/14 7:52:21 AM	1116.69	233
12/24/14 4:38:29 PM	1116.85	217
12/25/14 1:24:36 AM	1117.21	223
12/25/14 10:10:44 AM	1117.86	163
12/30/14 12:56:30 PM	1117.21	38
12/30/14 9:42:37 PM	1117.07	38
12/31/14 6:28:45 AM	1116.97	38
12/31/14 3:14:52 PM	1117.11	38

TABLE 3: BYRON WESTON POND LEVEL 2015

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Byron Weston Hydroelectric Project
Dalton, Massachusetts

12/28/2016

DateTime	Pond Level	Kilowatts
1/1/15 8:47:08 AM	1116.87	38
1/1/15 5:33:15 PM	1116.91	40
1/2/15 2:19:23 AM	1116.87	38
1/2/15 11:05:30 AM	1116.51	160
1/2/15 7:51:38 PM	1116.32	156
1/3/15 4:37:45 AM	1116.44	148
1/3/15 1:23:53 PM	1116.49	145
1/4/15 3:42:16 PM	1117.07	38
1/5/15 12:28:23 AM	1117.33	38
1/5/15 9:14:31 AM	1117.22	148
1/5/15 6:00:38 PM	1116.76	231
1/6/15 2:46:46 AM	1116.62	229
1/6/15 8:19:01 PM	1117.05	38
1/7/15 5:05:09 AM	1116.95	39
1/7/15 1:51:16 PM	1116.38	187
1/8/15 7:23:31 AM	1116.77	158
1/8/15 4:09:39 PM	1116.36	154
1/9/15 12:55:46 AM	1116.36	142
1/15/15 2:46:03 PM	1116.47	98
1/21/15 7:50:11 PM	1116.34	189
1/23/15 6:54:42 AM	1116.78	84
1/25/15 2:45:19 AM	1116.68	71
1/26/15 1:49:50 PM	1116.65	69
1/31/15 4:35:36 PM	1116.50	73
2/1/15 1:21:43 AM	1116.59	72
2/1/15 10:07:51 AM	1116.36	68
2/1/15 6:53:58 PM	1116.34	74
2/2/15 3:40:06 AM	1116.29	66
3/21/15 7:50:22 AM	1116.54	56
3/21/15 4:36:30 PM	1116.49	51
3/22/15 1:22:37 AM	1116.47	53
3/22/15 10:08:45 AM	1116.48	55
3/22/15 6:54:52 PM	1116.46	49
4/8/15 2:16:41 PM	1116.87	233
4/8/15 11:02:48 PM	1116.85	229
4/9/15 7:48:56 AM	1116.73	234
4/9/15 4:35:03 PM	1116.63	232
4/10/15 1:21:11 AM	1116.56	232
4/10/15 10:07:18 AM	1116.94	231
4/10/15 6:53:26 PM	1117.26	226
4/11/15 3:39:34 AM	1117.46	212
4/11/15 12:25:41 PM	1117.47	177
4/12/15 2:44:04 PM	1117.25	211
4/12/15 11:30:11 PM	1117.50	198
4/13/15 8:16:19 AM	1117.39	187
4/13/15 5:02:26 PM	1117.47	181
4/14/15 10:34:42 AM	1117.81	193
4/15/15 12:53:04 PM	1117.53	202

TABLE 3: BYRON WESTON POND LEVEL 2015

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Byron Weston Hydroelectric Project
Dalton, Massachusetts

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DateTime	Pond Level	Kilowatts
4/15/15 9:39:12 PM	1117.49	195
4/16/15 6:25:19 AM	1117.41	185
4/16/15 3:11:27 PM	1117.22	217
4/16/15 11:57:35 PM	1117.21	209
4/17/15 8:43:42 AM	1117.26	201
4/17/15 5:29:50 PM	1117.36	190
4/20/15 3:38:50 PM	1116.87	216
4/21/15 12:24:58 AM	1116.99	208
4/21/15 9:11:05 AM	1117.41	215
4/21/15 5:57:13 PM	1117.40	189
4/22/15 2:43:21 AM	1117.28	178
4/22/15 11:29:28 AM	1117.08	209
4/22/15 8:15:36 PM	1117.04	210
4/23/15 5:01:43 AM	1117.26	199
4/23/15 1:47:51 PM	1117.14	210
4/23/15 10:33:58 PM	1117.00	201
4/24/15 7:20:06 AM	1116.83	224
4/24/15 4:06:14 PM	1116.62	216
4/25/15 12:52:21 AM	1116.42	210
4/25/15 9:38:29 AM	1116.39	212
4/25/15 6:24:36 PM	1116.42	196
4/26/15 3:10:44 AM	1116.49	183
4/26/15 11:56:51 AM	1116.35	175
4/26/15 8:42:59 PM	1116.46	165
4/27/15 5:29:06 AM	1116.39	160
4/27/15 2:15:14 PM	1116.48	155
4/27/15 11:01:22 PM	1116.35	147
4/28/15 7:47:29 AM	1116.45	140
4/28/15 4:33:37 PM	1116.47	132
4/29/15 1:19:44 AM	1116.33	102
4/29/15 10:05:52 AM	1116.43	93
4/29/15 6:51:59 PM	1116.41	98
4/30/15 3:38:07 AM	1116.34	85
5/5/15 3:10:01 PM	1116.32	48
5/5/15 11:56:08 PM	1116.34	44
5/6/15 8:42:16 AM	1116.34	38
5/6/15 5:28:23 PM	1116.41	33
5/7/15 2:14:31 AM	1116.41	33
5/7/15 11:00:38 AM	1116.32	29
5/7/15 7:46:46 PM	1116.32	27
5/8/15 4:32:54 AM	1116.32	20
5/8/15 1:19:01 PM	1116.41	19
5/8/15 10:05:09 PM	1116.44	21
5/9/15 6:51:16 AM	1116.25	21
5/29/15 9:08:12 AM	1116.42	41
5/29/15 5:54:20 PM	1116.36	24
6/1/15 4:03:21 PM	1116.47	122
6/2/15 12:49:28 AM	1117.19	192

TABLE 3: BYRON WESTON POND LEVEL 2015

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Byron Weston Hydroelectric Project
Dalton, Massachusetts

12/28/2016

DateTime	Pond Level	Kilowatts
6/2/15 9:35:36 AM	1117.25	202
6/2/15 6:21:43 PM	1117.00	194
6/3/15 3:07:51 AM	1116.66	189
6/3/15 11:53:58 AM	1116.31	183
6/3/15 8:40:06 PM	1116.33	127
6/4/15 5:26:14 AM	1116.35	100
6/4/15 2:12:21 PM	1116.40	89
6/4/15 10:58:29 PM	1116.31	79
6/5/15 7:44:36 AM	1116.31	57
6/5/15 4:30:44 PM	1116.31	50
6/6/15 1:16:51 AM	1116.33	48
6/6/15 10:02:59 AM	1116.50	65
6/6/15 6:49:06 PM	1116.31	59
6/7/15 3:35:14 AM	1116.33	47
6/7/15 12:21:22 PM	1116.40	42
6/7/15 9:07:29 PM	1116.40	31
6/8/15 5:53:37 AM	1116.40	23
6/8/15 2:39:44 PM	1116.43	17
6/8/15 11:25:52 PM	1116.50	106
6/9/15 8:11:59 AM	1116.46	119
6/9/15 4:58:07 PM	1116.48	126
6/10/15 1:44:15 AM	1116.46	138
6/10/15 10:30:22 AM	1116.36	125
6/10/15 7:16:30 PM	1116.31	107
6/11/15 4:02:37 AM	1116.34	82
6/11/15 12:48:45 PM	1116.36	69
6/12/15 3:07:08 PM	1116.41	31
6/15/15 1:16:08 PM	1116.91	215
6/15/15 10:02:16 PM	1116.98	196
6/16/15 6:48:23 AM	1116.82	188
6/16/15 3:34:31 PM	1116.58	219
6/17/15 12:20:38 AM	1116.39	209
6/17/15 9:06:46 AM	1116.32	181
6/17/15 5:52:54 PM	1116.32	152
6/18/15 2:39:01 AM	1116.32	126
6/18/15 11:25:09 AM	1116.32	109
6/18/15 8:11:16 PM	1116.36	95
6/19/15 1:43:31 PM	1116.40	72
6/21/15 9:34:09 AM	1116.66	221
6/22/15 11:52:32 AM	1117.09	219
6/22/15 8:38:39 PM	1116.75	222
6/23/15 5:24:47 AM	1116.29	215
6/24/15 4:29:17 PM	1116.30	133
6/25/15 1:15:25 AM	1116.30	110
6/25/15 10:01:32 AM	1116.44	97
6/25/15 6:47:40 PM	1116.39	81
6/26/15 3:33:48 AM	1116.32	57
6/26/15 12:19:55 PM	1116.32	56

TABLE 3: BYRON WESTON POND LEVEL 2015

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Byron Weston Hydroelectric Project
Dalton, Massachusetts

12/28/2016

DateTime	Pond Level	Kilowatts
6/29/15 10:28:56 AM	1116.27	225
6/29/15 7:15:03 PM	1116.30	204
6/30/15 4:01:11 AM	1116.39	181
6/30/15 12:47:18 PM	1116.34	156
6/30/15 9:33:26 PM	1116.30	140
7/1/15 6:19:34 AM	1116.46	145
7/2/15 8:37:56 AM	1117.36	219
7/2/15 5:24:04 PM	1117.09	214
7/3/15 2:10:11 AM	1116.82	211
7/3/15 10:56:19 AM	1116.86	143
7/4/15 4:28:34 AM	1116.30	179
7/4/15 1:14:42 PM	1116.43	165
7/4/15 10:00:49 PM	1116.43	170
7/5/15 6:46:57 AM	1116.40	159
7/5/15 3:33:04 PM	1116.35	147
7/6/15 12:19:12 AM	1116.40	133
7/6/15 9:05:19 AM	1116.43	122
7/6/15 5:51:27 PM	1116.31	91
7/7/15 11:23:42 AM	1116.55	64
7/7/15 8:09:50 PM	1116.48	95
7/8/15 4:55:57 AM	1116.39	94
7/9/15 4:00:28 PM	1116.31	79
7/10/15 9:32:43 AM	1117.71	210
7/10/15 6:18:50 PM	1117.21	192
7/11/15 3:04:58 AM	1116.89	162
7/13/15 7:41:43 AM	1116.59	103
7/13/15 4:27:51 PM	1116.43	104
7/14/15 10:00:06 AM	1116.49	116
7/14/15 6:46:14 PM	1116.44	108
7/15/15 3:32:21 AM	1116.32	98
7/20/15 3:04:15 PM	1116.44	119
7/20/15 11:50:22 PM	1116.37	90
7/21/15 8:36:30 AM	1116.37	70
7/22/15 10:54:52 AM	1116.41	32
8/11/15 1:11:49 PM	1116.51	46
8/11/15 9:57:56 PM	1116.46	75
8/12/15 6:44:04 AM	1116.34	45
9/30/15 2:31:05 PM	1117.06	199
10/1/15 8:03:21 AM	1116.82	214
10/1/15 4:49:28 PM	1116.26	207
10/2/15 1:35:36 AM	1116.31	157
10/2/15 10:21:43 AM	1116.38	115
10/2/15 7:07:51 PM	1116.30	73
10/3/15 3:53:58 AM	1116.38	47
10/3/15 12:40:06 PM	1116.33	29
10/3/15 9:26:14 PM	1116.45	16
10/4/15 6:12:21 AM	1116.23	18
10/4/15 2:58:29 PM	1116.46	22

TABLE 3: BYRON WESTON POND LEVEL 2015

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Byron Weston Hydroelectric Project
Dalton, Massachusetts

12/28/2016

DateTime	Pond Level	Kilowatts
10/23/15 2:57:02 PM	1116.26	25
10/23/15 11:43:10 PM	1116.27	27
10/24/15 8:29:17 AM	1116.55	24
10/26/15 1:06:03 PM	1116.35	51
10/26/15 9:52:10 PM	1116.33	44
10/27/15 6:38:18 AM	1116.30	38
10/27/15 3:24:25 PM	1116.38	33
10/28/15 12:10:33 AM	1116.45	25
10/31/15 3:51:49 PM	1116.34	138
11/1/15 12:37:56 AM	1116.29	124
11/1/15 8:24:04 AM	1116.34	113
11/1/15 5:10:11 PM	1116.46	102
11/2/15 1:56:19 AM	1116.34	91
11/2/15 10:42:26 AM	1116.31	87
11/2/15 7:28:34 PM	1116.72	21
11/3/15 4:14:42 AM	1116.70	21
11/3/15 1:00:49 PM	1116.67	20
11/3/15 9:46:57 PM	1116.65	18
11/4/15 6:33:04 AM	1116.63	18
11/4/15 3:19:12 PM	1116.36	48
11/5/15 12:05:19 AM	1116.39	46
11/5/15 8:51:27 AM	1116.51	78
11/5/15 5:37:35 PM	1116.30	90
11/6/15 2:23:42 AM	1116.40	86
11/6/15 11:09:50 AM	1116.35	81
11/6/15 7:55:57 PM	1116.33	75
11/7/15 4:42:05 AM	1116.40	69
11/7/15 1:28:12 PM	1116.40	55
11/7/15 10:14:20 PM	1116.30	39
11/8/15 7:00:28 AM	1116.45	28
11/8/15 3:46:35 PM	1116.45	20
11/9/15 9:18:50 AM	1116.42	37
11/9/15 6:04:58 PM	1116.50	34
11/10/15 2:51:05 AM	1116.35	30
11/10/15 11:37:13 AM	1116.38	29
11/10/15 8:23:21 PM	1116.50	27
11/11/15 5:09:28 AM	1116.47	57
11/11/15 1:55:36 PM	1116.38	96
11/12/15 7:27:51 AM	1116.68	77
11/12/15 4:13:58 PM	1116.35	110
11/13/15 1:00:06 AM	1116.35	112
11/13/15 9:46:14 AM	1116.49	99
11/13/15 6:32:21 PM	1116.47	103
11/14/15 3:18:29 AM	1116.40	90
11/16/15 7:55:14 AM	1116.51	50
11/16/15 4:41:22 PM	1116.46	42
11/17/15 1:27:29 AM	1116.46	42
11/17/15 10:13:37 AM	1116.41	32

TABLE 3: BYRON WESTON POND LEVEL 2015

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Byron Weston Hydroelectric Project
Dalton, Massachusetts

12/28/2016

DateTime	Pond Level	Kilowatts
11/17/15 6:59:44 PM	1116.43	34
11/18/15 3:45:52 AM	1116.34	24
11/18/15 12:31:59 PM	1116.39	16
11/18/15 9:18:07 PM	1116.43	22
11/19/15 6:04:15 AM	1116.31	20
11/19/15 2:50:22 PM	1116.48	21
11/19/15 11:36:30 PM	1116.53	87
11/23/15 3:17:45 PM	1116.35	82
11/24/15 12:03:53 AM	1116.44	69
11/24/15 8:50:01 AM	1116.42	59
11/24/15 5:36:08 PM	1116.49	52
11/25/15 2:22:16 AM	1116.44	48
11/25/15 11:08:23 AM	1116.42	44
11/25/15 7:54:31 PM	1116.44	40
11/26/15 4:40:38 AM	1116.39	37
11/26/15 1:26:46 PM	1116.49	31
11/26/15 10:12:54 PM	1116.49	37
11/27/15 6:59:01 AM	1116.39	37
11/27/15 3:45:09 PM	1116.47	36
11/28/15 12:31:16 AM	1116.32	38
11/28/15 9:17:24 AM	1116.32	39
11/28/15 6:03:31 PM	1116.47	39
11/29/15 2:49:39 AM	1116.35	35
11/29/15 11:35:46 AM	1116.42	36
11/29/15 8:21:54 PM	1116.35	28
11/30/15 5:08:02 AM	1116.35	16
11/30/15 1:54:09 PM	1116.21	22
11/30/15 10:40:17 PM	1116.27	23
12/1/15 4:12:32 PM	1116.51	24
12/2/15 12:58:39 AM	1116.27	25
12/2/15 9:44:47 AM	1116.42	39
12/2/15 6:30:55 PM	1116.47	69
12/3/15 3:17:02 AM	1116.49	118
12/3/15 12:03:10 PM	1116.49	121
12/3/15 8:49:17 PM	1116.32	110
12/4/15 5:35:25 AM	1116.30	93
12/4/15 2:21:32 PM	1116.30	77
12/4/15 11:07:40 PM	1116.37	69
12/5/15 7:53:48 AM	1116.40	54
12/5/15 4:39:55 PM	1116.47	48
12/6/15 1:26:03 AM	1116.37	43
12/6/15 10:12:10 AM	1116.44	38
12/6/15 6:58:18 PM	1116.35	31
12/7/15 3:44:25 AM	1116.35	33
12/7/15 12:30:33 PM	1116.47	21
12/7/15 9:16:41 PM	1116.47	30
12/8/15 6:02:48 AM	1116.47	23
12/8/15 2:48:56 PM	1116.35	15

TABLE 3: BYRON WESTON POND LEVEL 2015

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Byron Weston Hydroelectric Project
Dalton, Massachusetts

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DateTime	Pond Level	Kilowatts
12/8/15 11:35:03 PM	1116.40	33
12/9/15 8:21:11 AM	1116.47	28
12/9/15 5:07:18 PM	1116.42	19
12/10/15 1:53:26 AM	1116.35	25
12/10/15 10:39:34 AM	1116.32	29
12/10/15 7:25:41 PM	1116.35	34
12/11/15 4:11:49 AM	1116.32	33
12/11/15 12:57:56 PM	1116.32	25
12/11/15 9:44:04 PM	1116.42	32
12/12/15 6:30:11 AM	1116.42	28
12/12/15 3:16:19 PM	1116.35	22
12/13/15 12:02:26 AM	1116.49	29
12/13/15 8:48:34 AM	1116.47	21
12/13/15 5:34:42 PM	1116.49	20
12/14/15 2:20:49 AM	1116.33	20
12/14/15 11:06:57 AM	1116.39	19
12/15/15 1:25:19 PM	1116.49	132
12/15/15 10:11:27 PM	1116.30	130
12/16/15 6:57:35 AM	1116.42	113
12/16/15 3:43:42 PM	1116.35	98
12/17/15 12:29:50 AM	1116.44	86
12/17/15 9:15:57 AM	1116.42	70
12/17/15 6:02:05 PM	1116.49	90
12/18/15 11:34:20 AM	1116.49	155
12/18/15 8:20:28 PM	1116.42	144
12/19/15 5:06:35 AM	1116.47	131
12/19/15 1:52:43 PM	1116.42	115
12/19/15 10:38:50 PM	1116.30	89
12/20/15 7:24:58 AM	1116.42	78
12/20/15 4:11:05 PM	1116.37	61
12/21/15 12:57:13 AM	1116.40	56
12/21/15 9:43:21 AM	1116.32	46
12/21/15 6:29:28 PM	1116.44	56
12/22/15 3:15:36 AM	1116.35	71
12/22/15 12:01:43 PM	1116.47	89
12/22/15 8:47:51 PM	1116.51	131
12/23/15 5:33:58 AM	1116.42	151
12/23/15 2:20:06 PM	1116.42	146
12/23/15 11:06:14 PM	1116.49	165
12/28/15 5:05:52 PM	1116.31	176
12/29/15 1:51:59 AM	1116.48	163
12/29/15 10:38:07 AM	1116.41	160
12/29/15 7:24:15 PM	1116.36	149
12/30/15 4:10:22 AM	1116.48	148
12/30/15 12:56:30 PM	1116.46	143
12/30/15 9:42:37 PM	1116.50	157
12/31/15 6:28:45 AM	1116.45	169
12/31/15 3:14:52 PM	1116.41	187

TABLE 4: BYRON WESTON POND LEVEL 2016

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Byron Weston Hydroelectric Project
Dalton, Massachusetts

12/28/2016

DateTime	Pond Level	Kilowatts
1/1/16 12:01:00 AM	1116.43	191
1/1/16 8:31:16 AM	1116.36	185
1/1/16 5:01:32 PM	1116.43	175
1/2/16 1:31:49 AM	1116.34	159
1/2/16 10:02:05 AM	1116.41	148
1/2/16 6:32:21 PM	1116.31	139
1/3/16 3:02:37 AM	1116.48	132
1/3/16 11:32:54 AM	1116.48	113
1/3/16 8:03:10 PM	1116.39	114
1/4/16 4:33:26 AM	1116.34	105
1/4/16 1:03:42 PM	1116.48	94
1/4/16 9:33:58 PM	1116.27	51
1/5/16 6:04:15 AM	1116.39	53
1/5/16 2:34:31 PM	1116.40	76
1/5/16 11:04:47 PM	1116.42	43
1/6/16 7:35:03 AM	1116.35	34
1/6/16 4:05:19 PM	1116.47	57
1/7/16 12:35:36 AM	1116.44	43
1/7/16 9:05:52 AM	1116.35	32
1/7/16 5:36:08 PM	1116.44	49
1/8/16 2:06:24 AM	1116.35	36
1/8/16 10:36:41 AM	1116.47	34
1/8/16 7:06:57 PM	1116.35	49
1/9/16 3:37:13 AM	1116.49	46
1/9/16 12:07:29 PM	1116.49	54
1/9/16 8:37:45 PM	1116.47	61
1/10/16 5:08:02 AM	1116.37	75
1/12/16 8:09:39 AM	1117.03	141
1/12/16 4:39:55 PM	1116.34	216
1/13/16 1:10:11 AM	1116.42	209
1/13/16 9:40:28 AM	1116.46	184
1/13/16 6:10:44 PM	1116.27	160
1/14/16 2:41:00 AM	1116.44	117
1/14/16 11:11:16 AM	1116.46	140
1/14/16 7:41:32 PM	1116.32	134
1/15/16 4:11:49 AM	1116.39	132
1/15/16 12:42:05 PM	1116.49	136
1/15/16 9:12:21 PM	1116.39	127
1/16/16 5:42:37 AM	1116.49	126
1/16/16 2:12:54 PM	1116.44	139
1/16/16 10:43:10 PM	1116.37	142
1/17/16 7:13:26 AM	1116.46	141
1/17/16 3:43:42 PM	1116.46	138
1/18/16 12:13:58 AM	1116.46	136
1/18/16 8:44:15 AM	1116.33	113
1/18/16 5:14:31 PM	1116.40	118
1/19/16 1:44:47 AM	1116.47	94
1/19/16 10:15:03 AM	1116.52	84

TABLE 4: BYRON WESTON POND LEVEL 2016

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Byron Weston Hydroelectric Project
Dalton, Massachusetts

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DateTime	Pond Level	Kilowatts
1/21/16 9:46:57 PM	1116.33	60
1/22/16 6:17:13 AM	1116.30	44
1/22/16 2:47:29 PM	1116.50	64
1/22/16 11:17:45 PM	1116.38	50
1/23/16 7:48:02 AM	1116.45	49
1/23/16 4:18:18 PM	1116.35	56
1/24/16 12:48:34 AM	1116.35	45
1/24/16 9:18:50 AM	1116.35	29
1/24/16 5:49:06 PM	1116.42	45
1/25/16 2:19:23 AM	1116.47	33
1/25/16 10:49:39 AM	1116.42	25
1/25/16 7:19:55 PM	1116.30	38
1/26/16 3:50:11 AM	1116.45	30
1/26/16 12:20:28 PM	1116.45	34
1/26/16 8:50:44 PM	1116.43	37
1/27/16 5:21:00 AM	1116.50	39
1/27/16 1:51:16 PM	1116.50	43
1/27/16 10:21:32 PM	1116.33	40
1/28/16 6:51:49 AM	1116.38	35
1/28/16 3:22:05 PM	1116.31	42
1/28/16 11:52:21 PM	1116.45	35
1/29/16 8:22:37 AM	1116.35	31
1/29/16 4:52:54 PM	1116.44	28
1/30/16 1:23:10 AM	1116.42	24
1/30/16 9:53:26 AM	1116.47	20
1/30/16 6:23:42 PM	1116.47	21
1/31/16 2:53:58 AM	1116.30	23
1/31/16 11:24:15 AM	1116.49	22
1/31/16 7:54:31 PM	1116.37	30
2/1/16 4:24:47 AM	1116.35	32
2/1/16 12:55:03 PM	1116.47	40
2/1/16 9:25:19 PM	1116.50	64
2/2/16 5:55:36 AM	1116.47	57
2/2/16 2:25:52 PM	1116.40	54
2/2/16 10:56:08 PM	1116.45	55
2/3/16 7:26:24 AM	1116.35	50
2/3/16 3:56:41 PM	1116.52	147
2/4/16 12:26:57 AM	1116.47	203
2/4/16 5:27:29 PM	1116.75	194
2/5/16 10:28:02 AM	1116.79	159
2/5/16 6:58:18 PM	1116.45	196
2/6/16 3:28:34 AM	1116.30	125
2/6/16 11:58:50 AM	1116.40	165
2/6/16 8:29:06 PM	1116.42	147
2/7/16 4:59:23 AM	1116.28	107
2/7/16 1:29:39 PM	1116.47	132
2/7/16 9:59:55 PM	1116.30	120
2/8/16 6:30:11 AM	1116.37	109

TABLE 4: BYRON WESTON POND LEVEL 2016

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Byron Weston Hydroelectric Project
Dalton, Massachusetts

12/28/2016

DateTime	Pond Level	Kilowatts
2/8/16 3:00:28 PM	1116.39	97
2/8/16 11:30:44 PM	1116.42	91
2/9/16 8:01:00 AM	1116.49	85
2/9/16 4:31:16 PM	1116.37	107
2/10/16 1:01:32 AM	1116.42	93
2/10/16 9:31:49 AM	1116.49	87
2/10/16 6:02:05 PM	1116.42	91
2/11/16 2:32:21 AM	1116.37	79
2/11/16 11:02:37 AM	1116.49	80
2/11/16 7:32:54 PM	1116.34	54
2/12/16 4:03:10 AM	1116.49	27
2/12/16 12:33:26 PM	1116.46	63
2/12/16 9:03:42 PM	1116.49	55
2/13/16 5:33:58 AM	1116.49	37
2/13/16 2:04:15 PM	1116.39	57
2/13/16 10:34:31 PM	1116.24	16
2/17/16 11:37:13 AM	1117.14	210
2/18/16 1:08:02 PM	1116.54	220
2/18/16 9:38:18 PM	1116.30	206
2/19/16 2:38:50 PM	1116.40	182
2/19/16 11:09:06 PM	1116.48	161
2/20/16 7:39:23 AM	1116.43	155
2/20/16 4:09:39 PM	1116.41	180
2/21/16 12:39:55 AM	1116.33	179
2/21/16 9:10:11 AM	1116.38	173
2/21/16 5:40:28 PM	1116.48	174
2/22/16 10:41:00 AM	1116.34	172
2/22/16 7:11:16 PM	1116.48	163
2/23/16 3:41:32 AM	1116.34	128
2/23/16 12:11:49 PM	1116.47	152
2/23/16 8:42:05 PM	1116.49	127
2/24/16 5:12:21 AM	1116.42	131
2/24/16 1:42:37 PM	1116.52	129
2/25/16 3:13:26 PM	1119.10	73
2/26/16 8:13:58 AM	1117.69	197
2/26/16 4:44:15 PM	1117.48	198
2/27/16 9:44:47 AM	1116.86	224
2/27/16 6:15:03 PM	1117.01	200
2/29/16 12:46:24 PM	1116.46	214
2/29/16 9:16:41 PM	1116.45	204
3/1/16 2:17:13 PM	1116.50	208
3/1/16 10:47:29 PM	1116.49	204
3/2/16 7:17:45 AM	1116.51	213
3/2/16 3:48:02 PM	1116.63	202
3/3/16 12:18:18 AM	1116.63	190
3/3/16 5:18:50 PM	1116.56	214
3/4/16 1:49:06 AM	1116.37	194
3/4/16 10:19:23 AM	1116.37	166

TABLE 4: BYRON WESTON POND LEVEL 2016

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Byron Weston Hydroelectric Project
Dalton, Massachusetts

12/28/2016

DateTime	Pond Level	Kilowatts
3/4/16 6:49:39 PM	1116.41	174
3/5/16 3:19:55 AM	1116.34	162
3/5/16 11:50:11 AM	1116.51	163
3/5/16 8:20:28 PM	1116.49	160
3/6/16 4:50:44 AM	1116.49	144
3/6/16 1:21:00 PM	1116.30	136
3/6/16 9:51:16 PM	1116.42	140
3/7/16 6:21:32 AM	1116.45	132
3/7/16 2:51:49 PM	1116.37	132
3/7/16 11:22:05 PM	1116.30	130
3/8/16 7:52:21 AM	1116.45	125
3/8/16 4:22:37 PM	1116.45	127
3/9/16 12:52:54 AM	1116.45	132
3/9/16 9:23:10 AM	1116.45	129
3/9/16 5:53:26 PM	1116.47	139
3/10/16 2:23:42 AM	1116.47	142
3/10/16 10:53:58 AM	1116.50	148
3/10/16 7:24:15 PM	1116.48	187
3/14/16 9:26:57 AM	1116.52	161
3/14/16 5:57:13 PM	1116.37	190
3/15/16 2:27:29 AM	1116.44	190
3/16/16 12:28:34 PM	1116.42	202
3/16/16 8:58:50 PM	1116.37	195
3/17/16 5:29:06 AM	1116.49	210
3/17/16 1:59:23 PM	1116.35	213
3/17/16 10:29:39 PM	1116.39	206
3/18/16 6:59:55 AM	1116.39	192
3/18/16 3:30:11 PM	1116.38	171
3/19/16 12:00:28 AM	1116.40	160
3/19/16 8:30:44 AM	1116.38	145
3/19/16 5:01:00 PM	1116.31	137
3/20/16 1:31:16 AM	1116.38	130
3/20/16 10:01:32 AM	1116.31	111
3/20/16 6:31:49 PM	1116.45	113
3/21/16 3:02:05 AM	1116.36	110
3/21/16 11:32:21 AM	1116.43	104
3/21/16 8:02:37 PM	1116.48	108
3/22/16 4:32:54 AM	1116.33	107
3/22/16 1:03:10 PM	1116.48	99
3/22/16 9:33:26 PM	1116.50	105
3/23/16 6:03:42 AM	1116.50	101
3/23/16 2:33:58 PM	1116.50	97
3/23/16 11:04:15 PM	1116.33	99
3/25/16 9:05:19 AM	1116.54	98
3/25/16 5:35:36 PM	1116.49	121
3/26/16 2:05:52 AM	1116.49	122
3/26/16 10:36:08 AM	1116.45	125
3/26/16 7:06:24 PM	1116.47	120

TABLE 4: BYRON WESTON POND LEVEL 2016

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Byron Weston Hydroelectric Project
Dalton, Massachusetts

12/28/2016

DateTime	Pond Level	Kilowatts
3/27/16 3:36:41 AM	1116.42	108
3/27/16 12:06:57 PM	1116.49	106
3/27/16 8:37:13 PM	1116.39	98
3/28/16 5:07:29 AM	1116.32	98
3/28/16 1:37:45 PM	1116.47	124
3/28/16 10:08:02 PM	1116.49	181
3/29/16 6:38:18 AM	1116.49	204
3/29/16 3:08:34 PM	1116.39	199
3/29/16 11:38:50 PM	1116.34	178
3/30/16 8:09:06 AM	1116.43	158
3/31/16 9:39:55 AM	1116.40	124
3/31/16 6:10:11 PM	1116.49	120
4/1/16 2:40:28 AM	1116.35	110
4/1/16 11:10:44 AM	1116.45	109
4/1/16 7:41:00 PM	1116.40	124
4/2/16 4:11:16 AM	1116.37	125
4/2/16 12:41:32 PM	1116.49	127
4/2/16 9:11:49 PM	1116.39	138
4/3/16 5:42:05 AM	1116.39	141
4/3/16 2:12:21 PM	1116.34	145
4/3/16 10:42:37 PM	1116.41	133
4/4/16 7:12:54 AM	1116.48	123
4/4/16 3:43:10 PM	1116.36	124
4/5/16 12:13:26 AM	1116.39	121
4/5/16 8:43:42 AM	1116.36	94
4/5/16 5:13:58 PM	1116.36	109
4/6/16 1:44:15 AM	1116.36	105
4/6/16 10:14:31 AM	1116.44	93
4/6/16 6:44:47 PM	1116.44	95
4/7/16 3:15:03 AM	1116.48	96
4/7/16 11:45:19 AM	1116.48	111
4/9/16 2:46:57 PM	1116.57	214
4/9/16 11:17:13 PM	1116.33	210
4/10/16 7:47:29 AM	1116.38	195
4/10/16 4:17:45 PM	1116.47	179
4/11/16 12:48:02 AM	1116.32	164
4/11/16 9:18:18 AM	1116.49	160
4/11/16 5:48:34 PM	1116.42	170
4/12/16 2:18:50 AM	1116.39	182
4/12/16 10:49:06 AM	1116.86	205
4/12/16 7:19:23 PM	1117.09	187
4/13/16 12:19:55 PM	1116.71	217
4/13/16 8:50:11 PM	1116.49	216
4/14/16 5:20:28 AM	1116.39	207
4/14/16 1:50:44 PM	1116.46	201
4/14/16 10:21:00 PM	1116.29	182
4/15/16 6:51:16 AM	1116.45	169
4/15/16 3:21:32 PM	1116.43	167

TABLE 4: BYRON WESTON POND LEVEL 2016

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Byron Weston Hydroelectric Project
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DateTime	Pond Level	Kilowatts
4/15/16 11:51:49 PM	1116.43	156
4/16/16 8:22:05 AM	1116.50	142
4/16/16 4:52:21 PM	1116.35	142
4/17/16 1:22:37 AM	1116.38	135
4/17/16 9:52:54 AM	1116.47	125
4/17/16 6:23:10 PM	1116.35	121
4/18/16 2:53:26 AM	1116.35	117
4/18/16 11:23:42 AM	1116.42	108
4/18/16 7:53:58 PM	1116.47	108
4/19/16 4:24:15 AM	1116.40	101
4/19/16 12:54:31 PM	1116.49	102
4/19/16 9:24:47 PM	1116.42	98
4/20/16 5:55:03 AM	1116.37	88
4/20/16 2:25:19 PM	1116.45	87
4/20/16 10:55:36 PM	1116.40	82
4/21/16 7:25:52 AM	1116.37	77
4/21/16 3:56:08 PM	1116.42	72
4/22/16 12:26:24 AM	1116.37	71
4/22/16 8:56:41 AM	1116.32	68
4/22/16 5:26:57 PM	1116.35	74
4/23/16 1:57:13 AM	1116.44	77
4/23/16 10:27:29 AM	1116.44	75
4/23/16 6:57:45 PM	1116.37	72
4/24/16 3:28:02 AM	1116.32	66
4/24/16 11:58:18 AM	1116.32	60
4/24/16 8:28:34 PM	1116.32	54
4/25/16 4:58:50 AM	1116.32	50
4/25/16 1:29:06 PM	1116.47	45
4/25/16 9:59:23 PM	1116.47	45
4/26/16 6:29:39 AM	1116.32	43
4/26/16 2:59:55 PM	1116.52	97
4/26/16 11:30:11 PM	1116.35	99
4/27/16 8:00:28 AM	1116.45	111
4/27/16 4:30:44 PM	1116.46	124
4/28/16 1:01:00 AM	1116.29	113
4/28/16 9:31:16 AM	1116.31	102
4/28/16 6:01:32 PM	1116.29	91
4/29/16 2:31:49 AM	1116.36	81
4/29/16 11:02:05 AM	1116.41	69
4/29/16 7:32:21 PM	1116.41	61
4/30/16 4:02:37 AM	1116.44	53
4/30/16 12:32:54 PM	1116.47	46
4/30/16 9:03:10 PM	1116.42	46
5/1/16 5:33:26 AM	1116.37	39
5/1/16 2:03:42 PM	1116.49	40
5/1/16 10:33:58 PM	1116.35	48
5/2/16 7:04:15 AM	1116.42	49
5/2/16 3:34:31 PM	1116.47	108

TABLE 4: BYRON WESTON POND LEVEL 2016

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Byron Weston Hydroelectric Project
Dalton, Massachusetts

12/28/2016

DateTime	Pond Level	Kilowatts
5/3/16 12:04:47 AM	1116.47	119
5/3/16 8:35:03 AM	1116.45	145
5/3/16 5:05:19 PM	1116.40	153
5/4/16 10:05:52 AM	1116.35	171
5/4/16 6:36:08 PM	1116.30	177
5/5/16 3:06:24 AM	1116.42	177
5/5/16 11:36:41 AM	1116.34	171
5/5/16 8:06:57 PM	1116.32	165
5/6/16 4:37:13 AM	1116.48	155
5/6/16 1:07:29 PM	1116.39	151
5/6/16 9:37:45 PM	1116.36	142
5/7/16 6:08:02 AM	1116.51	150
5/7/16 2:38:18 PM	1116.43	159
5/7/16 11:08:34 PM	1116.31	161
5/8/16 7:38:50 AM	1116.39	159
5/8/16 4:09:06 PM	1116.48	160
5/9/16 12:39:23 AM	1116.39	141
5/9/16 9:09:39 AM	1116.47	130
5/9/16 5:39:55 PM	1116.38	118
5/10/16 2:10:11 AM	1116.33	104
5/11/16 12:11:16 PM	1116.50	70
5/11/16 8:41:32 PM	1116.40	60
5/12/16 5:11:49 AM	1116.31	53
5/12/16 1:42:05 PM	1116.47	50
5/12/16 10:12:21 PM	1116.31	45
5/13/16 6:42:37 AM	1116.43	38
5/13/16 3:12:54 PM	1116.50	42
5/13/16 11:43:10 PM	1116.38	111
5/14/16 8:13:26 AM	1116.47	120
5/14/16 4:43:42 PM	1116.51	135
5/15/16 1:13:58 AM	1116.48	128
5/15/16 9:44:15 AM	1116.31	129
5/15/16 6:14:31 PM	1116.36	118
5/16/16 2:44:47 AM	1116.39	105
5/16/16 11:15:03 AM	1116.43	94
5/16/16 7:45:19 PM	1116.46	87
5/17/16 4:15:36 AM	1116.41	67
5/17/16 12:45:52 PM	1116.34	62
5/17/16 9:16:08 PM	1116.32	56
5/18/16 5:46:24 AM	1116.39	41
5/18/16 2:16:41 PM	1116.32	40
5/18/16 10:46:57 PM	1116.32	41
5/19/16 7:17:13 AM	1116.34	32
5/19/16 3:47:29 PM	1116.37	32
5/20/16 12:17:45 AM	1116.34	28
5/20/16 8:48:02 AM	1116.37	19
5/20/16 5:18:18 PM	1116.46	24
5/21/16 1:48:34 AM	1116.37	16

TABLE 4: BYRON WESTON POND LEVEL 2016

File No. 19349.81

Page 21 of 23

Byron Weston Hydroelectric Project
Dalton, Massachusetts

12/28/2016

DateTime	Pond Level	Kilowatts
5/21/16 10:18:50 AM	1116.25	12
5/21/16 6:49:06 PM	1116.37	15
5/22/16 3:19:23 AM	1116.37	19
5/22/16 11:49:39 AM	1116.34	17
5/22/16 8:19:55 PM	1116.27	20
5/23/16 4:50:11 AM	1116.25	20
5/23/16 1:20:28 PM	1116.32	21
5/27/16 10:53:26 AM	1114.40	12
5/31/16 8:26:24 AM	1116.36	201
6/1/16 9:57:13 AM	1116.46	137
6/1/16 6:27:29 PM	1116.37	95
6/2/16 2:57:45 AM	1116.34	62
6/2/16 11:28:02 AM	1116.32	49
6/2/16 7:58:18 PM	1116.32	33
6/3/16 4:28:34 AM	1116.39	21
6/3/16 12:58:50 PM	1116.25	22
6/3/16 9:29:06 PM	1116.35	22
6/6/16 9:01:00 AM	1116.41	189
6/6/16 5:31:16 PM	1116.31	185
6/7/16 2:01:32 AM	1116.34	146
6/7/16 10:31:49 AM	1116.29	125
6/7/16 7:02:05 PM	1116.39	140
6/8/16 3:32:21 AM	1116.36	124
6/8/16 12:02:37 PM	1116.41	116
6/8/16 8:32:54 PM	1116.34	103
6/9/16 5:03:10 AM	1116.36	84
6/9/16 1:33:26 PM	1116.36	73
6/9/16 10:03:42 PM	1116.41	50
6/10/16 6:33:58 AM	1116.46	36
6/10/16 3:04:15 PM	1116.31	23
6/10/16 11:34:31 PM	1116.36	15
6/11/16 8:04:47 AM	1116.24	20
6/11/16 4:35:03 PM	1116.50	47
6/12/16 1:05:19 AM	1116.46	41
6/12/16 9:35:36 AM	1116.36	42
6/12/16 6:05:52 PM	1116.46	46
6/13/16 2:36:08 AM	1116.31	34
6/13/16 11:06:24 AM	1116.31	30
6/13/16 7:36:41 PM	1116.38	26
6/14/16 4:06:57 AM	1116.34	15
6/14/16 12:37:13 PM	1116.27	14
6/14/16 9:07:29 PM	1116.54	15
6/15/16 5:37:45 AM	1116.42	24
6/15/16 2:08:02 PM	1116.44	20
8/1/16 5:13:58 PM	1116.40	35
8/2/16 1:44:15 AM	1116.40	33
8/2/16 10:14:31 AM	1116.31	170
8/2/16 6:44:47 PM	1116.31	140

TABLE 4: BYRON WESTON POND LEVEL 2016

File No. 19349.81

Page 22 of 23

Byron Weston Hydroelectric Project
Dalton, Massachusetts

12/28/2016

DateTime	Pond Level	Kilowatts
8/3/16 3:15:03 AM	1116.31	116
8/3/16 11:45:19 AM	1116.31	85
8/3/16 8:15:36 PM	1116.31	51
8/4/16 4:45:52 AM	1116.31	30
8/4/16 1:16:08 PM	1116.50	24
10/28/16 2:21:00 PM	1116.39	87
10/28/16 10:51:16 PM	1116.49	78
11/7/16 7:58:50 PM	1116.24	20
11/30/16 12:16:08 PM	1116.48	179
11/30/16 8:46:24 PM	1116.50	195
12/13/16 2:56:08 PM	1116.54	21
12/13/16 11:26:24 PM	1116.41	25
12/14/16 7:56:41 AM	1116.28	24
12/14/16 4:26:57 PM	1116.23	23

Chart 1 - Byron Weston Pond Level: 2013 - 2016

Pond Water Elevation (NAVD 88)

Date and Time

10/3/13 12:00:00 AM

4/21/14 12:00:00 AM

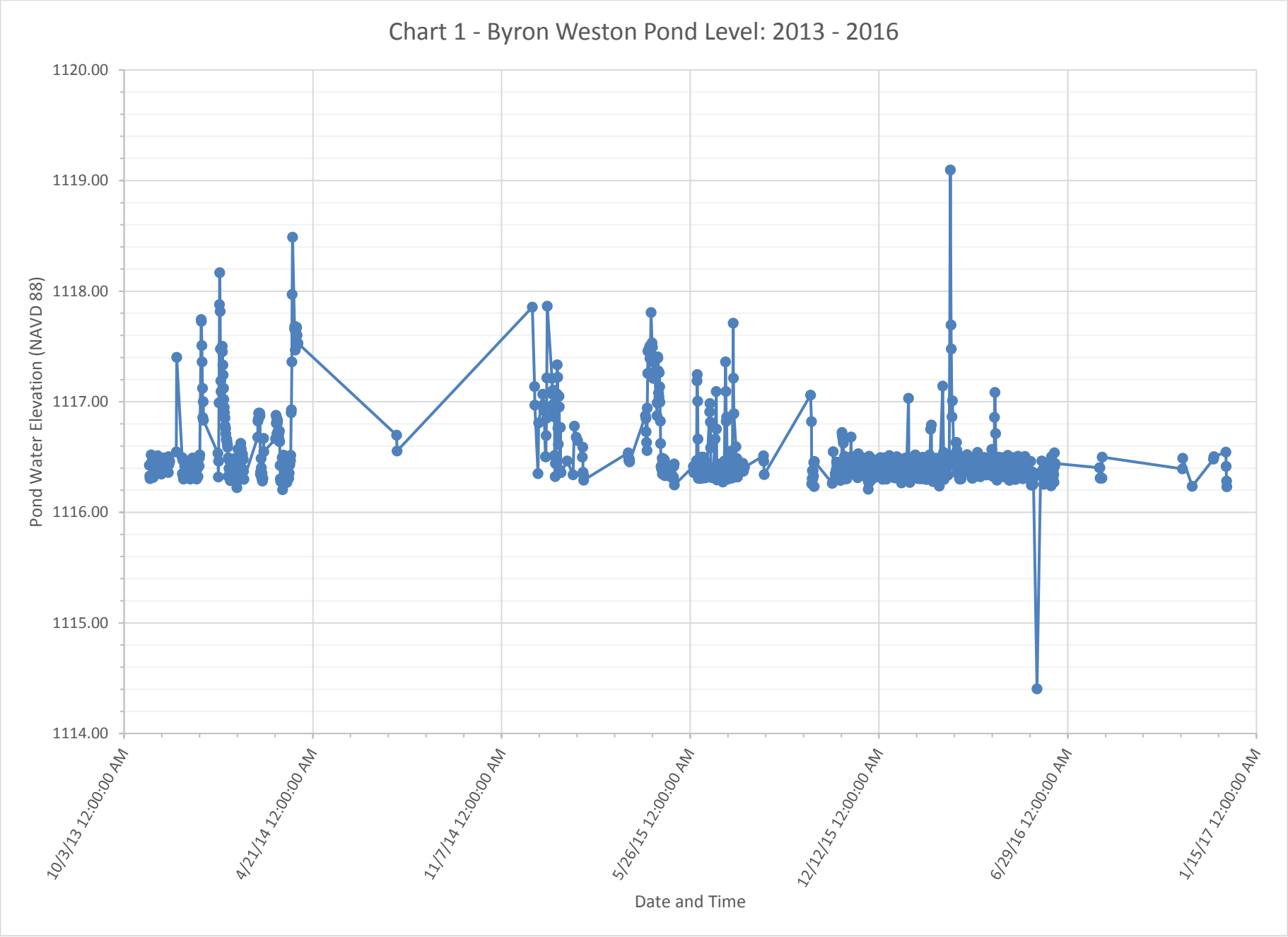
11/7/14 12:00:00 AM

5/26/15 12:00:00 AM

12/12/15 12:00:00 AM

6/29/16 12:00:00 AM

1/15/17 12:00:00 AM





Appendix D – Supplemental Documentation for Water Quality



Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

Western Regional Office • 436 Dwight Street, Springfield MA 01103 • 413-784-1100

DEVAL L. PATRICK
Governor

TIMOTHY P. MURRAY
Lieutenant Governor

RICHARD K. SULLIVAN JR.
Secretary

KENNETH L. KIMMELL
Commissioner

Water Quality Certification
Byron Weston Hydroelectric Project
FERC License No. 13583
BRPWW11

Applicant: Crane & Company

INTRODUCTION

In February 2011, the Crane & Company, (Project Owner), submitted to the Federal Energy Regulatory Commission (FERC) an application for an Exemption from Licensing for the Byron Weston Hydroelectric Project (Project No. 13583), a Minor Project of less than 1.5 MW Capacity located at an existing dam on the East Branch of the Housatonic River in the Housatonic River watershed in Dalton, MA. The Project Owner submitted an application for Water Quality Certification (Certification) to the Massachusetts Department of Environmental Protection (MassDEP) on April 22, 2011. Public notice of the Certification application was made in the Berkshire Eagle on May 18, 2011 according to 314 CMR 9.05(3). All information necessary to issue this Certification, including final terms and conditions from the MA Division of Fisheries and Wildlife, has been submitted to the MassDEP.

PROJECT DESCRIPTION

Crane and Company proposes to reconstruct the Byron Weston No. 2 Hydroelectric Project, which had originally begun operation in the 1880's, when the project was converted from hydromechanical to hydroelectrical generation. Byron Weston Dam No. 2, constructed in 1887, is located adjacent to the Defiance Mill. There is a single 6 foot diameter penstock that branches into two smaller penstocks that conveyed flows to dual turbines. The turbines remain in place but are inoperable. The footings for the generators remain atop the turbines but the generators have been removed. Crane proposes to install a new double regulated Kaplan turbine with an installed capacity of 250 kW operating at flows from 20 cfs to 170 cfs. Water exiting the turbines flow

through an arched discharge portal immediately downstream of the Byron Weston Dam No. 2 thus there is no bypassed reach of river.

The proposed Byron Weston Hydroelectric Project will include: (1) an existing 200 foot long, 23 foot high stone and masonry gravity dam; (2) a 6 foot diameter penstock; (3) a proposed 250 kW turbine/generator, switchgears, and other power generating equipment, located within the Defiance Mill; and (4) appurtenant facilities. The Project will be connected to an interstate grid. It will not occupy any tribal or federal lands.

IMPACTED RESOURCES

The Byron Weston Hydroelectric Project is located within the Housatonic River watershed, Segment MA21-02 on the East Branch of the Housatonic River in Dalton, Massachusetts. 314 CMR 4.06 of the Massachusetts Surface Water Quality Standards (Standards) classifies this segment as a Class B, Warm Water Fishery.

The normal pool surface area for the impoundment is approximately 0.94 acres with a corresponding storage volume of approximately 3.1 acre-feet. Maximum depth of the impoundment is 18.5 feet. This dam is a run-of-river structure approximately 90 feet long and has a hydraulic height of approximately 23 feet. The East Branch of the Housatonic River has a drainage area of about 53.1 square miles at the Byron Weston No. 2 Dam.

The Byron Weston Dam No. 2 is located approximately 700 feet downstream of the Byron Weston Dam No. 1 and 1.1 miles upstream of the Upper Pioneer Pond Dam.

APPLICABLE LAW

The Massachusetts Clean Waters Act (State Act), G.L. c.21, §§ 26-53, delegates responsibility for enhancing the quality and value of water resources within the Commonwealth to MassDEP. The State Act directs MassDEP to take all action necessary or appropriate to secure to the Commonwealth the benefits of the Federal Clean Water Act, 33 U.S.C. §§1251-1387 (Federal Act). The main objectives of the Federal Act are to restore and maintain the chemical, physical and biological integrity of the nation's waters. To meet these objectives, MassDEP adopted the Massachusetts Surface Water Quality Standards, 314 CMR 4.00. The Standards classify each body of water within the Commonwealth; designate the most sensitive uses to be enhanced, maintained and protected for each class; prescribe minimum water quality criteria required to sustain the designated uses; and contain regulations necessary to achieve the designated uses and maintain existing water quality including, where appropriate, the prohibition of discharges into waters of the Commonwealth.

314 CMR 4.06 (5), Figure 2 and Table 2 classify the East Branch of the Housatonic River as a Class B water for its entire length. All Class B waters are designated as habitat for fish, other aquatic life, and wildlife, including for their reproduction, migration, growth and other critical functions, and for primary and secondary contact recreation (314 CMR 4.05(3)(b)). Class B waters shall also be suitable for irrigation and other agricultural uses, and for compatible industrial cooling and process uses. Class B waters must also consistently exhibit good aesthetic

quality (314 CMR 4.05(3)(b)). The minimum criteria applicable to Class B waters are listed within 314 CMR 4.05(3)(b). Additional minimum criteria applicable to all surface waters are listed within 314 CMR 4.05(5). The Antidegradation provisions of 314 CMR 4.04 at a minimum require protection of all existing and designated uses of water bodies, and maintenance of the level of water quality needed to protect those uses.

CERTIFICATION PROVISIONS

1. MassDEP APPROVES the application of Crane Company and CERTIFIES that there is reasonable assurance that the Byron Weston Hydroelectric Project, as described above and subject to the conditions below, can be constructed and operated in compliance with the applicable provisions of §303 of the Federal Act, 33 U.S.C. § 1313.
2. This Water Quality Certification shall become a condition on the FERC License issued to the Project Owner.
3. This Certification shall become effective on the date that the license issued for the Project by FERC becomes effective.
4. The state and federal resource agencies referred to in this Certification include the MassDEP, the Massachusetts Department of Fisheries and Wildlife (MADFW), and the U.S. Department of the Interior, Fish and Wildlife Service (USFWS).
5. The Project shall be operated by the Project Owner in accordance with the conditions contained in this Certification and the information included in the FERC license application. Any modifications made to the FERC application during the licensing process that would have a significant or material effect on the conclusions or conditions contained in this Certification, as determined by MassDEP, must be submitted to MassDEP for prior review and approval.
6. The Project shall be operated to maintain the existing and designated uses of the East Branch of the Housatonic River as outlined in the Standards at 314 CMR 4.00, and to maintain an integrated and diverse biological community within the East Branch of the Housatonic River.
7. The Project Owner shall obtain and comply with all applicable federal, state and local licenses, permits, authorizations, conditions, agreements and orders required for the construction and operation of the project in accordance with the terms of this Certification.
8. All activities shall be conducted in compliance with the Massachusetts Wetlands Protection Act, including the Rivers Protection Act, G.L. Chapter 131, Section 40, and the implementing regulations at 310 CMR 10.00. A Water Quality Certification shall be obtained from MassDEP prior to initiating any activity that will cause a discharge subject to §404 of the federal Act, 33 U.S.C., §1344. The Project Owner shall comply with all applicable provisions of the Public Waterfront Act, G.L. c. 91, and the implementing regulations at 310 CMR 9.00.
9. Prior to beginning any construction on the Project, the Project Owner shall submit a plan to monitor and control erosion during construction activities to keep impacted waters free from turbidity in concentrations that are aesthetically objectionable or would impair any designated use(s) of such waters. The Project Owner shall implement the plan as approved by MassDEP.

10. All construction, maintenance and repair activities, including disposal of debris and removal of sediments in impounded areas, shall be conducted in a manner so as not to impair water quality, and pursuant to and in compliance with any required approvals.

11. MassDEP may request, at any time during which this Certification is in effect, that FERC reopen the license to make modifications MassDEP deems necessary to maintain compliance with the Standards at 314 CMR 4.00, or other appropriate requirements of state law.

12. MassDEP reserves the right to add and alter the terms and conditions of this Certification when authorized by law, and as it deems appropriate to carry out its responsibilities during the life of the Project with respect to water quality and the protection of the existing and designated uses of the waters of the Commonwealth.

13. The Project Owner shall operate the project in a run-of-river mode such that inflow to the project equals outflow from the project on an instantaneous basis and fluctuations of the head pond water level are minimized. This operating regime may be temporarily modified by approved maintenance activities, agreement between the Project Owner and appropriate state and/or federal resource agencies, or by extreme hydrologic conditions or emergency electrical system conditions, as these terms are defined below.

14. "Extreme Hydrologic Conditions" signifies the occurrence of events beyond the Project Owner's control including without limitation, abnormal precipitation, extreme runoff, flood conditions, ice conditions or other hydrologic conditions which render the operational restrictions and requirements contained within this Certification impossible to achieve, or are inconsistent with the safe operation of the Project.

15. "Emergency Electrical System Conditions" signifies operating emergencies beyond the Project Owner's control which require changes in flow regimes to eliminate such emergencies including without limitation, equipment failure or other abnormal temporary operating condition, generating unit operation or third-party mandated interruptions under power supply emergencies, and orders from local, state or federal law enforcement or public safety authorities.

16. The Project Owner shall implement a refill procedure whereby, during impoundment refilling after drawdowns for maintenance or emergency purposes, 90% of inflow is passed downstream and the headpond is refilled on the remaining 10% of inflow to the Project. The refill procedure may be modified on a case-by-case basis with the prior approval of both the USFWS and the MADFW.

17. The Project Owner, within three months of the date of issuance of an exemption from licensing, prepare and file for approval with the MADFW and USFWS, a plan for maintaining and monitoring run-of-river operation at the Project. The plan shall include a description of the mechanisms and structures that will be used, the level of manual and automatic operation, the methods to be used for recording data on run-of-river operation, an implementation schedule, and a plan for maintaining the data for inspection by the USFWS, MassDEP, the FERC, and MADFW.

18. The Project Owner shall conduct a post-operation water quality monitoring survey. The survey protocol shall be identical to the pre-operation survey, and shall be developed in consultation with, and require approval by the MassDEP and the USFWS. The study shall be initiated the first low-flow season after Project start-up. Results of the post-operation survey shall be compared to the pre-operation data. If results indicate that, in the opinion of the MADFW, USFWS and MassDEP, the Project is not causing depletion of dissolved oxygen no further study will be required. If results indicate that, in the opinion of the MADFW, USFWS and MassDEP, the Project is causing depletion of dissolved oxygen further study will be required and mitigation measures may be required (e.g. releasing flow over dam for aeration) as determined by the MADFW, USFWS and MassDEP.

19. The Project Owner shall install trashracks that meet the following criteria: (1) have an approach velocity ≤ 2.0 fps (as measured six inches in front of the racks); (2) have clear spacing of one inch or less; and (3) extend full depth. The trashracks shall be installed and operational concurrent with Project start-up. The racks shall be required to be kept free of debris and maintained to design specifications.

20. The Project Owner shall be responsible for constructing, operating, maintaining and evaluating upstream and downstream fish passage facilities at this Project when notified by the USFWS and/or the MADFW that such fishways are needed. All plans and schedules associated with the design, construction, operation, maintenance and evaluation of any prescribed fishways shall be developed by the Project Owner in consultation with, and require approval by, the MADFW and the USFWS.

21. The Project Owner shall notify the MADFW and the USFWS in writing when the Project commences operation. Such notice shall be sent within 30 days of start-up. The Project Owner shall furnish the MADFW and USFWS with a set of as-built drawings concurrent with filing said plans with the FERC.

22. The Project Owner shall allow any employee, agent, consultant, contractor or authorized representative of MassDEP, MADFW or USFWS to enter the facilities in order to assess compliance with the terms and conditions of this Certification including, but not limited to, entry for the purposes of: (i) investigating, sampling, inspecting, or photocopying documents or other writings, conditions, equipment, practices or property; (ii) interviewing facility personnel and contractors; (iii) making records of field activities; and (iv) observing any activities undertaken at the facilities under any of the provisions of this Certification.

23. If any event occurs which delays or will delay the Project Owner's performance of work beyond a deadline established by or pursuant to this Certification, which event was beyond the reasonable control and without the fault of the Project Owner or any person or entity subject to the Project Owner's control, and which event could not have been prevented or avoided by the exercise of due care, foresight, or due diligence on the part of the Project Owner (a "force majeure event"), then the time for performance shall be extended for an appropriate period of time, as determined by MassDEP in its sole discretion. The Project Owner shall bear the burden of demonstrating that a force majeure event has occurred or will occur, and that the delay was

beyond the reasonable control and without the fault of the Project Owner. Such an extension of time must be in writing to have effect.

24. Submissions under this Certification shall be sent to:

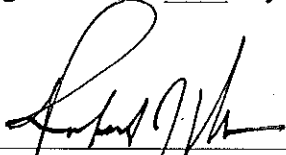
MassDEP: Massachusetts Department of Environmental Protection
Division of Watershed Management
Central Regional Office
627 Main Street
Worcester, MA 01608
(508) 767-2854; FAX (508) 791-4131

Massachusetts Department of Environmental Protection
Bureau of Resource Protection
Western Regional Office
436 Dwight Street
Springfield, MA 01103
(413) 755-2138; FAX (413) 784-1149

MADFW: Massachusetts Division of Fisheries and Wildlife
Field Headquarters
Assistant Director of Fisheries
1 Rabbit Hill Road
Westborough, MA 01581
(508) 389-6331; FAX (508) 389-7890

USFWS: United States Fish and Wildlife Service
New England Field Office
Attention: Supervisor
70 Commercial Street, Suite 300
Concord, NH 03301-5087
(603) 223-2541; FAX (603) 223-0104

Signed on this 23 day of September, 2011.



Robert J. McCollum, Program Chief
Wetlands and Waterways
MassDEP Western Regional Office

TABLE 5: POST CONSTRUCTION WATER QUALITY STUDY RESULTS SUMMARY

File No. 19349.81

Page 1 of 1

12/28/2016

Byron Weston Hydroelectric Project
Dalton, Massachusetts

Sensor ID: Study Parameter	Sensor 1			Sensor 2 ³			Sensor 3			Sensor 4			Class B Water Quality Benchmarks ⁵
	Minimum	Maximum	Arithmetic Mean	Minimum	Maximum	Arithmetic Mean	Minimum	Maximum	Arithmetic Mean	Minimum	Maximum	Arithmetic Mean	
Flow Rate (CFS avg) ^a	14.7	284	48.7	15.5	43.6	25.5	14.7	284	48.7	14.7	284	52.5	NA
Water Temp (Deg F) ^b	41.0	72.4	55.3	59.4	71.9	66.5	40.3	71.0	54.4	41.0	68.3	53.5	≤83 Deg F
Water Barometric Pressure (in Hg) ^b	27.2	28.8	27.9	27.6	28.4	28.0	27.1	29.0	28.0	26.6	29.3	27.7	NA
DO (% Saturation) ^b	69.8	107	99.8	89.9	106	97.7	94.4	111	104	97.4	111	104	NA
DO (mg/L) ^c	8.40	13.2	10.6	8.10	9.90	9.00	9.10	14.1	11.3	11.0	14.1	11.4	≥5.0 mg/L
Precipitation (Inches) ^d	0.000	1.17	0.093	0.000	0.680	0.148	0.000	1.17	0.093	0.000	1.17	0.098	NA
Max Daily Air Temp (Deg F) ^d	41.0	92.0	67.3	67.0	92.0	82.8	41.0	92.0	67.3	41.0	85.0	65.0	NA
Min Daily Air Temp (Deg F) ^d	17.0	63.0	41.0	47.0	62.0	54.7	17.0	63.0	41.0	17.0	63.0	39.1	NA

Notes:

- Calculations are derived from the Crane & Company Byron Weston Dam #2 Post Construction Water Quality Study Data for FERC License Exemption Project 13583. The study was carried out at Low Flow High Temperature conditions from 9/4/2015 through 11/5/2015 using four in-situ water quality measuring instruments (In-Situ Roll 9500) set to automatically record every 15 minutes.
- The four sensors were positioned across the site as follows:
 - Sensor 1: Deployed at Toe of Dam #1 in Upstream of Impoundment for Dam #2
 - Sensor 2: Deployed at Deep Location in Impoundment for Dam #2
 - Sensor 3: Deployed at Toe of Dam #2 in Tailrace of Hydro
 - Sensor 4: Deployed Downstream of Dam #1
- Sensor 2 malfunctioned on 9/15/2015, so data for this sensor is limited to the 9/4/2015 through 9/15/2015 portion of the study.
- Data is from the following sources:
 - a All Water Sensors
 - b USGS Flow Data from station 1197000. East Branch Housatonic
 - c Converted from water sensor readings
 - d Weather information from station GHCND:USC00194131 in LENOX DALE, MA.
- Water Quality Benchmarks are from 314 CMR 4 as presented for Class B, Warm Water Fisheries at: <http://www.mass.gov/eea/docs/dep/service/regulations/314cmr04.pdf>
- CFS = Cubic feet per second; DO = Dissolved oxygen; NA = Not applicable/Not available

Massachusetts Category 5 Waters "Waters requiring a TMDL"

NAME	SEGMENT ID	DESCRIPTION	SIZE	UNITS	IMPAIRMENT CAUSE	EPA TMDL NO.
French River	MA42-03	Headwaters, outlet Greenville Pond, Leicester to the outlet of Thayer Pond, Oxford (excluding approximately 0.6 miles through Rochdale Pond segment MA42048) (through former pond segments Texas Pond MA42058 and Thayers Pond MA42059).	3.8	MILES	Aquatic Plants (Macrophytes)	2357
					Mercury in Fish Tissue	
					Phosphorus (Total)	
					Turbidity	
French River	MA42-04	From dam just upstream of Clara Barton Road, Oxford, to dam at North Village, Webster/Dudley.	9.6	MILES	Mercury in Fish Tissue	
French River	MA42-05	Dam at North Village, Webster/Dudley to Webster WWTP outfall, Webster/Dudley.	2.4	MILES	(Debris/Floatables/Trash*)	
					(Other flow regime alterations*)	
					Aquatic Macroinvertebrate Bioassessments	
					Fecal Coliform	
French River	MA42-06	Webster WWTP outfall, Webster/Dudley to state line, Dudley, MA/Thompson,CT.	1	MILES	(Debris/Floatables/Trash*)	
					Aquatic Macroinvertebrate Bioassessments	
					Fecal Coliform	
					Other	
					Sediment Screening Value (Exceedence)	
					Taste and Odor	
Grindstone Brook	MA42-18	Headwaters outlet Henshaw Pond, Leicester to inlet Rochdale Pond, Leicester.	2.3	MILES	Escherichia coli	
Little River	MA42-13	Headwaters, outlet Pikes Pond, Charlton to inlet Buffumville Lake, Charlton (formerly part of segment MA42-09).	3.5	MILES	Aquatic Macroinvertebrate Bioassessments	
					Oxygen, Dissolved	
Sucker Brook	MA42-15	Headwaters, outlet Nipmuck Pond, Webster to inlet Club Pond, Webster	1.7	MILES	Aquatic Macroinvertebrate Bioassessments	
					Escherichia coli	
Housatonic						
East Branch Housatonic River	MA21-01	Outlet of Muddy Pond, Washington to the outlet of Center Pond, Dalton.	11.251	MILES	Fecal Coliform	
					PCB in Fish Tissue	
East Branch Housatonic River	MA21-02	Outlet of Center Pond, Dalton to confluence with the Housatonic River, Pittsfield.	8.019	MILES	Fecal Coliform	
					PCB in Fish Tissue	
Goodrich Pond	MA21042	Pittsfield	15.355	ACRES	PCB in Fish Tissue	
Housatonic River	MA21-04	Confluence of Southwest Branch Housatonic River and West Branch Housatonic River, Pittsfield to outlet of Woods Pond, Lee/Lenox (pond was formerly segment MA21120).	12.322	MILES	(Non-Native Aquatic Plants*)	
					Fecal Coliform	
					PCB in Fish Tissue	
					Polychlorinated biphenyls	

EAST BRANCH HOUSATONIC RIVER (SEGMENT MA21-02)

Location: Outlet of Center Pond, Dalton, to confluence with the Housatonic River, Pittsfield.

Segment Length: 8.0 miles.

Classification: Class B, Warm Water Fishery.

Based on the last evaluation of water quality conditions, this segment is listed in Category 5 of the 2004 Integrated List of Waters. This segment was assessed as impaired and requires TMDLs for unknown causes, unknown toxicity, priority organics, and pathogens (MassDEP 2005a).

WMA WATER WITHDRAWALS (APPENDIX J)

Crane & Co., Inc (10207002)

Pittsfield Generating Company (Altresco Pittsfield L.P) (9P10223601)

Berkshire Hills Country Club (10223602)

NPDES SURFACE WATER DISCHARGES (APPENDIX J)

Crane & Co., Inc. Byron Weston Mill (MAG250956)

Crane & Co., Inc. Pioneer Mill (MAG250955)

Crane & Co., Inc (MA0000671)

Pittsfield Development Authority (MA0040231) was General Electric Company (GE), Pittsfield (MA0003891) until June 2005

General Dynamics Defense Systems (MA0035718)

OTHER

General Electric Company, Pittsfield (<http://www.epa.gov/region01/ge/>).

It is important to note that the upper ½ mile and 1½ mile sections of the GE/EPA PCB Housatonic River cleanup project are located along the lower 2 miles of this segment. See EPA website above for more details. The upper ½ mile reach cleanup was completed in September 2002. Cleanup of the 1½ mile reach is ongoing.

USE ASSESSMENT AQUATIC LIFE USE

Habitat and Flow

Crane & Co. maintains five dams for their mill along this segment of the East Branch Housatonic River.

Crane & Co. made repairs to the Center Pond dam in October 2006. Center Pond has been dewatered in order to carry out repair work (Noel 2006). Byron Weston Dam #2 was temporarily by-passed while repair work was carried out, but it is now back to normal level. The Old Berkshire Mill Dam (formerly dam #3) breach was completed in November 2000. The process of removing the dam began in 1999 as a collaboration between Crane & Company and the Department of Fish and Game's Riverways Program. The dam, an historic timber-crib structure and concrete dam, had stood on the East Branch Housatonic River for 200 years (Riverways 2000). Crane & Co. also owns and operates three additional dams that are located along this segment downstream from the Old Berkshire Mill Dam. From upstream to downstream the dams are: Pioneer Mill Dam, Baystate Mill Dam, and Government Mill Dam. There are no fish passage facilities at these three dams.

DWM also performed a habitat assessment on the East Branch Housatonic River at Station EB02A (B0502) on 10 Sept. 2002 (Appendix C). The sampling reach, described below, received an overall score of 156 out of 200 due to a lack of in-stream fish cover, channel alteration, riparian vegetative zone width. Aquatic macrophytes (mosses) were present in 20% of the reach. Green filamentous and mat algae covered 50% of the rock substrates (Appendix G). The dominant algal genera were *Vaucheria* sp. and *Melosira* sp.

The United State Geological Survey (USGS) maintains one streamflow monitoring gage on this segment of the East Branch Housatonic River. USGS Gage #01197000 on the East Branch Housatonic River at Coltsville, MA, is located on the right bank 250 ft downstream from Hubbard Avenue Bridge in Pittsfield. Data are available from 1936 to the present (prior to 1945 data were published as the Housatonic River at Coltsville). The drainage area at the gage is 57.6 mi² and the average annual discharge over the period of record is 107 cfs. According to USGS flows are regulated by power plants upstream and, since 1949, for

the diversion of water upstream from Cleveland Brook Reservoir for the municipal supply of Pittsfield (Socolow *et al.* 2004). The estimated 7-day, 10-year low flow (7Q10) is 12.1 cfs (USGS 1998).

Biology

DWM also conducted benthic macroinvertebrate sampling on the East Branch Housatonic River at Station EB02A upstream from the Hubbard Avenue Bridge in Pittsfield, MA, on 10 Sept. 2002 (Appendix C). RBP III analysis of the benthos at Station EB02A indicated a non-impacted community when compared to the upstream reference station. However, DWM biologists point out that biotic index, EPT/Chironomidae Ratio, and Scraper/Filterer Ratio all indicated nutrient loading at this station.

DWM conducted fish population sampling upstream from the Hubbard Avenue Bridge in Pittsfield at Station 680 on 20 August 2002 (Appendix F). A total of 64 fish were collected including: 21 longnose dace, 20 rock bass, six fallfish, five creek chub, three white sucker, three brown trout (196-425mm), two pumpkinseed, two common shiner, and two blacknose dace. The assemblage in this reach was dominated by moderately pollution tolerant fluvial specialist/dependent species.

Toxicity

Ambient

The Crane and Company WWTF staff collected water from this segment of the East Branch Housatonic River approximately 1,350 feet upstream of the WWTF Outfall # 001 at the trestle next to the Bay State Mill where a pipeline enters the WWTF (Noel 2005). This collected river water is used as dilution water in the facility's whole effluent toxicity tests. Between May 1999 and January 2006 (n=25), survival of *C. dubia* exposed (7-day) to the river water ranged from 80 to 100% (TOXTD database).

Effluent

A total of 20 modified acute and chronic whole effluent toxicity tests were conducted on the Crane and Company effluent between May 1999 and January 2006 (n=27) using *C. dubia*. The effluent did not exhibit any acute toxicity (LC₅₀s were all >100% effluent). The C-NOEC results for the 26 valid tests ranged from 25 to 100% effluent with only two tests (May 1999 and July 2004) failing to meet the C-NOEC limit of 63% effluent (TOXTD database).

The effluent toxicity tests from GE Company in Pittsfield are conducted on composite samples (flow weighted) from various outfalls (Appendix J) that actually discharge into three different water bodies (Unkamet Brook, Silver Lake, and the East Branch Housatonic River). Since these tests represent combined outfalls they are not summarized here.

Chemistry-water

DWM sampled the water quality of the East Branch Housatonic River at two stations in 2002. Station 02A was located upstream from the Hubbard Ave. Bridge in Pittsfield and Station 02B was located ~600 feet downstream from Pomeroy Avenue in Pittsfield. *In-situ* sampling was conducted to measure dissolved oxygen, temperature, pH, and conductivity during pre-dawn hours. Grab samples were collected from Station 02A only and analyzed for total suspended solids, nitrate-nitrogen, ammonia-nitrogen, and total phosphorus (low-level).

HVA conducted monthly water quality sampling downstream from Hubbard Avenue in Pittsfield between June and October 2002; April and October 2003; and May and October 2004 (HVA 2002b, 2003c, and 2004b). HVA also sampled this site in 2001, but data from 2001 are not summarized below, since their QAPP was not approved until 2002. Parameters measured included dissolved oxygen, pH, temperature, alkalinity, total phosphorus, and total suspended solids. Dissolved oxygen data were not collected during worst-case, pre-dawn conditions.

USGS also collected discrete water samples at their gage on the East Branch Housatonic on 21 August 2003 near Hubbard Avenue (USGS 2006a).

All water quality data collected by DWM, HVA, and USGS in the river near Hubbard Avenue met criteria except for elevated levels of total phosphorous. The two total phosphorous measurements taken by DWM in 2002 were 0.1 and 0.2 mg/L. The 17 total phosphorus measurements recorded by HVA between 2002 and 2004 ranged from <0.01 to 0.574 and 3 measurements exceeded 0.05 mg/L. USGS reported

0.026 mg/L (USGS 2006a). All *in-situ* measurements taken by DWM in the river near Pomeroy Avenue met standards.

The *Aquatic Life Use* is assessed as support for the upper six mile reach of this segment of the East Branch Housatonic River based primarily on the non-impacted benthic community, the good survival of test organisms exposed to the river water, and the generally good water quality conditions. However, this use is identified with an Alert Status downstream from the Crane and Company WWTP discharge because of elevated phosphorous concentrations and some evidence of nutrient enrichment in the benthic community attributes. The *Aquatic Life Use* will not be assessed for the lower two mile reach (downstream from GE site) until water quality monitoring is conducted post remediation of the PCB contaminated sediments.

FISH CONSUMPTION

In 1982 the Massachusetts Department of Public Health (MA DPH) issued a fish consumption advisory for the Housatonic River because of PCB contamination associated with the General Electric site. The MA DPH advisory recommends: "*The general public should not consume any fish, frogs, or turtles from Housatonic River in the towns of Dalton, Pittsfield, Lenox, Lee, Stockbridge, Great Barrington, and Sheffield*". Since it is the East Branch Housatonic River that flows through Dalton and past the GE plant in Pittsfield, the MA DPH advisory for the Housatonic River is assumed to cover this area of the East Branch of the Housatonic River. In 1995 MA DPH updated their advisory to include a recommendation that fish taken from feeder streams to the Housatonic River should be trimmed of fatty tissue prior to cooking.

Due to the MA DPH site-specific fish consumption advisory issued in 1982 (see previous segment), the *Fish Consumption Use* is assessed as impaired due to PCBs.

PRIMARY CONTACT RECREATION, SECONDARY CONTACT RECREATION AND AESTHETICS

HVA collected monthly bacteria samples at their Hubbard Avenue water quality station in 2002, 2003, and 2004 (HVA 2002b, 2003c, and 2004b).

DWM collected fecal coliform bacteria and *E. coli* samples from the East Branch Housatonic River approximately 600 feet downstream from Pomeroy Avenue in Pittsfield (Station 02B) between May and September 2002 (Appendix B).

Fecal coliform counts from sampling conducted by DWM and HVA ranged from 20 to 1400 cfu/100mL (n=25). Bacteria counts collected at DWM Station 02B (the farthest downstream) had a geometric mean of 234 cfu/100mL. Elevated bacteria, particularly during wet-weather sampling events, were documented by HVA in 2002 and 2003.






In 1999 HVA volunteers conducted a shoreline survey of the East Branch Housatonic River between the Center Pond Dam and the Government Mill Dam in Pittsfield. Improper disposal of pet waste into the storm drains was reported near Depot Street in Dalton (HVA initiated a Storm Drain Awareness Program in 2001). Isolated areas of trash were noted. However, after the removal of the Berkshire Mill Dam in 2001, HVA conducted a river cleanup and removed the trash. Numerous pipes were noted and their locations have been mapped and entered into HVA's Geographic Information System for future action. It is important to note that HVA and Berkshire Regional Planning Commission are working on several projects to measure the impact of storm drains on the East Branch Housatonic River (HVA 2004a). Overall this segment was generally free from odor, oil and grease, color and turbidity, floating matter, and nuisance organisms.

DWM biologists noted the water at Station EB02A was "rust" colored and had a paper effluent odor (Mitchell 2005). DWM biologists also noted slight turbidity to the water but no oils or objectionable deposits (MassDEP 2002b). DWM personnel also made visual observations at this station during water quality surveys. At Station 02A trash was noted on two occasions (5/21/02 and 7/21/02) while on eight other occasions no objectionable deposits were noted (MassDEP 2002a). On 21 May 2002 no indication of the extent of deposits was noted, but on 21 July 2002 it was noted that the trash/garbage was "light, (a) few bottles". With the exception of 24 September 2002 when white foam was noted, no scums were noted. A musky water odor and a "rotting vegetable" water odor were noted on two different occasions,

respectively. All other occasions no odor was noted. Water clarity was noted as clear on four occasions, slightly turbid on four other occasions and murky once. At Station 02B no objectionable deposits or scums were noted. A musky water odor was noted on one occasion, a septic water odor was noted twice, and sewage water odor was noted once. On the remaining six occasions no water odor was noted but of these occasions a sewer smell in the air was noted three times. Water clarity was generally noted as clear, and on only a few occasions it was rated as slightly turbid.

Similar to the upper East Branch Housatonic River segment, the *Primary Contact Recreational Use* is assessed as impaired because of elevated fecal coliform bacteria counts, noted particularly during wet weather. The *Secondary Contact* and *Aesthetics* uses are assessed as support based upon the acceptable bacteria counts and the generally acceptable aesthetic conditions noted by HVA volunteers and DWM personnel. However, these uses are identified with an Alert Status due to occasional septic/sewage odors and issues with turbidity.

EAST BRANCH HOUSATONIC RIVER (Segment MA21-02) Use Summary

Designated Uses		Status
Aquatic Life		SUPPORT* upper 6 miles NOT ASSESSED lower 2 miles
Fish Consumption		IMPAIRED Cause: PCBs Source: inappropriate waste disposal from General Electric Site
Primary Contact		IMPAIRED Cause: elevated fecal coliform bacteria Source: unknown Suspected sources: stormwater runoff
Secondary Contact		SUPPORT*
Aesthetics		SUPPORT*

*Alert status issues identified, see details in use assessment

RECOMMENDATIONS

Continued monitoring of the aquatic conditions (both chemical and biological) is recommended to monitor the status of the resident biotic communities.

Develop a monitoring plan and conduct bacteria sampling to evaluate effectiveness of point (Phase II stormwater permits) and non-point source pollution control activities in Dalton and Pittsfield and to assess the status of the *Primary* and *Secondary Contact Recreational* uses. Conduct bacteria source tracking as needed to identify undocumented sources.

It is currently being investigated by EPA as part of their Ecological Risk Assessment whether or not the biota in the East Branch Housatonic River upstream from the Crane & Co., Inc. dams (which pose a barrier to fish migration) are contaminated by PCBs. The MA DPH should review the results of this investigation and adjust the fish consumption advisory as needed.

138 FERC ¶ 62,190
UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Crane and Company

Project No. 13583-001

ORDER GRANTING EXEMPTION FROM LICENSING
(5 MW OR LESS)

(February 29, 2012)

1. On March 9, 2011, as supplemented on June 22, 2011, and August 17, 2011, Crane and Company (Crane or exemptee) filed an application to exempt its proposed 250-kilowatt (kW) Byron Weston Hydroelectric Project (Byron Weston Project or project) from the requirements of Part I of the Federal Power Act (FPA).¹ The project would be located on the East Branch of the Housatonic River in the Town of Dalton, Berkshire County, Massachusetts.² The project would not use or occupy any federal facilities or land. As discussed below, I am issuing an exemption from licensing for the project.

BACKGROUND

2. On March 18, 2011, the Commission issued public notice of the application tendered for filing and soliciting additional study requests, establishing May 9, 2011, as

¹ The Commission is authorized to exempt from the licensing requirements of Part I of the FPA small hydroelectric projects with an installed capacity of 5 megawatts or less that use for the generation of electricity either an existing dam (*i.e.*, one in existence on or before July 22, 2005) or a "natural water feature" without the need for any dam or impoundment. *See* sections 405 and 408 of the Public Utility Regulatory Policies Act of 1978, 16 U.S.C. §§ 2705 and 2708 (2006).

² The Byron Weston Project is located on the East Branch of the Housatonic River, a headwater of the Housatonic River, a navigable water of the United States. *Connecticut Light and Power v. FPC*, 557 F.2d 348 (2nd Cir. 1977). Because the project would have post-1935 construction, be located on a commerce clause waterway, and affect interstate commerce through its selling of power through an interstate grid, it is required to be licensed (or exempted from licensing) by the Commission pursuant to FPA section 23(b)(1), 16 U.S.C. § 817(1) (2006). *See* 126 FERC ¶ 62,248 (2009) (order requiring the Byron Weston Project to be licensed or exempted from licensing).

the deadline for filing study requests.³ On May 5, 2011, the National Park Service (NPS) requested that Crane provide additional information regarding the proposed project's impact on views from the Appalachian National Scenic Trail. On May 11, 2011, the Massachusetts Division of Fisheries and Wildlife (Massachusetts DFW) filed comments and revised preliminary terms and conditions.⁴ On May 12, 2011, the U.S. Department of the Interior (Interior) filed comments and preliminary terms and conditions.

3. On May 18, 2011, Crane filed information with the Commission in response to NPS' request for additional information regarding the proposed project's impact on views from the Appalachian National Scenic Trail.

4. On September 1, 2011, the Commission issued a notice accepting the application and indicating that the application was ready for environmental analysis. The notice established October 3, 2011, as the deadline to file motions to intervene, comments, recommendations, and terms and conditions.⁵ On September 2, 2011, Massachusetts DFW filed comments and final terms and conditions on the proposed project. On September 29, 2011, Interior filed comments and final terms and conditions. No other comments or motions to intervene were filed in response to the notice.

5. An Environmental Assessment (EA) was prepared by Commission staff and is being issued concurrently with this order. The EA contains background information, analysis of impacts, and support for the requirements of this exemption from licensing. Based on the record of the proceeding, including the EA, granting an exemption from licensing for the Byron Weston Project would not constitute a major federal action significantly affecting the quality of the human environment.

6. The comments and terms and conditions have been fully considered in determining whether, and under what conditions, to issue this exemption.

³ 76 *Fed. Reg.* 16,764 (March 25, 2011).

⁴ On April 4, 2011, the Massachusetts DFW filed comments and preliminary terms and conditions on the proposed project. On May 11, 2011, it filed revised preliminary terms and conditions, modifying the term of the post-operation water quality monitoring study from three years to one year.

⁵ Because the notice period deadline fell on a weekend, Saturday, October 1, 2011, the public notice deadline period did not end until the close of the next Commission business day, Monday, October 3, 2011. 18 C.F.R. 385.2007(a)(2) (2011). 76 *Fed. Reg.* 55,893 (September 9, 2011).

PROJECT DESCRIPTION

7. The Byron Weston Project will use the water power potential of the existing 30-foot-high, 90-foot-long, stone-masonry Byron Weston Dam No. 2 equipped with a 23-foot-high, 75-foot-long spillway.⁶ The dam creates a 0.94-acre impoundment with a normal water surface elevation of 1,116.7 feet North Atlantic Vertical Datum (NAVD 1988).

8. In addition to the dam and impoundment, the project will include an existing intake structure equipped with existing trashracks⁷ and an existing headgate. The water will pass through the headgate to an existing 6.5-foot-long, 6-foot-diameter penstock connected to an existing 50-foot-long, 9.5-foot-wide headrace canal. The headrace canal will convey flow to a new 15-foot-long, 4.4-foot-diameter penstock leading to a new 250-kilowatt turbine-generating unit within the existing Byron Weston Defiance Mill building. Water will then be discharged into the East Branch of the Housatonic River through a new draft tube within the existing tailrace approximately 35 feet downstream of the dam.⁸ Project power will be transmitted through a new 100-foot-long, 600-volt transmission line within the Byron Weston Defiance Mill building that will be connected to the mill's existing electrical distribution system.⁹

9. The proposed project boundary encloses all of the project facilities described above.

10. Crane proposes to operate the project in a run-of-river mode, where outflow from the project will equal inflow, and water levels in the impoundment will not be drawn

⁶ The Byron Weston Dam No. 2 was retrofitted with a hydroelectric generator to produce energy in the early 1900s, and electric generation continued at the dam site until sometime after 1942.

⁷ The existing trashracks extend full-depth and have 1-inch clear bar spacing.

⁸ Crane proposes to remove components from the Byron Weston Defiance Mill building that were previously used for hydroelectric generation at the site, including sections of the penstock and the two McCormick Hercules wheel turbines. Structural modifications will also be made within the existing footprint of the Byron Weston Defiance Mill building to accommodate the new turbine-generating unit.

⁹ The electricity generated by the project will be used within Crane's mill complex, which includes the Byron Weston Defiance Mill building as well as other facilities. The mill complex serves as the headquarters and principal paper-manufacturing location for Crane.

down for electric generation. Flow to the turbine will be automatically managed by a controller connected to the turbine wicket gates and a water level sensor located in the impoundment. When the sensor detects a decrease in the impoundment level, the wicket gates will close to reduce flow to the turbine and stabilize the impoundment level. When the sensor detects an increase in the impoundment level, the wicket gates will open to increase flow to the turbine. At flows less than 20 cubic feet per second (cfs) (the minimum hydraulic capacity of the turbine), the project will not operate and all flow will pass over the spillway. At flows between 20 and 170 cfs (the maximum hydraulic capacity of the turbine), the project will operate and no flow will pass over the spillway. At flows greater than 170 cfs, the project will generate at its maximum capacity and all excess flow will pass over the spillway. The project will bypass approximately 35 feet of the East Branch; however, discharge from the tailrace will backwater up to the base of the dam and maintain a wetted channel in the bypassed reach. No minimum flow release to the bypassed reach is proposed. Crane estimates that the annual generation of the project will be 938 megawatt-hours.

WATER QUALITY CERTIFICATION

11. On September 23, 2011, the Massachusetts Department of Environmental Protection (Massachusetts DEP) issued a water quality certification for the Byron Weston Project (see Appendix C). The certification contains 24 conditions.

FPA SECTION 30(c) CONDITIONS

12. Pursuant to section 405 of Public Utility Regulatory Policies Act (PURPA),¹⁰ 5-MW exemptions are subject to the requirements of section 30(c) of the FPA,¹¹ which provides, among other things, that the Commission “shall include in any such exemption . . . such terms and conditions as the Fish and Wildlife Service, National Marine Fisheries Service, and the State [fish and wildlife] agency each determine are appropriate to prevent loss of, or damage to, such resources . . .” Article 2 of all exemptions requires compliance with the terms and conditions filed by federal and state fish and wildlife agencies to protect fish and wildlife resources.¹²

13. On September 2, 2011, Massachusetts DFW submitted 10 section 30(c) conditions, and on September 29, 2011, Interior submitted 10 nearly identical section 30(c) conditions. Massachusetts DFW’s and Interior’s conditions require the exemptee

¹⁰ 16 U.S.C. § 2705(b) (2006).

¹¹ 16 U.S.C. § 823a(c) (2006).

¹² See 18 C.F.R. § 4.106 (2011).

to: (1) operate the project in an instantaneous run-of-river mode; (2) use full-depth trashracks with an approach velocity of 2.0 feet-per-second (fps) or less and with clear bar spacing of 1 inch or less;¹³ (3) conduct a post-operation water quality monitoring survey to ensure that the project does not deplete dissolved oxygen in the East Branch of the Housatonic River;¹⁴ (4) develop a plan for monitoring and maintaining run-of-river operation; (5) pass 90 percent of inflow downstream during refilling of the impoundment after maintenance or emergency drawdowns; (6) construct, operate, maintain, and evaluate upstream and downstream fish passage facilities when notified by the agencies that such facilities are necessary; (7) notify the agencies when the project commences operation and provide as-built drawings; (8) allow the agencies to inspect the project area at any time while the project operates; (9) file with the Commission any additional conditions imposed by the agencies; and (10) incorporate in any conveyance (by lease or sale) of the project, the terms and conditions of the exemption.

14. The section 30(c) conditions will protect water quality, fisheries, and aquatic habitat in the impoundment and in the East Branch of the Housatonic River downstream of the project.¹⁵

15. As discussed below, all of the section 30(c) conditions are set forth in Appendices A and B of this order.

THREATENED AND ENDANGERED SPECIES

16. Section 7 of the Endangered Species Act¹⁶ requires federal agencies to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or result in the destruction or adverse modification of the critical habitat of such species. In a letter dated January 3, 2011, included in the exemption application, the U.S. Fish and Wildlife Service stated that no federally listed or proposed,

¹³ Crane will use the existing trashracks with a measured approach velocity of 1.1 fps. EA at 17.

¹⁴ Massachusetts DFW's 30(c) condition 3 states that if results indicate that the project is causing depletion of dissolved oxygen, further study will be required. Interior's 30(c) condition 3 states that if environmental and/or operating conditions during the first year of post-operation monitoring are not representative, or if the data collected indicate that the project is causing depletion of DO, the survey should be repeated the following year.

¹⁵ EA at vi.

¹⁶ 16 U.S.C. § 1536(a) (2006).

threatened or endangered species or critical habitat are known to occur in the project area. Thus, issuing an exemption from licensing for the project will not affect federally listed threatened or endangered species. Therefore, no further action under the Endangered Species Act is required.¹⁷

NATIONAL HISTORIC PRESERVATION ACT

17. Under section 106 of the National Historic Preservation Act (NHPA)¹⁸ and its implementing regulations,¹⁹ federal agencies must take into account the effect of any proposed undertaking on properties listed or eligible for listing in the National Register (defined as historic properties) and afford the Advisory Council on Historic Preservation a reasonable opportunity to comment on the undertaking. This generally requires the Commission to consult with the State Historic Preservation Office (SHPO) to determine whether and how a proposed action may affect historic properties, and to seek ways to avoid or minimize any adverse effects.

18. The Byron Weston Defiance Mill building, in which the project works will be located, was constructed in 1821 but is not listed in the National Register. Because of its age, however, the Byron Weston Defiance Mill is a structure that could be eligible for listing in the National Register.

19. On October 17, 2011, the Commission issued a letter to the Massachusetts Historical Commission (Massachusetts SHPO) concluding that granting an exemption from licensing for the Byron Weston Project would have no effect on historic, archaeological, or traditional cultural properties. The Massachusetts SHPO did not respond to the Commission's determination of no effect finding in the October 17, 2011, letter. Pursuant to the Advisory Council on Historic Preservation's regulations, if the SHPO does not object within 30 days of receipt of a finding, then the agency's responsibilities under section 106 of the NHPA are fulfilled.²⁰

20. The exemptee will occasionally need to implement project modifications not specifically authorized by this exemption; however, these modifications could affect cultural resources at the project. Therefore, to ensure that cultural resources are not adversely affected by implementing project modifications, Article 25 requires the

¹⁷ EA at 9.

¹⁸ 16 U.S.C § 470 *et seq.* (2006).

¹⁹ 36 C.F.R. Part 800 (2011).

²⁰ 36 C.F.R. § 800.4(d)(1)(i) (2011).

exemptee to consult with the Massachusetts SHPO prior to conducting any maintenance activities, land-clearing or land-disturbing activities, or changes to project operation or facilities that do not require Commission approval but could affect cultural resources.

21. While construction of the project will have no adverse effect on known historic properties, previously unidentified cultural resources could be discovered during the course of constructing or operating the project; therefore, Article 26 requires the exemptee to stop work and consult with the Massachusetts SHPO if previously unidentified cultural resources are discovered during project construction or operation.

22. Crane proposes to remove both of the McCormick Hercules wheel turbines from the existing powerhouse within the Byron Weston Defiance Mill building and refurbish one of the turbines for public display. To ensure that appropriate measures are taken to preserve the McCormick Hercules wheel turbine for public display, Article 27 requires the exemptee to develop and implement a Wheel Turbine Relocation Plan in consultation with the Dalton Historical Commission and the Massachusetts SHPO. The plan will identify how the turbine will be refurbished, procedures involved in the relocation process, and where the turbine will be relocated for public display. The plan will also include methods for photo-documentation of the turbine prior to removal from its existing location and describe the information Crane will incorporate into the turbine's interpretive display.

ADMINISTRATIVE PROVISIONS

23. All projects exempted from licensing under Part I of the FPA are subject to standard terms and conditions. These terms and conditions are included as standard Articles 1 through 9. Special Articles 10 through 27, which provide for administration of the exemption from licensing and dam safety, are also included in this exemption.

A. Annual Charges

24. The Commission collects annual charges from exemptees for the administration of its hydropower program.²¹ As explained in Article 10, however, under the regulations currently in effect, projects with an authorized installed capacity of 1,500 kW or less, like this project, are not assessed an annual charge.

B. Start of Construction

25. Standard Article 3 provides that the Commission may revoke the exemption if actual construction of the project's generating facilities has not begun within two years or

²¹ See 18 C.F.R. § 11.1(b)(2) (2011).

has not been completed within four years from the date this exemption was granted. Additionally, Article 11 is included in this exemption and states that the Commission may terminate the exemption if the construction of any other project works described in this exemption has not begun within two years or is not completed within four years of the date this exemption is issued.²²

C. Exhibit F and G Drawings

26. The Commission requires the exemptee to file sets of approved project drawings (Exhibits F and G) on microfilm and electronic file format. The four Exhibit F drawings (F-1 through F-4) filed on March 9, 2011, the two revised Exhibit F drawing (F-5 and F-6) filed on June 22, 2011, are approved and made part of this exemption. Article 12 requires the filing of the approved Exhibit F drawings in aperture card and electronic file format. The Exhibit F drawings being filed must meet the requirements of sections 4.39 and 4.41 of the Commission's regulations.²³

27. The Exhibit G drawings (G-1 and G-2) filed on March 9, 2011, are not approved. Exhibit G-1 is an aerial photograph and Exhibits G-1 and G-2 contain color which is illegible when formatted on microfilm aperture cards. Exhibit G-1 is not stamped by a registered land surveyor, and Exhibit G-2 shows an illegible surveyor's stamp affixed approximately 11 years prior to the date of the drawing (i.e., January 28, 2011). In addition, Exhibit G-2 includes two illegible drawings, and the reference points shown on Exhibit G-1 and G-2 are linear which makes geo-reference verification difficult. Article 13 requires the refiling of legible Exhibit G-1 and G-2 drawings that are black and white (no color), are stamped by a registered land surveyor, include three non-linear reference points, and meet the requirements of sections 4.39 and 4.41 of the Commission's regulations.

D. Project Safety

28. Ensuring the safety of all jurisdictional dams is an important public interest function of the Commission. A dam failure could result in loss of life or property damage, and could also result in significant negative environmental effects. In the interest of ensuring the safety of this project, Article 14 is included in this exemption and

²² The start-of-construction deadline in standard Article 3 (contained in the attached Form E-2) refers to the project's generating facilities. The deadline in special Article 11 applies to on-the-ground construction of other project facilities.

²³ 18 C.F.R. §§ 4.39 and 4.41(g)-(h) (2011).

requires the exemptee to comply with Part 12 of the Commission's regulations, which governs the safety of water power projects and project works.²⁴

E. Operation and Maintenance

29. Ensuring that the exempted project is operated and maintained as required by this exemption is an important public interest function of the Commission. Therefore, Article 15 is included in this exemption and states that if the exemptee causes or allows essential project property to be removed or destroyed or to become unfit for use, without adequate replacement, the Commission will deem it the exemptee's intent to surrender the exemption.

F. Exemptee Liability

30. Section 10(c) of the FPA provides that licensees, and not the United States, are liable for "damages occasioned to the property of others by the construction, maintenance, or operation of the project works . . ." ²⁵ To clarify that exemptees are similarly liable, Article 16 is included in this exemption and states that the exemptee is liable for damages to the property of others.

G. Property Rights

31. Pursuant to 18 C.F.R. § 4.31(c)(2)(ii), an applicant for exemption is required to demonstrate that, at the time it files its exemption application, it has sufficient rights to any non-federal land and facilities required for the construction and operation of the project. The application and supplemental information filed on June 22, 2011, and August 17, 2011, contains documentation that Crane has the necessary property rights to develop and operate the project. However, because an exemption is issued in perpetuity, Article 17 is included in this exemption and reserves the Commission's authority to revoke the exemption if in the future the exemptee fails to maintain sufficient rights to comply with the terms and conditions of the exemption.

H. Commission Approval of Resource Plans

32. The section 30(c) conditions (Appendices A and B of this order) and the water quality certification conditions (Appendix C) require that plans be prepared for run-of-river operation and erosion control. The conditions, however, do not require the plans to

²⁴ 18 C.F.R. Part 12 (2011). Special Article 14 is broader than standard Article 8 (contained in the attached Form E-2), which essentially is subsumed in special Article 14.

²⁵ 16 U.S.C. § 803(c) (2006).

be filed with the Commission for approval. Therefore, Article 18(a) requires the filing of each plan with the Commission for approval before implementation. In addition, Article 18(b) requires the exemptee to report data collected during the post-operation water quality monitoring survey and Article 18(c) requires the exemptee to notify the Commission of temporary modification of project operation, temporary impoundment refill procedure modification, and when the project commences operation. Finally, Article 18(d) requires the exemptee to file an amendment application with the Commission if Massachusetts DFW, Interior, or Massachusetts DEP determines that depletion of dissolved oxygen in the river from project operation requires mitigation measures, upstream or downstream fish passage facilities are needed, or terms and conditions need to be added or altered to carry out their responsibilities with respect to fish and wildlife resources.

I. Review of Final Plans and Specifications

33. To ensure that the exemptee is constructing and operating a safe and adequate project, Articles 19 through 24 require the exemptee to provide the Commission's Division of Dam Safety and Inspections – New York Regional Office (D2SI), for its review and approval: contract plans and specifications, including a soil erosion and sediment control plan; cofferdam construction drawings; as-built drawings; an owner's dam safety program; an inflow design flood and hazard classification study; and a public safety plan.²⁶

34. The exemptee may not begin any construction until the D2SI – New York Regional Engineer has reviewed and commented on the plans and specifications, determined that all preconstruction requirements have been satisfied, and authorized, in writing, the start of construction.

The Director orders:

(A) Effective the date this order is issued, the Byron Weston Hydroelectric Project is exempted from Part I of the Federal Power Act (FPA), subject to the conditions submitted by the Massachusetts Division of Fisheries and Wildlife and the U.S.

²⁶ Interior recommended providing access to the project area wherever possible to allow for public utilization of fish and wildlife resources, taking into consideration any necessary restrictions to maintain public safety and protect project civil works. Article 24 requires a public safety plan. The public safety plan requires an evaluation of public safety concerns at the project site, including designated recreation areas, and an assessment of the need for the installation of safety devices, including signage or other safety measures.

Department of the Interior under section 30(c) of the FPA, as those conditions are set forth in Appendices A and B of this order, the conditions in Appendix C, and the articles specified below.

(B) The project consists of:

(1) All lands, to the extent of the exemptee's interests in these lands, described in the project description and the project boundary discussion of this order.

(2) The following project works: (1) the existing 90-foot-long, 30-foot-high, stone-masonry Byron Weston Dam No. 2 equipped with a 75-foot-long, 23-foot-high spillway section; (2) an existing 0.94-acre impoundment with a normal water surface elevation of 1,116.7 feet North Atlantic Vertical Datum (NAVD 1988); (3) an existing 20.8-foot-wide, 12-foot-deep intake structure that includes trashracks with 1-inch clear-bar spacing; (4) a new 3/8-inch-thick steel plate extending from the top of the trashracks to the top of the intake opening; (5) an existing 8-foot-wide, 8-foot-high headgate; (6) an existing 6.5-foot-long, 6-foot-diameter penstock that conveys flow to an existing 50-foot-long, 9.5-foot-wide, 10-foot-high headrace canal connected to a new 15-foot-long, 4.4-foot-diameter penstock; (7) the existing Byron Weston Defiance Mill building containing one new 250-kilowatt turbine-generating unit; (8) a new draft tube placed within the existing 11.8-foot-wide, 10-foot-high arched tailrace; (9) a new 12-inch-diameter low-level outlet pipe that discharges water into the turbine draft tube and tailrace and is connected to the new 15-foot-long, 4.4-foot-diameter penstock; (10) a new 100-foot-long, 600-volt transmission line connecting the generating unit to the existing electrical distribution system for the Byron Weston Defiance Mill; and (11) appurtenant facilities.

The project works generally described above are more specifically shown and described by those portions of Exhibits A and F below:

Exhibit A: Pages A-2 through A-8 filed on March 9, 2011, and information filed on June 22, 2011.

Exhibit F: The following Exhibit F drawings filed on March 9, 2011, (F-1 through F-4) and June 22, 2011, (F-5 and F-6):

<u>Exhibit F Drawing</u>	<u>FERC No. 13583</u>	<u>Description</u>
F-1	1	Title Sheet, Maps, & Index of Drawings
F-2	2	Powerhouse Area Plan – Existing Conditions
F-3	3	Powerhouse Area, Section View – Existing Conditions

<u>Exhibit F Drawing</u>	<u>FERC No. 13583</u>	<u>Description</u>
F-4	4	Powerhouse Area Plan – Proposed Conditions
F-5	5	Flow Profile Through System
F-6	6	Powerhouse Area – Proposed Conditions

(3) All of the structures, fixtures, equipment or facilities used to operate or maintain the project, all portable property that may be employed in connection with the project, and all riparian or other rights that are necessary or appropriate in the operation or maintenance of the project.

(C) The Exhibits A and F described above are approved and made part of the exemption. The Exhibit G drawings filed on March 9, 2011, are not approved.

(D) This exemption is also subject to the articles set forth in Form E-2 entitled Standard Terms and Conditions of Exemption from Licensing (attached), and the following additional articles:

Article 10. Administrative Annual Charges. The exemptee shall pay the United States annual charges, effective as of the start of project construction, as determined in accordance with the provisions of the Commission's regulations in effect from time to time, for the purpose of reimbursing the United States for the cost of administration of the Commission's hydropower program. The authorized installed capacity for that purpose is 250 kilowatts. Under the regulations currently in effect, projects with authorized installed capacity of less than or equal to 1,500 kilowatts will not be assessed annual charges.

Article 11. Start of Construction. The Commission may terminate this exemption if actual construction of any project works has not begun within two years or has not been completed within four years from the issuance date of this exemption. If an exemption is terminated under this article, the Commission will not accept from the prior exemption holder a subsequent application for exemption from licensing for the same project within two years of the termination.

Article 12. Exhibit F Drawings. Within 45 days of the date of issuance of this exemption, the exemptee shall file the approved exhibit drawings in aperture card and electronic file formats.

(a) Three sets of the approved exhibit drawings shall be reproduced on silver or gelatin 35mm microfilm. All microfilm shall be mounted on type D (3-1/4" x 7-3/8") aperture cards. Prior to microfilming, the FERC Project-Drawing Number (i.e., P-13583-

1 through P-13583-6) shall be shown in the margin below the title block of the approved drawing. After mounting, the FERC Drawing Number shall be typed on the upper right corner of each aperture card. Additionally, the Project Number, FERC Exhibit (i.e., F-1, F-2, etc.), Drawing Title, and date of this exemption shall be typed on the upper left corner of each aperture card.

Two of the sets of aperture cards shall be filed with the Secretary of the Commission, ATTN: OEP/DHAC. The third set shall be filed with the Commission's Division of Dam Safety and Inspections – New York Regional Office.

(b) The exemptee shall file two separate sets of exhibit drawings in electronic raster format with the Secretary of the Commission, ATTN: OEP/DHAC. A third set shall be filed with the Commission's Division of Dam Safety and Inspections – New York Regional Office. Exhibit F drawings must be segregated from other project exhibits, and identified as (CEII) material under 18 C.F.R. § 388.113(c). Each drawing must be a separate electronic file, and the file name shall include: FERC Project-Drawing Number, FERC Exhibit, Drawing Title, date of this exemption, and file extension in the following format [P-13583-2, F-2, Powerhouse Area Plan, MM-DD-YYYY.TIF]. Electronic drawings shall meet the following format specification:

IMAGERY - black & white raster file
 FILE TYPE – Tagged Image File Format, (TIFF) CCITT Group 4
 RESOLUTION – 300 dpi desired, (200 dpi min)
 DRAWING SIZE FORMAT – 24” x 36” (min), 28” x 40” (max)
 FILE SIZE – less than 1 MB desired

Article 13. Exhibit G Drawings. Within 90 days of the date of issuance of this exemption, the exemptee shall file, for Commission approval, revised legible Exhibit G drawings that are black and white (no color), are stamped by a registered land surveyor, and include three non-linear reference points. The Exhibit G drawings must comply with sections 4.39 and 4.41 of the Commission's regulations.

Article 14. Part 12 Requirements. This project is subject to Part 12 of the Commission's regulations, 18 C.F.R. Part 12 (as they may be amended from time to time). For the purposes of applying these provisions of Part 12, the exempted project is deemed to be a licensed project development and the owner of the exempted project is deemed to be a licensee.

Article 15. Operation and Maintenance. The Commission may determine that the exemptee has impliedly surrendered this exemption if essential project property is removed or destroyed or becomes unfit for use, without adequate replacement; or if the project is abandoned or good faith project operation or maintenance is discontinued; or if

the exemptee refuses or neglects to comply with the terms of the exemption and the lawful orders of the Commission.

Article 16. Liability. This exemption is subject to the provisions of section 10(c) of the Federal Power Act, 16 U.S.C. § 803(c) (2006). That section provides that the exemptee shall be liable for all damages occasioned to the property of others by the construction, maintenance, or operation of the project works or of the works appurtenant or accessory thereto, constructed under this exemption; and in no event shall the United States be liable therefore.

Article 17. Property Rights. The Commission reserves the right to require the exemptee to obtain additional property rights, if such rights become necessary to develop, operate, or maintain the project or to achieve compliance with the terms and conditions of the exemption. The Commission may terminate this exemption if, at any time, the exemptee does not hold sufficient property rights in the land or project works necessary to develop, maintain, and operate the project.

Article 18. Commission Approval and Reporting.

(a) Requirement to File Plans for Commission Approval

Various measures in the Massachusetts Division of Fisheries and Wildlife (Massachusetts DFW) and the U.S. Department of the Interior's (Interior) conditions issued pursuant to section 30(c) of the Federal Power Act (Appendices A and B), and conditions in the Massachusetts Department of Environmental Protection (Massachusetts DEP) water quality certification (WQC) issued pursuant to section 401 of the Clean Water Act (Appendix C), require the exemptee to prepare plans in consultation with state and federal agencies but without submittal to or approval by the Commission. Each such plan shall be submitted to the Commission for approval. These plans are listed below.

30(c) condition no.		WQC condition no.	Plan name	Due date
Massachusetts DFW	Interior	Massachusetts DEP		
4	4	17	Run-of-river operation, maintenance, and monitoring plan	Within 5 months of issuance of this exemption
		9	Erosion control plan	At least 60 days prior to commencing project construction

The exemptee shall include with each plan filed with the Commission documentation that the exemptee developed the plan in consultation with the Massachusetts DFW, Interior, and Massachusetts DEP (as appropriate), and has received approval from these agencies. The Commission reserves the right to make changes to any plan submitted. Upon Commission approval, the plan becomes a requirement of the exemption, and the exemptee shall implement the plan, including any changes required by the Commission.

(b) Requirement to File Reports

Various measures in Massachusetts DFW and Interior's section 30(c) conditions and Massachusetts DEP's WQC conditions require the exemptee to report data or information to other entities that documents compliance with requirements of this exemption and may have bearing on future actions. These reports shall also be submitted to the Commission. These reports are listed below.

30(c) condition no.		WQC condition no.	Description	Due date
Massachusetts DFW	Interior	Massachusetts DEP		
3	3	18	Post-operation water quality monitoring survey results	Within 3 months of completion of the survey

The exemptee shall submit to the Commission documentation of any consultation, and copies of any comments and recommendations made by any consulted entity in connection with each report. The Commission reserves the right to require changes to project operations or facilities based on the information contained in the report and any other available information.

(c) Requirement to File Notification

The exemptee shall also file with the Commission notification of the following activities.

30(c) condition no.		WQC condition no.	Notification requirement	Due date
Massachusetts DFW	Interior	Massachusetts DEP		
1	1	13	Notification of temporary modification of project operation	Within 10 days of each occurrence and a report within 30 days of each occurrence
5	5	16	Notification of temporary refill procedure modification	Within 10 days of each occurrence
7	7	21	Notification of when the project commences operation	Within 30 days of commencement of project operation

(d) Requirement to File Amendment Applications

Certain Massachusetts DFW and Interior section 30(c) conditions and Massachusetts DEP WQC conditions contemplate unspecified long-term changes to project operations or facilities for the purpose of mitigating environmental impacts. These changes may not be implemented without prior Commission authorization granted after the filing of an application to amend the exemption. These conditions are listed below.

30(c) condition no.		WQC condition no.	Exemption requirement	Due date
Massachusetts DFW	Interior	Massachusetts DEP		
3, 6, 9	3, 6, 9	11, 12, 18, 20	Changes or modifications to the exemption	Within 30 days of receipt of new or revised conditions

Article 19. Commission's Review of Contract Plans and Specifications. At least 60 days prior to the start of any construction, the exemptee shall submit one copy of its plans and specifications and a supporting design document to the Commission's Division of Dam Safety and Inspections (D2SI) – New York Regional Engineer, and two copies to the Commission (one of these shall be a courtesy copy to the Director, D2SI). The submittal to the D2SI – New York Regional Engineer must also include as part of preconstruction requirements: a Quality Control and Inspection Program, Temporary Construction Emergency Action Plan, and Soil Erosion and Sediment Control Plan. The exemptee may not begin any land-disturbing activities until the D2SI – New York Regional Engineer has reviewed and commented on the plans and specifications,

determined that all preconstruction requirements have been satisfied, and authorized the start of construction.

The Soil Erosion and Sediment Control Plan shall describe all measures that will be taken to minimize erosion and sedimentation during construction, including: procedures for removal and disposal of accumulated sediment removed from the tailrace, procedures to handle and process wastewater drained from the cofferdam area in the tailrace, descriptions and drawings of all erosion control measures, and an implementation schedule. The Soil Erosion and Sediment Control Plan shall include provisions of the erosion control plan including debris disposal required by Massachusetts Department of Environmental Protection's certification conditions 9 and 10.

Article 20. Cofferdam Construction. The exemptee shall review and approve the design of contractor-designed cofferdams and deep excavations prior to the start of construction and shall ensure that construction of cofferdams and deep excavations are consistent with the approved design. At least 30 days before starting construction of any cofferdams or deep excavations, the exemptee shall submit one copy to the Commission's Division of Dam Safety and Inspections (D2SI) – New York Regional Engineer and two copies to the Commission (one of these copies shall be a courtesy copy to the Director, D2SI) of the approved cofferdam and deep excavation construction drawings and specifications, and the letters of approval.

Article 21. As-built Exhibits. Within 90 days of completion of construction of the facilities authorized by this exemption, the exemptee shall file for Commission approval, revised Exhibits A, F, and G, as applicable, to describe and show those project facilities as built. A courtesy copy shall be filed with the Commission's Division of Dam Safety and Inspections (D2SI) – New York Regional Engineer; the Director, D2SI; and the Director, Division of Hydropower Administration and Compliance.

Article 22. Owner's Dam Safety Program. Within 90 days of the issuance date of the exemption, the exemptee shall submit to the Commission's Division of Dam Safety and Inspections (D2SI) – New York Regional Engineer, an Owner's Dam Safety Program which at a minimum shall demonstrate a clear acknowledgement of the dam owner's responsibility for the safety of the project, an outline of the roles and responsibilities of the exemptee's dam safety staff, and access of the exemptee's dam safety official to the Chief Executive Officer (CEO).

Article 23. Inflow Design Flood and Hazard Classification Study. Within six months of the issuance date of the exemption, the exemptee shall submit one copy to the Commission's Division of Dam Safety and Inspections (D2SI) – New York Regional Engineer and two copies to the Commission (one of these copies shall be a courtesy copy to the Director, D2SI) of an Inflow Design Flood and Hazard Classification study. The

study shall be performed according to Chapter 2 of the Commission's Engineering Guidelines. The study shall include: (1) an incremental hazard evaluation to determine the effects on downstream structures in the event of a dam failure; (2) a recommendation for the project's hazard potential classification; (3) a determination of the project's Inflow Design Flood; and (4) an assessment of the adequacy of the project's spillway capacity.

Article 24. Public Safety Plan. Within 60 days from the issuance of this order, the exemptee shall submit one copy to the Commission's Division of Dam Safety and Inspections (D2S1) – New York Regional Engineer and two copies to the Commission (one of these copies shall be a courtesy copy to the Director, D2SI) of a Public Safety Plan. The plan shall include an evaluation of public safety concerns at the project site, including any designated recreation areas, and assess the need for the installation of safety devices or other safety measures. The submitted plan shall include a description of all public safety devices and signage, as well as a map showing the location of all public safety measures. For additional guidance, the exemptee can review the Guidelines for Public Safety at Hydropower Projects on the FERC-D2SI website.

Article 25. Protection of Cultural Resources. Prior to implementing any project modifications not specifically authorized by this exemption, including but not limited to maintenance activities, land-clearing or land-disturbing activities, or changes to project operation or facilities, the exemptee shall consult with the Massachusetts Historical Commission (Massachusetts SHPO) to determine the effects of the activities and the need for any cultural resource studies or measures. If no studies or measures are needed, the exemptee shall file with the Commission documentation of its consultation with the Massachusetts SHPO.

If a project modification is determined to affect a historic property, the exemptee shall file for Commission approval a historic properties management plan (HPMP) prepared by a qualified cultural resource specialist after consultation with the Massachusetts SHPO. In developing the HPMP, the exemptee shall use the Advisory Council on Historic Preservation and the Commission's *Guidelines for the Development of Historic Properties Management Plans for FERC Hydroelectric Projects*, dated May 20, 2002. The HPMP shall include the following items: (1) a description of each historic property; (2) a description of the potential effect on each historic property; (3) proposed measures for avoiding or mitigating adverse effects; (4) documentation of the nature and extent of consultation; and (5) a schedule for implementing mitigation and conducting additional studies. The Commission reserves the right to require changes to the HPMP.

The exemptee shall not implement any project modifications, other than those specifically authorized in this exemption, until informed by the Commission that the requirements of this article have been fulfilled.

Article 26. Protection of Undiscovered Cultural Resources. If the exemptee discovers previously unidentified cultural resources during the course of constructing, maintaining, or developing project works or other facilities at the project, the exemptee shall stop all land-clearing and land-disturbing activities in the vicinity of the resource and consult with the Massachusetts Historical Commission (Massachusetts SHPO) to determine the need for any cultural resource studies or measures. If no studies or measures are needed, the exemptee shall file with the Commission documentation of its consultation with the Massachusetts SHPO.

If a discovered cultural resource is determined to be eligible for the National Register of Historic Places, the exemptee shall file for Commission approval a historic properties management plan (HPMP) prepared by a qualified cultural resource specialist after consultation with the Massachusetts SHPO. In developing the HPMP, the exemptee shall use the Advisory Council on Historic Preservation and the Commission's *Guidelines for the Development of Historic Properties Management Plans for FERC Hydroelectric Projects*, dated May 20, 2002. The HPMP shall include the following items: (1) a description of each discovered property, indicating whether it is listed in or eligible to be listed in the National Register of Historic Places; (2) a description of the potential effect on each discovered property; (3) proposed measures for avoiding or mitigating adverse effects; (4) documentation of the nature and extent of consultation; and (5) a schedule for implementing mitigation and conducting additional studies. The Commission reserves the right to require changes to the HPMP.

The exemptee shall not resume land-clearing or land-disturbing activities in the vicinity of a cultural resource discovered during construction, until informed by the Commission that the requirements of this article have been fulfilled.

Article 27. Wheel Turbine Relocation Plan. Within six months of the issuance date of the exemption, the exemptee shall file with the Commission, for approval, a Wheel Turbine Relocation Plan that describes the refurbishment and relocation of one of the McCormick Hercules wheel turbines being removed from the Byron Weston Defiance Mill building. The plan shall:

- (1) describe the procedures for removing and handling the turbine, including photo-documentation of the turbine prior to removal from its existing location;
- (2) describe the methods for refurbishing the turbine;
- (3) identify where the turbine will be relocated and describe the interpretive information that will be provided with the public display; and
- (4) provide an implementation schedule.

The plan shall be developed in consultation with the Massachusetts Historical Commission and the Dalton Historical Commission. The exemptee shall allow a minimum of 30 days for the agencies to comment and to make recommendations before filing the plan with the Commission. If the exemptee does not adopt a recommendation, the filing shall include the exemptee's reasons, based on project-specific information.

The Commission reserves the right to make changes to the plan. Removal of the McCormick Hercules wheel turbines from the Byron Weston Defiance Mill building shall not begin until the exemptee is notified by the Commission that the plan is approved. Upon Commission approval, the exemptee shall implement the plan, including any changes required by the Commission.

(E) The exemptee shall serve copies of any Commission filing required by this order on any entity specified in this order to be consulted on matters related to that filing. Proof of service on these entities must accompany the filing with the Commission.

(F) This order constitutes final agency action. Any party may file a request for rehearing of this order within 30 days from the date of its issuance, as provided in section 313(a) of the FPA, 16 U.S.C. § 825*l* (2006), and section 385.713 of the Commission's regulations, 18 C.F.R. § 385.713 (2011). The filing of a request for rehearing does not operate as a stay of the effective date of this exemption or of any other date specified in this order. The exemptee's failure to file a request for rehearing shall constitute acceptance of this order.

Jeff C. Wright
Director
Office of Energy Projects

Form E-2

FEDERAL ENERGY REGULATORY COMMISSION

Section 4.106 - Standard Terms and Conditions of Exemption from Licensing

Any exemption from licensing granted under this subpart for a small hydroelectric power project is subject to the following standard terms and conditions:

Article 1. The Commission reserves the right to conduct investigations under sections 4(g), 306, 307, and 311 of the Federal Power Act with respect to any acts, complaints, facts, conditions, practices, or other matters related to the construction, operation, or maintenance of the exempt project. If any term or condition of the exemption is violated, the Commission may revoke the exemption, issue a suitable order under section 4(g) of the Federal Power Act, or take appropriate action for enforcement, forfeiture, or penalties under Part III of the Federal Power Act.

Article 2. The construction, operation, and maintenance of the exempt project must comply with any terms and conditions that the United States Fish and Wildlife Service and any state fish and wildlife agencies have determined are appropriate to prevent loss of, or damage to, fish or wildlife resources or to otherwise carry out the purposes of the Fish and Wildlife Coordination Act, as specified in Exhibit E of the application for exemption from licensing or in the comments submitted in response to the notice of the exemption application.

Article 3. The Commission may revoke this exemption if actual construction of any proposed generating facilities has not begun within two years or has not been completed within four years from the date on which this exemption was granted. If an exemption is revoked under this article, the Commission will not accept from the prior exemption holder a subsequent application for exemption from licensing or a notice of exemption from licensing for the same project within two years of the revocation.

Article 4. This exemption is subject to the navigation servitude of the United States if the project is located on navigable waters of the United States.

Article 5. This exemption does not confer any right to use or occupy any Federal lands that may be necessary for the development or operation of the project. Any right to use or occupy any Federal lands for those purposes must be obtained from the administering Federal agencies. The Commission may accept a license application by any qualified license applicant and revoke this exemption, if any necessary right to use or occupy Federal lands for those purposes has not been obtained within one year from the date on which this exemption was granted.

Article 6. In order to best develop, conserve, and utilize in the public interest the water resources of the region, the Commission may require that the exempt facilities be modified in structure or operation or may revoke this exemption.

Article 7. The Commission may revoke this exemption if, in the application process, material discrepancies, inaccuracies, or falsehoods were made by or on behalf of the applicant.

Article 8. Any exempted small hydroelectric power project that utilizes a dam that is more than 33 feet in height above streambed, as defined in 18 C.F.R. § 12.31(c) of this chapter, impounds more than 2,000 acre-feet of water, or has a significant or high hazard potential, as defined in 33 C.F.R. Part 222, is subject to the following provisions of 18 C.F.R. Part 12, as it may be amended:

- (1) Section 12.4(b)(1)(i) and (ii), (b)(2)(i) and (iii), (b)(iv), and (b)(v);
- (2) Section 12.4(c);
- (3) Section 12.5;
- (4) Subpart C; and
- (5) Subpart D.

For the purposes of applying these provisions of 18 C.F.R. Part 12, the exempted project is deemed to be a licensed project development and the owner of the exempted project is deemed to be a licensee.

Article 9. Before transferring any property interests in the exempt project, the exemption holder must inform the transferee of the terms and conditions of the exemption. Within 30 days of transferring the property interests, the exemption holder must inform the Commission of the identity and address of the transferee.

APPENDIX A

Conditions submitted under section 30(c) of the FPA by the Massachusetts Division of Fisheries and Wildlife on September 2, 2011.

1. The Exemptee shall operate the project in an instantaneous run-of-river mode, whereby inflow to the project will equal outflow from the project at all times and water levels above the dam are not drawn down for the purpose of generating power. Run-of-river operation may be temporarily modified if required by operating emergencies beyond the control of the Exemptee, or for short periods upon mutual agreement between the Exemptee, the Massachusetts Division of Fisheries and Wildlife, and the U.S. Fish and Wildlife Service.
2. The Exemptee shall install trashracks that meet the following criteria: (1) have an approach velocity ≤ 2.0 fps (as measured six inches in front of the racks); (2) have clear spacing of one inch or less; and (3) extend full depth. The trashracks shall be installed and operational concurrent with project start-up. The racks shall be required to be kept free of debris and maintained to design specifications.
3. The Exemptee shall conduct a post-operation water quality monitoring survey. The survey protocol shall be identical to the pre-operation survey, and shall be developed in consultation with, and require approval by the Massachusetts Department of Environmental Protection, and the U.S. Fish and Wildlife Service. The study shall be initiated the first low-flow season after project start-up. Results of the post-operation survey shall be compared to the pre-operation data. If results indicate that, in the opinion of the Division, the USFWS, and the MADEP, the project is not causing depletion of dissolved oxygen no further study will be required. If results indicate that, in the opinion of the Division, the USFWS, and the MADEP, the project is causing depletion of dissolved oxygen further study will be required and mitigation measures may be required (e.g., releasing flow over the dam for aeration) as determined by of the Division, the USFWS, and the MADEP.
4. The Exemptee shall, within three (3) months of the date of issuance of an exemption from licensing, prepare and file for approval the Massachusetts Division of Fisheries and Wildlife, and the U.S. Fish and Wildlife Service, a plan for maintaining and monitoring run-of-river operation at the project. The plan shall include a description of the mechanisms and structures that will be used, the level of manual and automatic operation, the methods to be used for recording data on run-of-river operation, an implementation schedule, and a plan for maintaining the data for inspection by the U.S. Fish and Wildlife Service, the Federal Energy Regulatory Commission, and the Massachusetts Division of Fisheries and Wildlife.

5. The Exemptee shall implement a refill procedure whereby, during impoundment refilling after drawdowns for maintenance or emergency purposes, 90% of inflow is passed downstream and the headpond is refilled on the remaining 10% of inflow to the project. This refill procedure may be modified on a case-by-case basis with the prior approval of both the U.S. Fish and Wildlife Service and the Massachusetts Division of Fisheries and Wildlife.
6. The Exemptee shall be responsible for constructing, operating, maintaining and evaluating upstream and downstream fish passage facilities at this project when notified by the U.S. Fish and Wildlife Service and/or the Massachusetts Division of Fisheries and Wildlife that such fishways are needed. All plans and schedules associated with the design, construction, operation, maintenance and evaluation of any prescribed fishways shall be developed by the Exemptee in consultation with, and require approval by, the Massachusetts Division of Fisheries and Wildlife and the U.S. Fish and Wildlife Service.
7. The Exemptee shall notify the Massachusetts Division of Fisheries and Wildlife, and the U.S. Fish and Wildlife Service in writing when the project commences operation. Such notice shall be sent within 30 days of start-up. The Exemptee shall furnish the Massachusetts Division of Fisheries and Wildlife and the U.S. Fish and Wildlife Service with a set of as-built drawings concurrent with filing said plans with the Commission.
8. The Exemptee shall allow the Massachusetts Division of Fisheries and Wildlife and/or the U.S. Fish and Wildlife Service to inspect the project area at any time while the project operates under an exemption from licensing to monitor compliance with their terms and conditions.
9. The Division reserves the right to add to and alter terms and conditions for this exemption as appropriate to carry out its responsibilities with respect to fish and wildlife resources. The Exemptee shall, within thirty (30) days of receipt, file with the Federal Energy Regulatory Commission any additional terms and conditions imposed by the Massachusetts Division of Fisheries and Wildlife and/or the U.S. Fish and Wildlife Service.
10. The Exemptee shall incorporate the aforementioned terms and conditions in any conveyance—by lease, sale or otherwise—of its interests so as to legally assure compliance with said conditions for as long as the project operates under an exemption from licensing.

APPENDIX B

Conditions submitted under section 30(c) of the FPA by the U.S. Department of the Interior on September 29, 2011.

1. The Exemptee shall operate the project in an instantaneous run-of-river mode, whereby inflow to the project will equal outflow from the project at all times, and water levels above the dam are not drawn down for the purpose of generating power. Run-of-river operation may be temporarily modified if required by operating emergencies beyond the control of the Exemptee, or for short periods upon mutual agreement between the Exemptee, the U.S. Fish and Wildlife Service, and the Massachusetts Division of Fisheries and Wildlife.
2. The Exemptee shall utilize trashracks that meet the following criteria: (1) have an approach velocity ≤ 2.0 fps (as measured six inches in front of the racks); (2) have clear spacing of one inch or less; and (3) extend full depth. The trashracks shall be installed and operational concurrent with project start-up. The racks shall be required to be kept free of debris and maintained to design specifications.
3. The Exemptee shall conduct a post-operation water quality monitoring survey. The survey protocol shall be identical to the pre-operation survey, and shall be developed in consultation with, and require approval by, the U.S. Fish and Wildlife Service. The post-operation water quality monitoring survey shall be initiated the first low-flow season after project start-up. Results of the post-operation survey will be compared to the pre-operation data. If results indicate that the project is not causing depletion of dissolved oxygen, and the U.S. Fish and Wildlife Service and Massachusetts Department of Environmental Protection deem the data to have been collected during representative low flow conditions and turbine operating levels, no further monitoring will be required. However, if environmental and/or operating conditions during the first year of post-operation monitoring are not representative, or if the data collected indicate that the project is causing depletion of dissolved oxygen, the survey shall be repeated the following year. If survey results indicate that the project is causing depletion of dissolved oxygen, mitigation measures may be required (e.g., releasing flow over the dam for reaeration). Measures specified by the U.S. Fish and Wildlife Service shall be implemented.
4. The Exemptee shall, within three (3) months of the date of issuance of an exemption from licensing, prepare and file for approval by the U.S. Fish and Wildlife Service, a plan for maintaining and monitoring run-of-river operation at the project. The plan shall include a description of the mechanisms and structures that will be used, the level of manual and automatic operation, the methods to be used for recording data on run-of-river operation, an implementation schedule, and a plan for maintaining the data for

inspection by the U.S. Fish and Wildlife Service, the Federal Energy Regulatory Commission, and the Massachusetts Division of Fisheries and Wildlife.

5. The Exemptee shall implement a refill procedure whereby, during impoundment refilling after drawdowns for maintenance or emergency purposes, 90 percent of inflow is passed downstream and the headpond is refilled on the remaining 10 percent of inflow to the project. This refill procedure may be modified on a case-by-case basis with the prior approval of both the U.S. Fish and Wildlife Service and the Massachusetts Division of Fisheries and Wildlife.

6. The Exemptee shall be responsible for constructing, operating, maintaining and evaluating upstream and downstream fish passage facilities at this project when notified by the U.S. Fish and Wildlife Service and/or the Massachusetts Division of Fisheries and Wildlife that such fishways are needed. All plans and schedules associated with the design, construction, operation, maintenance and evaluation of any prescribed fishways shall be developed by the Exemptee in consultation with, and require approval by, the U.S. Fish and Wildlife Service.

7. The Exemptee shall notify the U.S. Fish and Wildlife Service in writing when the project commences operation. Such notice shall be sent within 30 days of start-up to Supervisor, New England Field Office, 70 Commercial Street, Suite 300, Concord, New Hampshire 03301. The Exemptee shall furnish the U.S. Fish and Wildlife Service with a set of as-built drawings concurrent with filing said plans with the Federal Energy Regulatory Commission.

8. The Exemptee shall allow the U.S. Fish and Wildlife Service to inspect the project area at any time while the project operates under an exemption from licensing to monitor compliance with their terms and conditions.

9. The U.S. Fish and Wildlife Service reserves the right to add to and alter terms and conditions for this exemption as appropriate to carry out its responsibilities with respect to fish and wildlife resources. The Exemptee shall, within thirty (30) days of receipt, file with the Federal Energy Regulatory Commission any additional terms and conditions imposed by the U.S. Fish and Wildlife Service.

10. The Exemptee shall incorporate the aforementioned terms and conditions in any conveyance—by lease, sale or otherwise—of its interests so as to legally assure compliance with said conditions for as long as the project operates under an exemption from licensing.

These conditions are required with the understanding that the Commission likely will want to retain concurrent approval authority over some or all of the plans and actions described above, and the above conditions should not be read as preventing this.

APPENDIX C

Water quality certification conditions issued by the Massachusetts Department of Environmental Protection on September 23, 2011.

1. MassDEP APPROVES the application of Crane Company and CERTIFIES that there is reasonable assurance that the Byron Weston Hydroelectric Project, as described above and subject to the conditions below, can be constructed and operated in compliance with the applicable provisions of §303 of the Federal Act, 33 U.S.C. § 1313.
2. This Water Quality Certification shall become a condition on the FERC License issued to the Project Owner.
3. This Certification shall become effective on the date that the license issued for the Project by FERC becomes effective.
4. The state and federal resource agencies referred to in this Certification include the MassDEP, the Massachusetts Department of Fisheries and Wildlife (MADFW), and the U.S. Department of the Interior, Fish and Wildlife Service (USFWS).
5. The Project shall be operated by the Project Owner in accordance with the conditions contained in this Certification and the information included in the FERC license application. Any modifications made to the FERC application during the licensing process that would have a significant or material effect on the conclusions or conditions contained in this Certification, as determined by MassDEP, must be submitted to MassDEP for prior review and approval.
6. The Project shall be operated to maintain the existing and designated uses of the East Branch of the Housatonic River as outlined in the Standards at 314 CMR 4.00, and to maintain an integrated and diverse biological community within the East Branch of the Housatonic River.
7. The Project Owner shall obtain and comply with all applicable federal, state and local licenses, permits, authorizations, conditions, agreements and orders required for the construction and operation of the project in accordance with the terms of this Certification.
8. All activities shall be conducted in compliance with the Massachusetts Wetlands Protection Act, including the Rivers Protection Act, G.L. Chapter 131, Section 40, and the implementing regulations at 310 CMR 10.00. A Water Quality Certification shall be obtained from MassDEP prior to initiating any activity that will cause a discharge subject to §404 of the federal Act, 33 U.S.C., §1344. The Project Owner shall comply with all applicable provisions of the Public Waterfront Act, G.L. c. 91, and the implementing

regulations at 310 CMR 9.00.

9. Prior to beginning any construction on the Project, the Project Owner shall submit a plan to monitor and control erosion during construction activities to keep impacted waters free from turbidity in concentrations that are aesthetically objectionable or would impair any designated use(s) of such waters. The Project Owner shall implement the plan as approved by MassDEP.

10. All construction, maintenance and repair activities, including disposal of debris and removal of sediments in impounded areas, shall be conducted in a manner so as not to impair water quality, and pursuant to and in compliance with any required approvals.

11. MassDEP may request, at any time during which this Certification is in effect, that FERC reopen the license to make modifications MassDEP deems necessary to maintain compliance with the Standards at 314 CMR 4.00, or other appropriate requirements of state law.

12. MassDEP reserves the right to add and alter the terms and conditions of this Certification when authorized by law, and as it deems appropriate to carry out its responsibilities during the life of the Project with respect to water quality and the protection of the existing and designated uses of the waters of the Commonwealth.

13. The Project Owner shall operate the project in a run-of-river mode such that inflow to the project equals outflow from the project on an instantaneous basis and fluctuations of the head pond water level are minimized. This operating regime may be temporarily modified by approved maintenance activities, agreement between the Project Owner and appropriate state and/or federal resource agencies, or by extreme hydrologic conditions or emergency electrical system conditions, as these terms are defined below.

14. "Extreme Hydrologic Conditions" signifies the occurrence of events beyond the Project Owner's control including without limitation, abnormal precipitation, extreme runoff, flood conditions, ice conditions or other hydrologic conditions which render the operational restrictions and requirements contained within this Certification impossible to achieve, or are inconsistent with the safe operation of the Project.

15. "Emergency Electrical System Conditions" signifies operating emergencies beyond the Project Owner's control which require changes in flow regimes to eliminate such emergencies including without limitation, equipment failure or other abnormal temporary operating condition, generating unit operation or third-party mandated interruptions under power supply emergencies, and orders from local, state or federal law enforcement or public safety authorities.

16. The Project Owner shall implement a refill procedure whereby, during impoundment

refilling after drawdowns for maintenance or emergency purposes, 90% of inflow is passed downstream and the headpond is refilled on the remaining 10% of inflow to the Project. The refill procedure may be modified on a case-by-case basis with the prior approval of both the USFWS and the MADFW.

17. The Project Owner, within three months of the date of issuance of an exemption from licensing, prepare and file for approval with the MADFW and USFWS, a plan for maintaining and monitoring run-of-river operation at the Project. The plan shall include a description of the mechanisms and structures that will be used, the level of manual and automatic operation, the methods to be used for recording data on run-of-river operation, an implementation schedule, and a plan for maintaining the data for inspection by the USFWS, MassDEP, the FERC, and MADFW.

18. The Project Owner shall conduct a post-operation water quality monitoring survey. The survey protocol shall be identical to the pre-operation survey, and shall be developed in consultation with, and require approval by the MassDEP and the USFWS. The study shall be initiated the first low-flow season after Project start-up. Results of the post-operation survey shall be compared to the pre-operation data. If results indicate that, in the opinion of the MADFW, USFWS and MassDEP, the Project is not causing depletion of dissolved oxygen no further study will be required. If results indicate that, in the opinion of the MADFW, USFWS and MassDEP, the Project is causing depletion of dissolved oxygen further study will be required and mitigation measures may be required (e.g. releasing flow over dam for aeration) as determined by the MADFW, USFWS and MassDEP.

19. The Project Owner shall install trashracks that meet the following criteria: (1) have an approach velocity ≤ 2.0 fps (as measured six inches in front of the racks); (2) have clear spacing of one inch or less; and (3) extend full depth. The trashracks shall be installed and operational concurrent with Project start-up. The racks shall be required to be kept free of debris and maintained to design specifications.

20. The Project Owner shall be responsible for constructing, operating, maintaining and evaluating upstream and downstream fish passage facilities at this Project when notified by the USFWS and/or the MADFW that such fishways are needed. All plans and schedules associated with the design, construction, operation, maintenance and evaluation of any prescribed fishways shall be developed by the Project Owner in consultation with, and require approval by, the MADFW and the USFWS.

21. The Project Owner shall notify the MADFW and the USFWS in writing when the Project commences operation. Such notice shall be sent within 30 days of start-up. The Project Owner shall furnish the MADFW and USFWS with a set of as-built drawings concurrent with filing said plans with the FERC.

22. The Project Owner shall allow any employee, agent, consultant, contractor or authorized representative of MassDEP, MADFW or USFWS to enter the facilities in order to assess compliance with the terms and conditions of this Certification including, but not limited to, entry for the purposes of: (i) investigating, sampling, inspecting, or photocopying documents or other writings, conditions, equipment, practices or property; (ii) interviewing facility personnel and contractors; (iii) making records of field activities; and (iv) observing any activities undertaken at the facilities under any of the provisions of this Certification.

23. If any event occurs which delays or will delay the Project Owner's performance of work beyond a deadline established by or pursuant to this Certification, which event was beyond the reasonable control and without the fault of the Project Owner or any person or entity subject to the Project Owner's control, and which event could not have been prevented or avoided by the exercise of due care, foresight, or due diligence on the part of the Project Owner (a "force majeure event"), then the time for performance shall be extended for an appropriate period of time, as determined by MassDEP in its sole discretion. The Project Owner shall bear the burden of demonstrating that a force majeure event has occurred or will occur, and that the delay was beyond the reasonable control and without the fault of the Project Owner. Such an extension of time must be in writing to have effect.

24. Submissions under this Certification shall be sent to:

MassDEP:

Massachusetts Department of Environmental Protection
Division of Watershed Management
Central Regional Office
627 Main Street
Worcester, MA 01608
(508) 767-2854; FAX (508) 791-4131

Massachusetts Department of Environmental Protection
Bureau of Resource Protection
Western Regional Office
436 Dwight Street
Springfield, MA 01103
(413) 755-2138; FAX (413) 784-1149

Project No. 13583-001

- 31 -

MADFW:

Massachusetts Division of Fisheries and Wildlife
Field Headquarters
Assistant Director of Fisheries
1 Rabbit Hill Road
Westborough, MA 01581
(508) 389-6331; FAX (508) 389-7890

USFWS:

United States Fish and Wildlife Service
New England Field Office
Attention: Supervisor
70 Commercial Street, Suite 300
Concord, NH 03301-5087
(603) 223-2541; FAX (603) 223-0104

Document Content(s)

P-13583-001Order.DOC.....1-31



Appendix E – Supplemental Documentation for Fish Passage and Protection



MassWildlife

Commonwealth of Massachusetts

Division of Fisheries & Wildlife

Wayne F. MacCallum, *Director*

January 29, 2010

Chad Cox, P.E.
GZA GeoEnvironmental
One Edgewater Drive
Norwood, MA 02062

Dr. Mr. Cox,

The Massachusetts Division of Fisheries and Wildlife (Division) is the agency responsible for the protection and management of the fish and wildlife resources of the Commonwealth. As such we monitor operations at hydroelectric projects within the Commonwealth. The Division has the following Comments in response to the Initial Consultation Package (ICP) for the proposed Byron Weston No. 2 Hydroelectric Project, located on the East Branch of the Housatonic River in Dalton, MA. The ICP was delivered with a cover letter dated November 19, 2009 and was presented at a joint stakeholder meeting at the project location on December 2, 2009.

PROJECT DESCRIPTION

Crane proposes to reconstruct the Byron Weston No. 2 Project, which had originally begun operation in the 1880's, when the original run-of-river project was converted from hydromechanical to hydroelectrical generation. Byron Weston Dam No. 2, constructed in 1887, is located adjacent to the Defiance Mill. There is a single 6-foot-diameter penstock that branches into two smaller penstocks that conveyed flows to dual turbines. The turbines remain in place but are inoperable. The footings for the generators remain atop the turbines but the generators have been removed. Crane proposes to install new equipment with a nameplate capacity of 176 kW.

The proposed Byron Weston Hydroelectric Project will include: (1) an existing 200-foot-long, 23-foot-high stone-and-masonry-gravity dam; (2) a 6-foot-diameter penstock; (3) a proposed 176-kW turbine/generator, and modernized turbines, switchgears, and other power generating equipment, located within the Defiance Mill; and (4) appurtenant facilities. The project will be connected to an interstate grid. It will not occupy any tribal or federal lands.

COMMENTS

General

The Division does not license or regulate hydroelectric projects directly, unless their operation affects threatened or endangered species. At this time the Byron Weston site is not mapped as Priority or Estimated Habitat and the Natural Heritage and Endangered Species Program (NHESP) database does not contain any state-listed species records in the immediate vicinity of this site. This evaluation is based on the most recent information available in the NHESP database, which is constantly being expanded and updated through ongoing research and inventory. Should your site plans change, or new rare species information become available, this evaluation may be reconsidered.

The Division understands that Crane and Company will now be applying for an Exemption from Licensing from the FERC. The Division will provide comments throughout the FERC process.

Environmental Setting

The text of this section states that there are 4 dams downstream of Byron Weston No. 2 on the East Branch of the Housatonic River, however the included table lists only 3.

www.masswildlife.org

Division of Fisheries and Wildlife

Field Headquarters, One Rabbit Hill Road, Westborough, MA 01581 (508) 389-6300 Fax (508)

An Agency of the Department of Fish and Game

Fish and Wildlife

Crane and Co. should contact the Division to get the latest fish community information for the project area. Given the configuration of the project, with the tailrace only 35 feet downstream of the project dam, the Division does not propose a minimum bypass flow at this time.

Diadromous Fish Passage

Fishery resource agencies are actively involved in diadromous fish restoration efforts within the watershed. These efforts are based on management goals contained in the following published fishery plans:

1. Interstate Fishery Management Plan for American Eel. April 2000. Atlantic States Marine Fisheries Commission.
2. Fishery Management Plan for the American Shad and River Herring. 1985 (amended in 1998). Atlantic States Marine Fisheries Commission.
3. Diadromous Fisheries Plan for the Upper Housatonic River Basin. 2000. Connecticut Department of Environmental Protection.

These plans call for improved fish passage and other measures to enhance populations of migratory fish. Accomplishing the stated fishery management goals requires providing fish passage via methods such as installing fishways along the Housatonic River.

According to the Connecticut Department of Environmental Protection's (CT DEP) Diadromous Fisheries Plan for the Upper Housatonic River Basin (2000), the Housatonic River from Derby Dam in the towns of Derby and Shelton, upstream to the base of Bulls Bridge Dam in the Town of Kent, has been targeted for anadromous fish restoration. The catadromous American eel is to be restored up to the base of the Falls Village Dam in the towns of Salisbury and Canaan, Connecticut. The new license issued for the Housatonic River Project (FERC No. 2576) requires fish passage facilities at the Stevenson, Shepaug, and Bulls Bridge dams.

Presently there are no plans to restore diadromous fish to the Massachusetts portion of the Housatonic River. However, once the CT DEP's restoration plan is fully implemented, American eel would have access to the base of the Risingdale Dam in Great Barrington, Massachusetts (although no upstream eel passage facilities are required at the Housatonic River Project's Falls Village facility, it is assumed eels will be able to ascend the Great Falls at the Falls Village Dam).

Therefore there is a possibility that passage for American eel will be required at this project at some point in the future. The Division will not at this time ask FERC to require eel passage but we will petition FERC and the applicant at such time that eels have been restored to this portion of the Housatonic watershed.

Water Quality

The applicant should contact the Massachusetts Department of Environmental Protection to begin the process of obtaining a 401 water quality certificate which is required for any FERC licensed hydro-project in MA.

Recreation

The applicant should allow public access to project lands, where appropriate, for fishing and boating. The applicant should investigate the need for a canoe take out above the dam as well as a portage route and put in below the dam.

Sincerely,



Caleb Slater, Ph.D.
Anadromous Fish Project Leader



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>

REF: FERC No. 13583
Crane & Company
Byron Weston No. 2 Hydroelectric Project
Comments On Initial Consultation Package
Study Requests

February 1, 2010

Chad Cox, P.E.
GZA GeoEnvironmental, Inc.
One Edgewater Drive
Norwood, MA 02062

Dear Mr. Cox:

This responds to your cover letter, dated November 19, 2009, transmitting the Initial Consultation Package (ICP) for the Byron Weston No. 2 Hydropower Project, located on the East Branch Housatonic River in Berkshire County, Massachusetts. We have reviewed the ICP and offer the following comments.

BACKGROUND

In June of 2009, Crane & Company (Crane) filed a Declaration of Intention with the Federal Energy Regulatory Commission (FERC) regarding the proposed redevelopment of Byron Weston Dams 1 and 2. In that filing, Crane stated that it believed the project would not fall under FERC's jurisdiction. FERC noticed Crane's filing on July 10, 2008, and on August 11, 2008, the Department of the Interior (Interior) submitted a Notice of Intervention and Protest in the proceeding. Interior's position was that the proposed project is subject to FERC's jurisdiction. On March 31, 2009, FERC issued an Order Finding Licensing Required.

On November 19, 2009, Crane's consultant (GZA GeoEnvironmental, Inc.) submitted a combined Environmental Hydropower Notification Form (HPNF) and ICP. The HPNF is required by the Massachusetts Energy Facilities Siting Board (EFSB). GZA also notified stakeholders that a pre-licensing meeting/site visit would be held on December 2, 2009. That meeting, which is required by the EFSB, would also serve as the joint agency meeting required by FERC to initiate the first stage consultation in permitting. While staff from the U.S. Fish and Wildlife Service (Service) were not able to attend that meeting, this letter transmits our

comments on the ICP. For your information, the Service, as a federal agency, does not have a direct role in the HPNF process.

PROPOSAL

The project would consist of the existing Byron Weston No. 2 Dam, a 720-foot-long impoundment approximately one acre in size, an intake, a penstock, and a powerhouse containing one Kaplan turbine with an installed capacity of 200 kW. The project would operate run-of-river, with the turbine generating at flows between 32 cfs and 120 cfs. Project operation would be monitored and controlled by a headpond sensor and programmable logic control system. Power generated by the project would be used on-site to partially offset Crane's existing power demands.

COMMENTS

General

The ICP is formatted as an HPNF application. While this formatting may suffice for the purposes of first stage consultation, any draft exemption application developed by Crane should conform to 18 CFR §4.107.

By cover letter dated January 14, 2010, GZA informed the Service that Crane intends to file for an exemption from licensing. Pursuant to 18 CFR 4.301(b), we are hereby providing Crane with an estimate of the total costs we anticipate will be incurred to set mandatory terms and conditions for the proposed project. Based on recently permitted projects of similar size/scope, we estimate it will cost \$4,000 to set terms and conditions for this project.

Page 4.e.iii

It is unclear how the monthly flow rate and percent exceedance graph was generated; the data do not appear to match either the monthly or annual flow duration curves. For example, the graph indicates that in September, flow at the site would average 50 cfs with a percent exceedance of about 57%, but the September flow duration curve (4.e.v) shows that a flow of 50 cfs is only exceeded 20 percent of the time for that month.

III.A. Exhibit E

Environmental Setting (Page 5.a.i)

The narrative states that there are four dams on the East Branch of the Housatonic River downstream of the Byron Weston No. 2 Dam, but the table identifies only three dams.

Fish and Wildlife

- The ICP provides a qualitative listing of fish and wildlife species observed in the vicinity of the project area. The Applicant should request the most recent fisheries survey and/or stocking data from the Massachusetts Division of Fisheries and Wildlife (MA DFW) and include it in the draft application.

- GZA states that, because the outlet from the hydropower system is located almost directly downstream of the dam, Crane is not proposing to provide a conservation flow. Given the short distance (35 feet) between the dam and the tailrace discharge, it is likely that outflow from the tailrace would backwater to the base of the dam; therefore, the Service does not plan on requiring a bypass flow at this time.
- Please note that the scientific name for brown bullhead is now *Ameiurus nebulosus*.

Fish Passage

Currently, there are no anadromous fish species present in the vicinity of the project. However, there is an active migratory fish restoration program on the Housatonic River in Connecticut. According to the Connecticut Department of Environmental Protection's (CT DEP) Diadromous Fisheries Plan for the Upper Housatonic River Basin (2000), the Housatonic River from Derby Dam in the Towns of Derby and Shelton, upstream to the base of Bulls Bridge Dam in the Town of Kent, has been targeted for anadromous fish restoration. The catadromous American eel is to be restored up to the base of the Falls Village Dam in the Towns of Salisbury and Canaan, Connecticut. The new license issued for the Housatonic River Project (FERC No. 2576) requires fish passage facilities at the Stevenson, Shepaug, and Bulls Bridge Dams.

Presently, there are no plans to restore anadromous fish to the Massachusetts portion of the Housatonic River. However, once the CT DEP's restoration plan is fully implemented, the catadromous American eel would have access to the base of the Risingdale Dam in Great Barrington, Massachusetts (although no upstream eel passage facilities are required at the Housatonic River Project's Falls Village facility, it is assumed eels will be able to ascend the Great Falls at the Falls Village Dam).

While currently the Risingdale Dam (the most downstream barrier on the Housatonic River in Massachusetts) is an impediment to eel passage, the FERC permits for the next two dams (Willow Mill Project, FERC No. 2985; and the Glendale Project, FERC No. 2801) do contain provisions for future eel passage. Above Willow Mill, there are five more (non-FERC) dams that would need eel passage before it would be required at Byron Weston Dam No. 2. However, since FERC exemptions are issued in perpetuity and eel passage may be required at some future date, the Service will include a future fish passage provision in any terms and conditions it prescribes for the project.

Water Quality and Quantity

This section also should include an explanation of how the project will meet state anti-degradation standards (314 CMR 4.04) in all project waters (i.e., the headpond and tailwater).

The ICP contains no actual water quality data, and does not identify that the section of river where the project would be located is classified as Class B Warm Water Fishery by the Massachusetts Department of Environmental Protection (MA DEP). The ICP does refer to MA DEP's 2002 Water Quality Assessment Report for the Housatonic River; while that report indicates that water chemistry (dissolved oxygen, pH, temperature, alkalinity, total phosphorus,

and total suspended solids) data collected met standards, the two sampling sites those data were based on are both in Pittsfield, over two miles downstream of the project area.

Currently, all inflow to the Byron Weston Dam No. 2 impoundment passes over the dam. Under Crane's proposal, spill at the dam would only occur at flows less than 32 cfs or greater than 120 cfs. According to the Annual Flow Duration Curve provided in the ICP, those conditions occur approximately 20% of the time. Spill over a dam can provide significant reaeration. With water being routed to the Kaplan turbine (which provides little or no reaeration), the project could act to lower dissolved oxygen (DO) levels in the river downstream of the Byron Weston No. 2 Dam.

No site-specific surveys have been conducted to determine whether waters within the project area meet state standards. This information gap needs to be filled so that resource agencies can evaluate properly the potential impact of project operations on water quality.

ADDITIONAL INFORMATION

- The application should include the dimensions of the intake (wetted area) so that we may determine the intake velocity of the project (and thus, the likelihood of fish impingement and entrainment).
- The Applicant should request the most recent fisheries survey and/or stocking data from the MA DFW and include it in the draft application. If no recent data exist, the Applicant should conduct a fisheries survey within the impoundment and tailrace area prior to any modifications.

RECOMMENDED STUDIES

We recommend that Crane perform a water quality monitoring survey in order to verify that state water quality standards are currently being met and to gather baseline data (e.g., temperature, DO, etc.) that will be used later to evaluate any post-project changes to water quality parameters. The full study request is included in Attachment A.

OTHER ACTIONS

The Applicant should visit our website (www.fws.gov/newengland/EndangeredSpec-Consultation/ProjectReview.htm) for information on the presence of federally-listed endangered or threatened species within the project area.

PRELIMINARY TERMS AND CONDITIONS

Pursuant to 18 CFR 4.106(b), any case-specific exemption from licensing granted for a small hydroelectric power project requires inclusion in the exemption of all terms and conditions that are prescribed by state and federal fish and wildlife agencies to prevent loss of, or damage to, fish and wildlife resources, and to otherwise carry out the purposes of the Fish and Wildlife Coordination Act.

Consistent with this office's responsibilities, the U.S. Fish and Wildlife Service hereby submits its preliminary terms and conditions for the proposed project. These terms and conditions may be modified based on supplemental information provided by the Applicant and/or FERC during the exemption from licensing process.

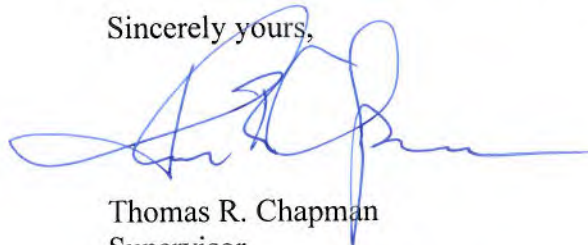
1. The Exemptee shall operate the project in an instantaneous run-of-river mode, whereby inflow to the project will equal outflow from the project at all times and water levels above the dam are not drawn down for the purpose of generating power. Run-of-river operation may be temporarily modified if required by operating emergencies beyond the control of the Exemptee, or for short periods upon mutual agreement between the Exemptee, the U.S. Fish and Wildlife Service, and the Massachusetts Division of Fisheries and Wildlife.
2. The Exemptee shall install trashracks that meet the following criteria: (1) have an approach velocity ≤ 2.0 fps (as measured six inches in front of the racks); (2) have clear spacing of one inch or less; and (3) extend full depth. The trashracks shall be installed and operational concurrent with project start-up. The racks shall be required to be kept free of debris and maintained to design specifications.
3. The Exemptee shall conduct a post-operation water quality monitoring survey. The survey protocol shall be identical to the pre-operation survey, and shall be developed in consultation with, and require approval by, the U.S. Fish and Wildlife Service. Data shall be collected over a minimum of three (3) years, and shall be initiated the first low-flow season after project start-up. Results of the post-operation survey will be compared to the pre-operation data. If results indicate that the project is causing depletion of dissolved oxygen, mitigation measures may be required (e.g., releasing flow over the dam for reaeration).
4. The Exemptee shall, within three (3) months of the date of issuance of an exemption from licensing, prepare and file for approval by the U.S. Fish and Wildlife Service, a plan for maintaining and monitoring run-of-river operation at the project. The plan shall include a description of the mechanisms and structures that will be used, the level of manual and automatic operation, the methods to be used for recording data on run-of-river operation, an implementation schedule, and a plan for maintaining the data for inspection by the U.S. Fish and Wildlife Service, the Federal Energy Regulatory Commission, and the Massachusetts Division of Fisheries and Wildlife.
5. The Exemptee shall implement a refill procedure whereby, during impoundment refilling after drawdowns for maintenance or emergency purposes, 90% of inflow is passed downstream and the headpond is refilled on the remaining 10% of inflow to the project. This refill procedure may be modified on a case-by-case basis with the prior approval of both the U.S. Fish and Wildlife Service and the Massachusetts Division of Fisheries and Wildlife.
6. The Exemptee shall be responsible for constructing, operating, maintaining and evaluating upstream and downstream fish passage facilities at this project when notified by the U.S. Fish and Wildlife Service and/or the Massachusetts Division of Fisheries and Wildlife that such fishways are needed. All plans and schedules associated with the design, construction, and evaluation of any prescribed fishways shall be developed by the Exemptee in consultation

with, and require approval by, the U.S. Fish and Wildlife Service. The fishways shall be operated and maintained in accordance with the schedule identified by the agencies.

7. The Exemptee shall notify the U.S. Fish and Wildlife Service in writing when the project commences operation. Such notice shall be sent within 30 days of start-up to Supervisor, New England Field Office, 70 Commercial Street, Suite 300, Concord, New Hampshire 03301. The Exemptee shall furnish the U.S. Fish and Wildlife Service with a set of as-built drawings concurrent with filing said plans with the Federal Energy Regulatory Commission.
8. The Exemptee shall allow the U.S. Fish and Wildlife Service to inspect the project area at any time while the project operates under an exemption from licensing to monitor compliance with their terms and conditions.
9. The U.S. Fish and Wildlife Service reserves the right to add to and alter terms and conditions for this exemption as appropriate to carry out its responsibilities with respect to fish and wildlife resources. The Exemptee shall, within thirty (30) days of receipt, file with the Federal Energy Regulatory Commission any additional terms and conditions imposed by the U.S. Fish and Wildlife Service.
10. The Exemptee shall incorporate the aforementioned terms and conditions in any conveyance—by lease, sale or otherwise—of its interests so as to legally assure compliance with said conditions for as long as the project operates under an exemption from licensing.

Thank you for this opportunity to comment. If you have any questions regarding these comments, please contact Melissa Grader of this office at (413) 548-8002, extension 124.

Sincerely yours,



Thomas R. Chapman
Supervisor
New England Field Office

Attachment

Chad Cox, P.E.
February 1, 2010

7

cc: FERC, Secretary
James Noel
Crane & Company
30 South Street
Dalton, MA 01226
MA DEP, Bob Kubit
MA DFW, Caleb Slater
EPA, Ralph Abele
Reading File
ES: MGrader:2-1-10:(603)223-2541

ATTACHMENT A

Study Request 1: Water Quality Survey

(1) Goals and Objectives

The goal of this study is to determine whether state water quality standards are being met within the project area under the current operational protocol.

The objective of the study will be to collect water temperature and dissolved oxygen (DO) data during the low flow/high water temperature season and compare those measurements with state threshold criteria for Class B surface waters.

(2) Relevant Resource Management Goals

The U.S. Fish and Wildlife Service (Service) seeks the accomplishment of a number of resource goals and objectives through the permitting process for the project. General goals include the following:

1. Ensure that protection, mitigation and enhancement measures are commensurate with project effects and help meet regional fish and wildlife objectives for the basin.
2. Conserve, protect, and enhance the habitats for fish, wildlife, and plants that will be affected by the project.

Specific to aquatic resources, the Service's goals are:

1. Protect, enhance, or restore, diverse high quality aquatic and riparian habitats for plants, animals, food webs, and communities in the watershed and mitigate for loss or degradation of these habitats.
2. Provide an instream flow regime that meets the life history requirements of resident fish and wildlife (including invertebrates such as freshwater mussels) throughout the area impacted by project operations.
3. Minimize potential negative project operation effects on water quality and aquatic habitat.

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

(3) Background and Existing Information

The ICP qualitatively references existing water quality information, with no actual quantitative data provided. Further, those data were collected over two miles (and several dams) downstream of the proposed project, in Pittsfield.

No site-specific surveys have been conducted to determine whether waters within the project area meet state standards. This information gap needs to be filled so that resource agencies can evaluate properly the potential impact of project operations on water quality.

(4) Project Nexus

Currently, all inflow passes over the dam. Under Crane's proposal, spill at the dam would only occur at flows less than 32 cfs or greater than 120 cfs. According to the Annual Flow Duration Curve provided in the ICP, those conditions occur approximately 20% of the time. Spill over a dam can provide significant reaeration. With water being routed to the Kaplan turbine (which provides little or no reaeration), the project could act to lower DO levels in the river downstream of the Byron Weston No. 2 Dam.

The Service requests that the Applicant conduct a water quality survey of the impoundment and tailrace reach in order to determine whether state water quality standards are being met under current conditions. These data can then be used as a baseline to compare with post-project water quality data, to determine if project operations are negatively affecting DO levels at the site.

(5) Proposed methodology

The Service requests a water quality survey be conducted at the project. The methodology should be similar to that used in the licensing of the Willow Mill Project (FERC No. 2985).¹

In general, water temperature and DO measurements should be collected from a minimum of three locations: upstream of the impoundment, at a deep location within the impoundment, and in the tailrace. Data collection should occur during a period of low flow and high temperature. Preliminarily, we are recommending at least three 72-hour sampling periods, to occur from July through September. Results should include date, time of sampling, water temperature, DO concentration, and any pertinent environmental conditions.

(6) Level of effort and cost

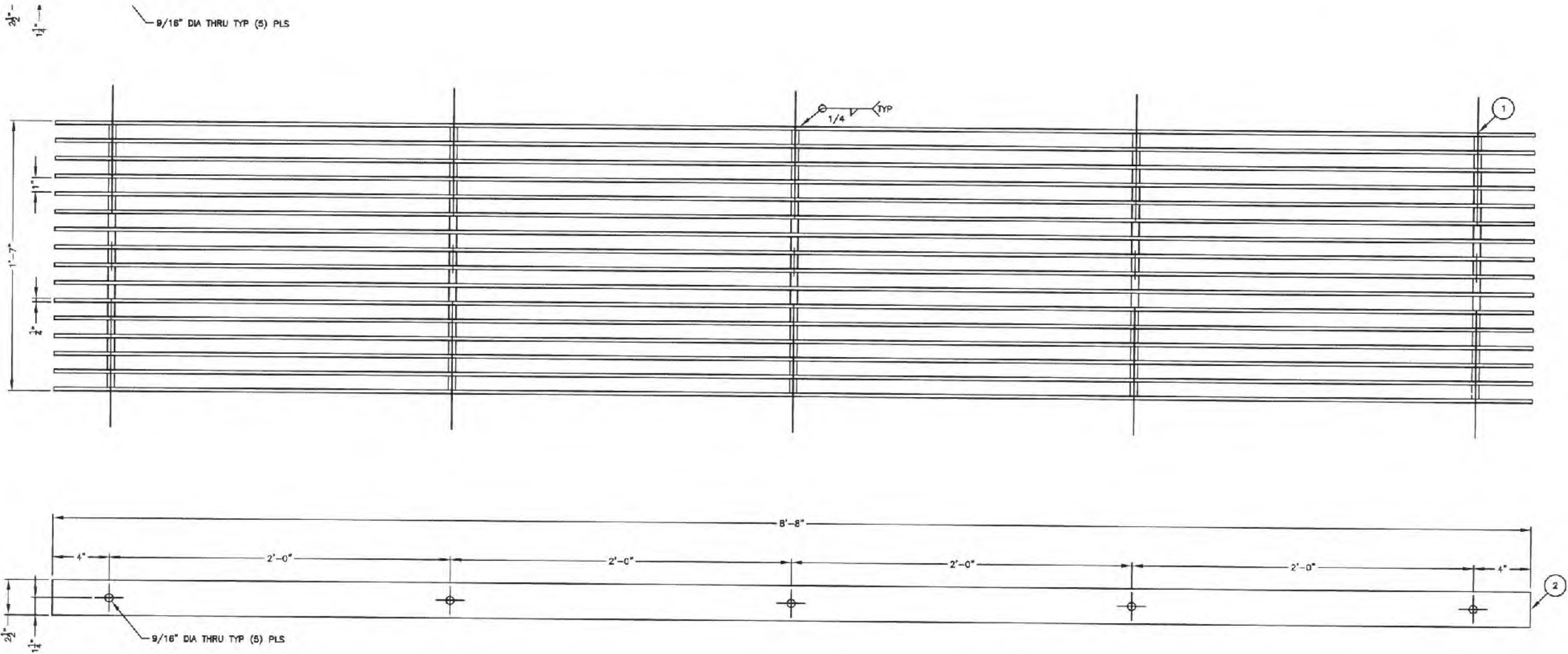
The expected level of effort and anticipated costs will be comparable to that experienced on similar FERC projects of this size.

¹ Letter from MeadWestvaco to FERC, dated January 23, 2007, page 21.

PART	QTY	MAT'L	DESCRIPTION	REMARKS
1	5	X	1/2" DIA ROD x 19" LONG	SEE NOTE 3
2	16	X	FLAT STOCK, 1/4" x 2 1/2" x 8'-8" LONG	SEE NOTE 3

NOTES

- 1) A TOTAL OF (13) OF THIS ASSEMBLY IS REQUIRED.
2) IT IS ACCEPTABLE TO BUTT WELD DROP OFF PIECES
3) QUOTE ASSEMBLIES IN BOTH 316 SST AND MILD STEEL
4) EST WEIGHT: 300 LBS PER ASSEMBLY



RFA: _____

WO: _____

THIS DRAWING AND INFORMATION CONTAINED HEREIN IS THE PROPERTY OF CRANE & CO., INC. NEITHER THIS DRAWING NOR ANY DATA OR INFORMATION THEREIN SHALL BE COPIED OR REPRODUCED IN ANY MANNER, LOANED OR OTHERWISE DISPOSED OF, OR USED FOR ANY PURPOSE WHATSOEVER WITHOUT THE PRIOR WRITTEN PERMISSION OF CRANE & CO., INC. IF THE DRAWING IS LOANED WITHOUT THE AUTHORITY OF CRANE & CO., INC., THE BORROWER ON CONSIDERATION OF OF SUCH LOAN, AGREES TO THE FORGOING CONDITIONS AND RETURN THE DRAWING UPON REQUEST.

DIMENSIONAL TOLERANCES ARE AS FOLLOWS, UNLESS OTHERWISE NOTED:

FRAC. = $\pm 1/32$
X.X = $\pm .015$
X.XX = $\pm .010$
X.XXX = $\pm .005$
ANG = $0^\circ \pm 30'$

ALL FINISHED SURFACES TO BE UNLESS OTHERWISE NOTED
BREAK ALL SHARP EDGES TO .06 R MAX

125

REV	DESCRIPTION	BY	DATE	CHK'D	APP'D
CRANE & CO. INCORPORATED PAPER MAKERS ESTABLISHED 1901					
DATE: 09/23/2014	SCALE: 3"=1'-0"	DSGN BY: SWD	DRWN BY: SWD	CHK'D: X	APP'D: X
PROJECT:	BYRON WESTON HYDRO PROJECT				
TITLE:	TRASH RACKS		DRAWING No:	SK-BW-184	REV: -



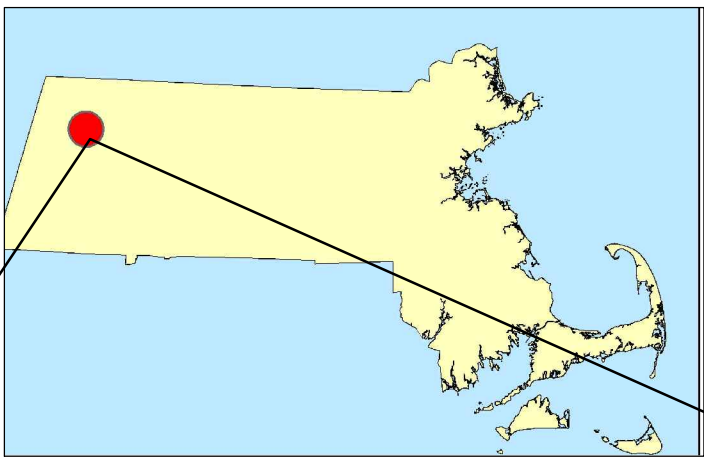
Appendix F – Supplemental Documentation for Watershed Protection

BYRON WESTON HYDROELECTRIC PROJECT
FERC P-13583

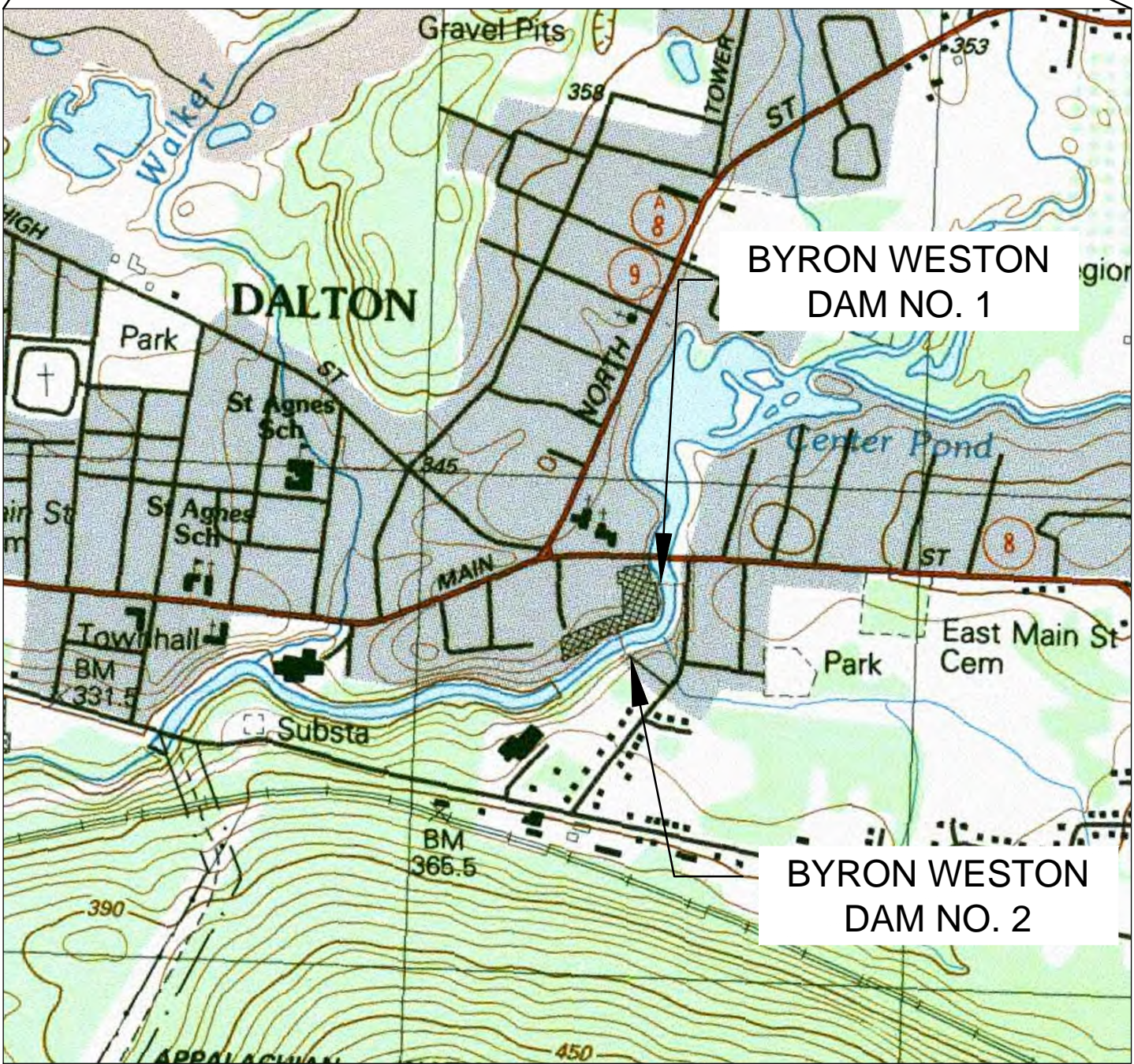
CRANE & CO.
BYRON WESTON DAM NO. 2
EAST BRANCH OF THE HOUSATONIC RIVER
DALTON, MA

INDEX OF DRAWINGS

- F-1 TITLE SHEET, LOCUS MAPS, & INDEX OF DRAWINGS
F-2 POWERHOUSE AREA PLAN
F-3 FLOW PROFILE THROUGH SYSTEM
F-4 POWERHOUSE AREA SECTIONS

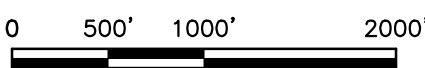


PROJECT LOCATION
DALTON, MA

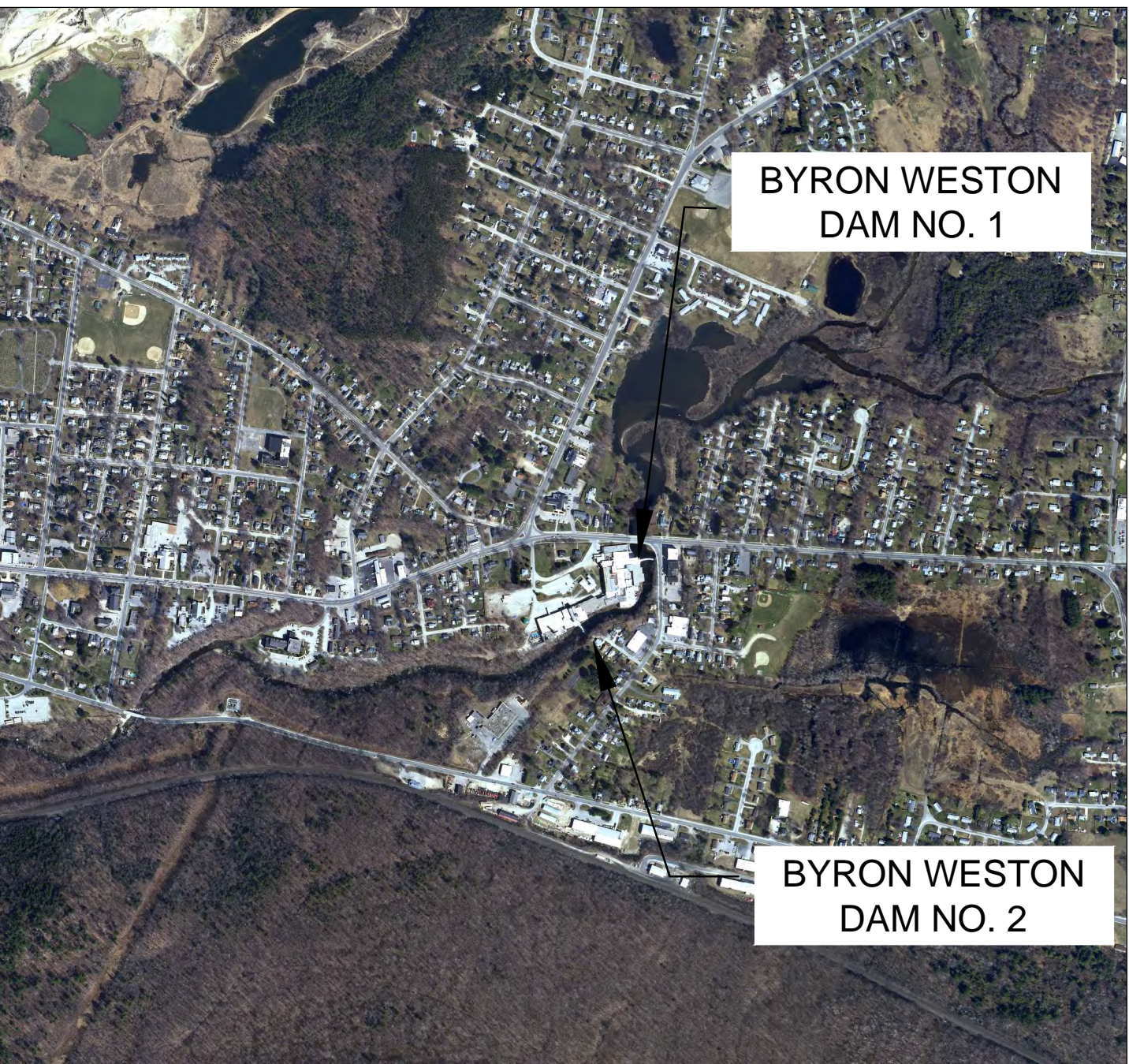


USGS TOPOGRAPHIC MAP

SCALE APPROXIMATELY: 1 INCH = 1000 FEET

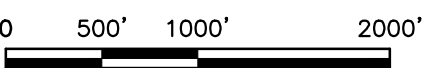


SOURCE: SCANNED USGS TOPOGRAPHIC QUADRANGLES SCANNED BY THE MASSACHUSETTS EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS, MASSGIS, DISTRIBUTED JUNE 2001

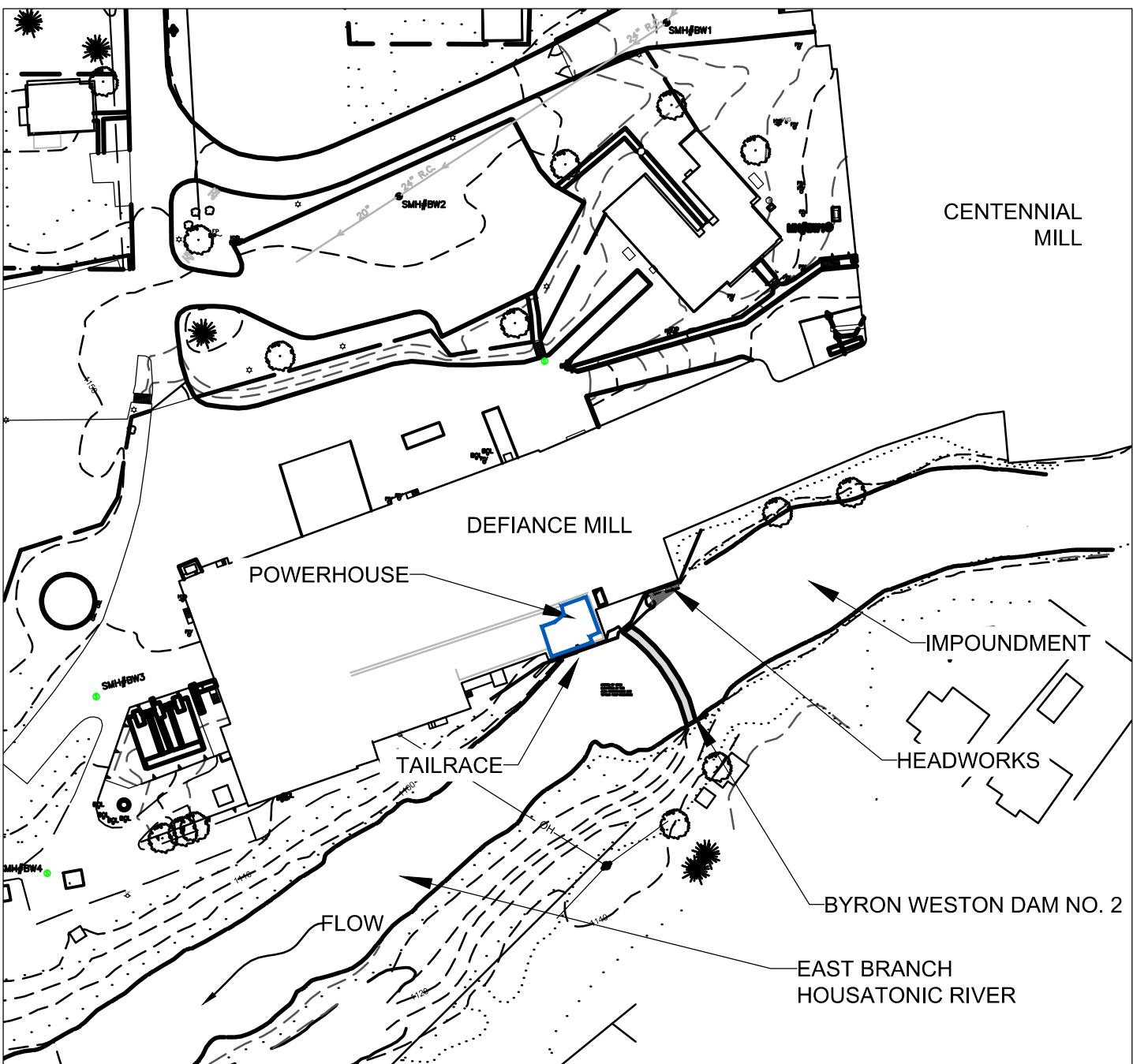


ORTHOPHOTO

SCALE APPROXIMATELY: 1 INCH = 1000 FEET

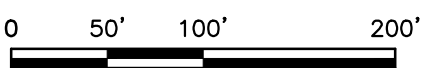


SOURCE: SCANNED ORTHOPHOTO SCANNED BY THE MASSACHUSETTS EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS, MASSGIS, DISTRIBUTED 2005



PROJECT LOCATION PLAN

SCALE APPROXIMATELY: 1 INCH = 100 FEET



SCHEMATIC PLAN BASED ON SURVEY BY HILL ENGINEERS, ARCHITECTS, PLANNERS NOVEMBER 3, 2009

OWNER & PROJECT PROPONENT

CRANE & COMPANY
30 SOUTH STREET
DALTON, MASSACHUSETTS 01226



FUNDING ASSISTANCE

MASSACHUSETTS CLEAN ENERGY CENTER
55 SUMMER STREET, 9TH FLOOR
BOSTON, MASSACHUSETTS 02110



ENGINEER

GZA GEOENVIRONMENTAL, INC.
249 VANDERBILT AVE
NORWOOD, MASSACHUSETTS 02062



Critical Energy Infrastructure Information (CEII)
material under 18 CFR §388.133(c)

0	DRAFT EXEMPTION APP	CWC	8/9/2010
1	DRAFT EXEMPTION APP	CWC	1/28/2011
2	RECORD DRAWING	CWC	4/29/14
REV. NO.	DESCRIPTION	BY	DATE

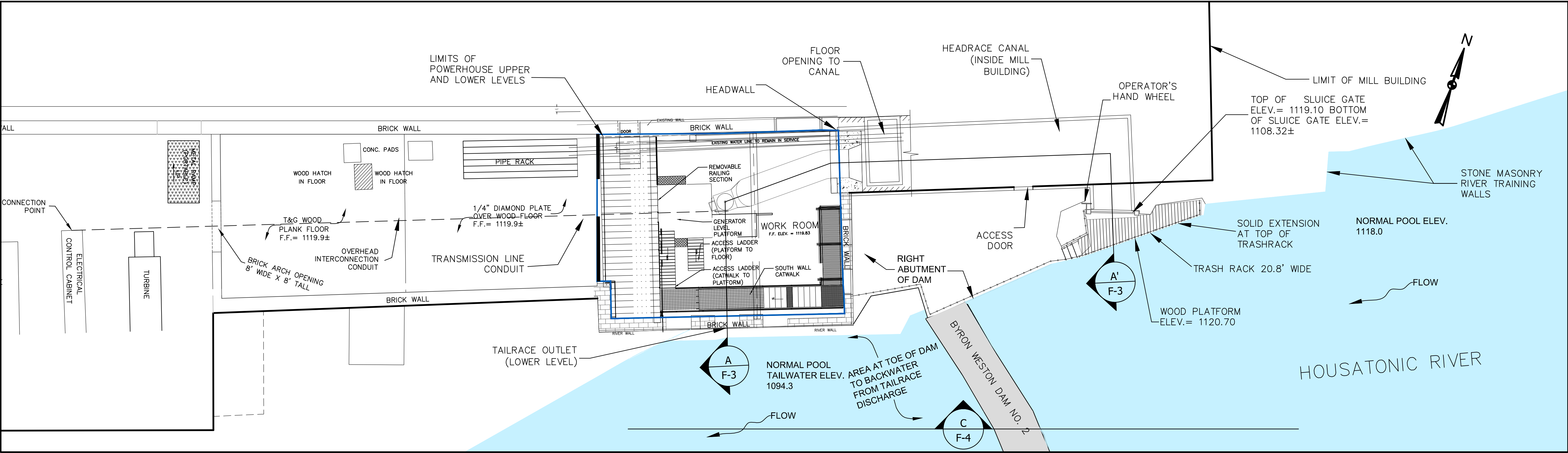


PROJ MGR: KDE REVIEWED BY: CWC
DESIGNED BY: CNF OPERATOR: CNF

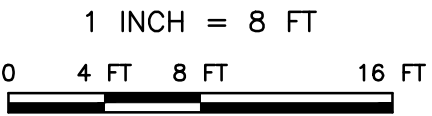
BYRON WESTON HYDROELECTRIC PROJECT
DALTON, MASSACHUSETTS
CRANE & CO.

TITLE SHEET, LOCUS MAPS, & INDEX OF DRAWINGS

Approximate Scale: See Drawing	Date: 04-29-2014	Project No.: P-13583	Drawing No.: F-1
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PLAN OVERVIEW (AT MILL GROUND FLOOR ELEVATION)



Critical Energy Infrastructure Information (CEII)
material under 18 CFR §388.133(c)

- NOTES:
- 1) FIGURES BASED UPON GZA RECORD DRAWINGS DATED DECEMBER 4, 2013
 - 2) VERTICAL DATUM BASED UPON NAVD 1988
 - 3) TRASHRACK DETAILS SHOWN ON F-3

BYRON WESTON HYDROELECTRIC PROJECT
DALTON, MASSACHUSETTS
CRANE & CO.

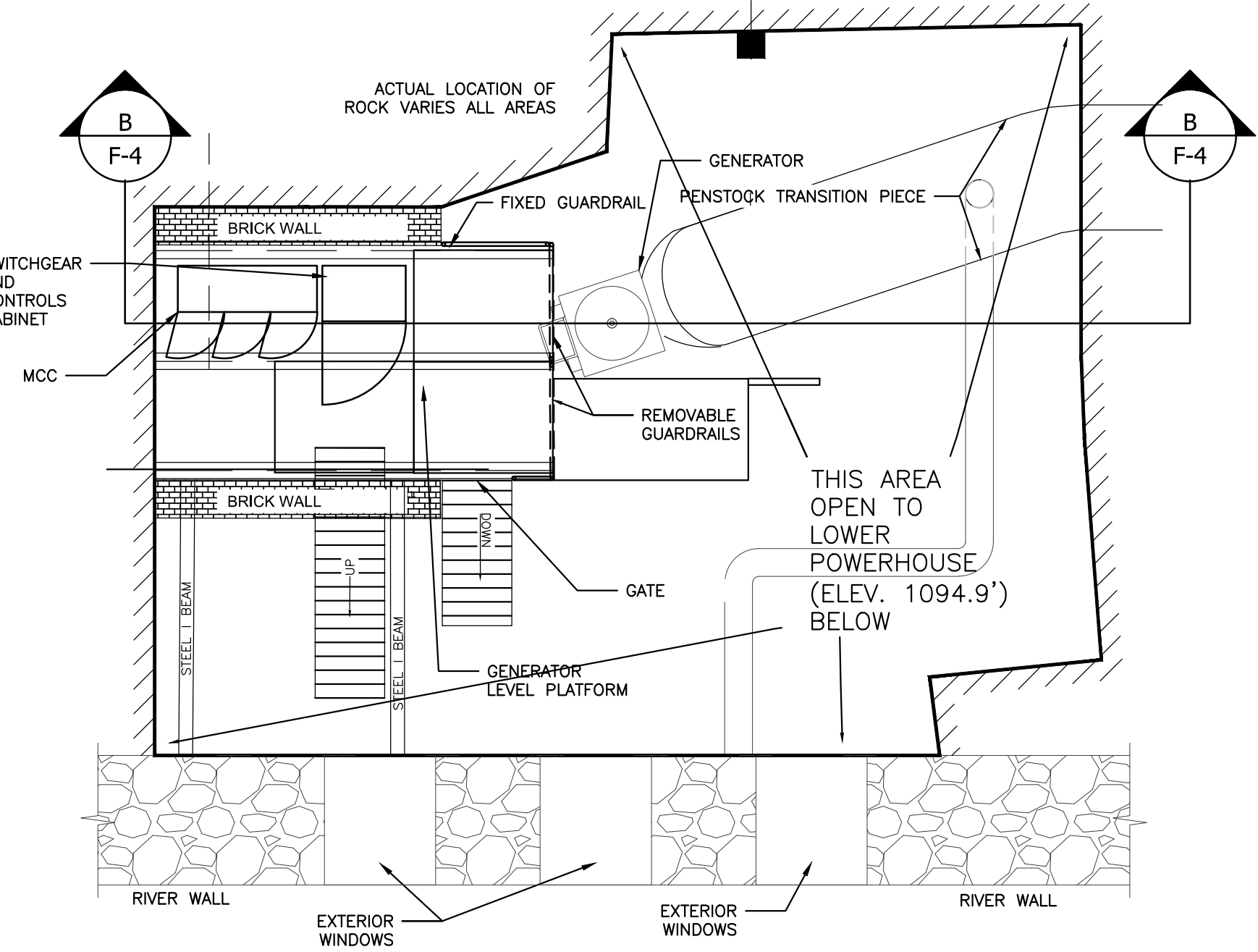
POWERHOUSE AREA PLAN

Approximate Scale:	Date:	Project No.:	Drawing No.:
See Drawing	04-29-2014	P-13583	F-2

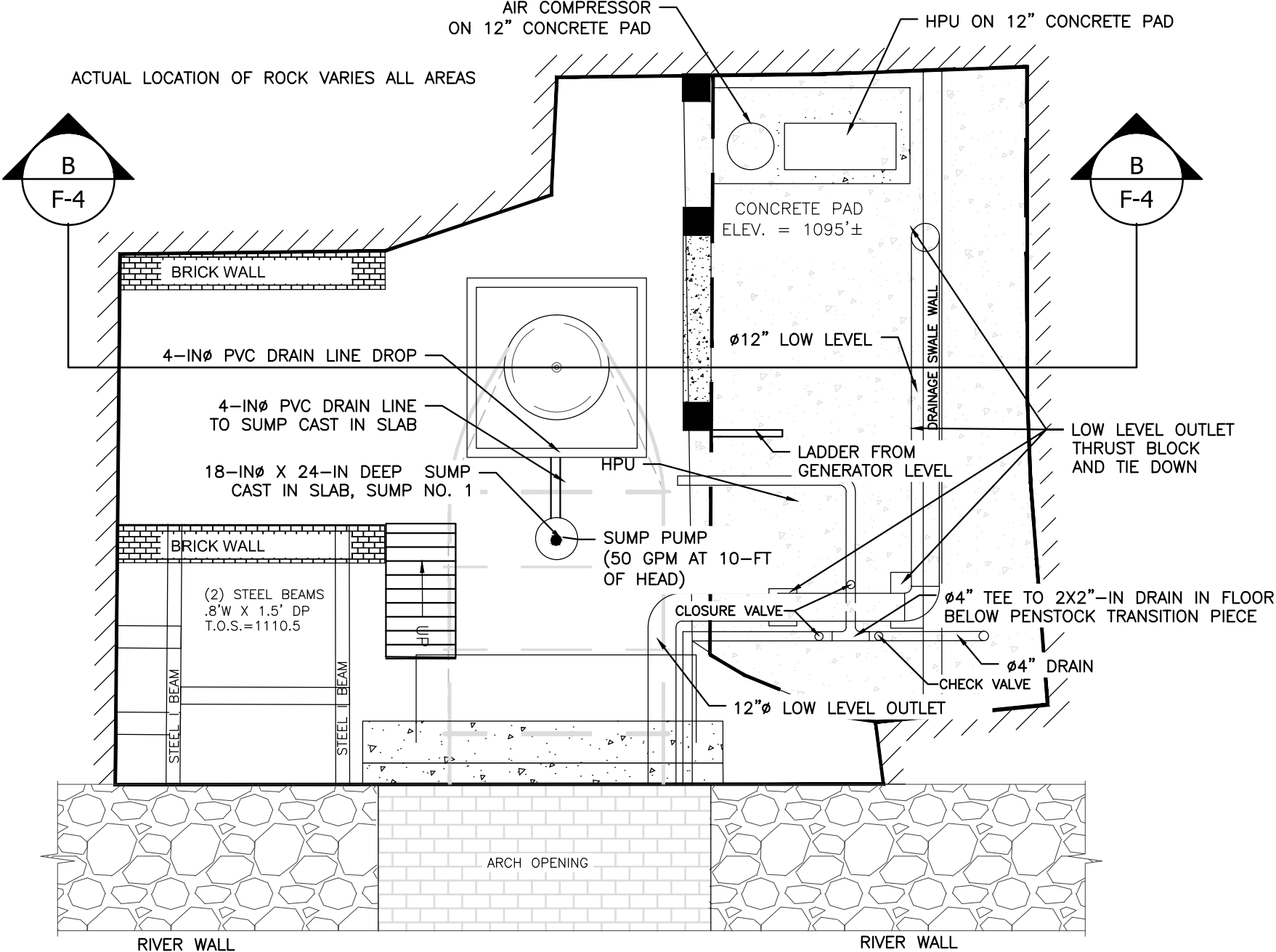
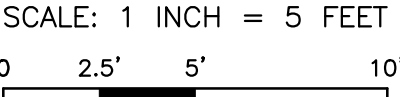
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1	DRAFT EXEMPTION APP	CWC	1/28/2011
2	RECORD DRAWING	CWC	4/29/2014
REV. NO.	DESCRIPTION	BY	DATE

GZA GeoEnvironmental, Inc.
Engineers and Scientists
249 VANDERBILT AVENUE
NORWOOD, MASSACHUSETTS 02062
(781) 278-3700

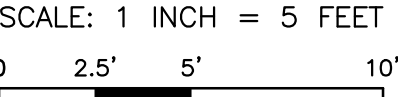
PROJ MGR: KDE REVIEWED BY: CWC
DESIGNED BY: CNF OPERATOR: CNF

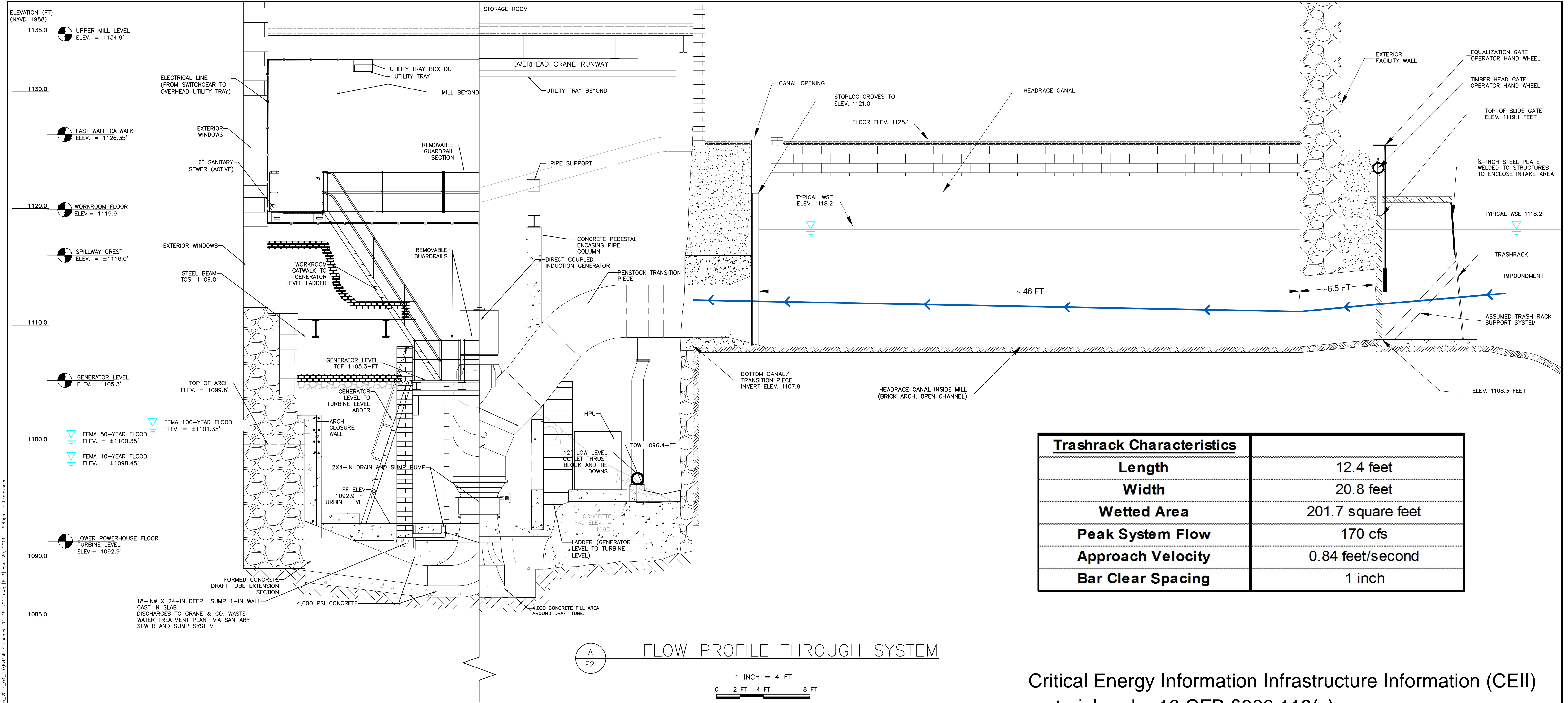


UPPER POWERHOUSE – GENERATOR
LEVEL (FLOOR ELEV. 1105.3')



LOWER POWERHOUSE – TURBINE
LEVEL (FLOOR ELEV. 1092.9')





Trashrack Characteristics	
Length	12.4 feet
Width	20.8 feet
Wetted Area	201.7 square feet
Peak System Flow	170 cfs
Approach Velocity	0.84 feet/second
Bar Clear Spacing	1 inch

Critical Energy Information Infrastructure Information (CEII) material under 18 CFR §388.113(c)

Turbine Characteristics	
Manufacturer	Canadian Hydro Components, LTD
Type	Double Regulated Kaplan
General Configuration	Vertical
Runner Diameter	900 mm
Number of Blades	4
Turbine Operation Speed	514 RPM
Peak Flow	170 cfs
Peak Turbine Power	255 kW

Generator Characteristics	
Manufacturer	Potencia / Tatum
Type	Induction
Drive Mechanism	Direct Couple
General Configuration	Vertical
Nameplate Capacity	250 kW
Peak Generator Output	237 kW
Generator Operation Speed	514 RPM
Voltage	600 V

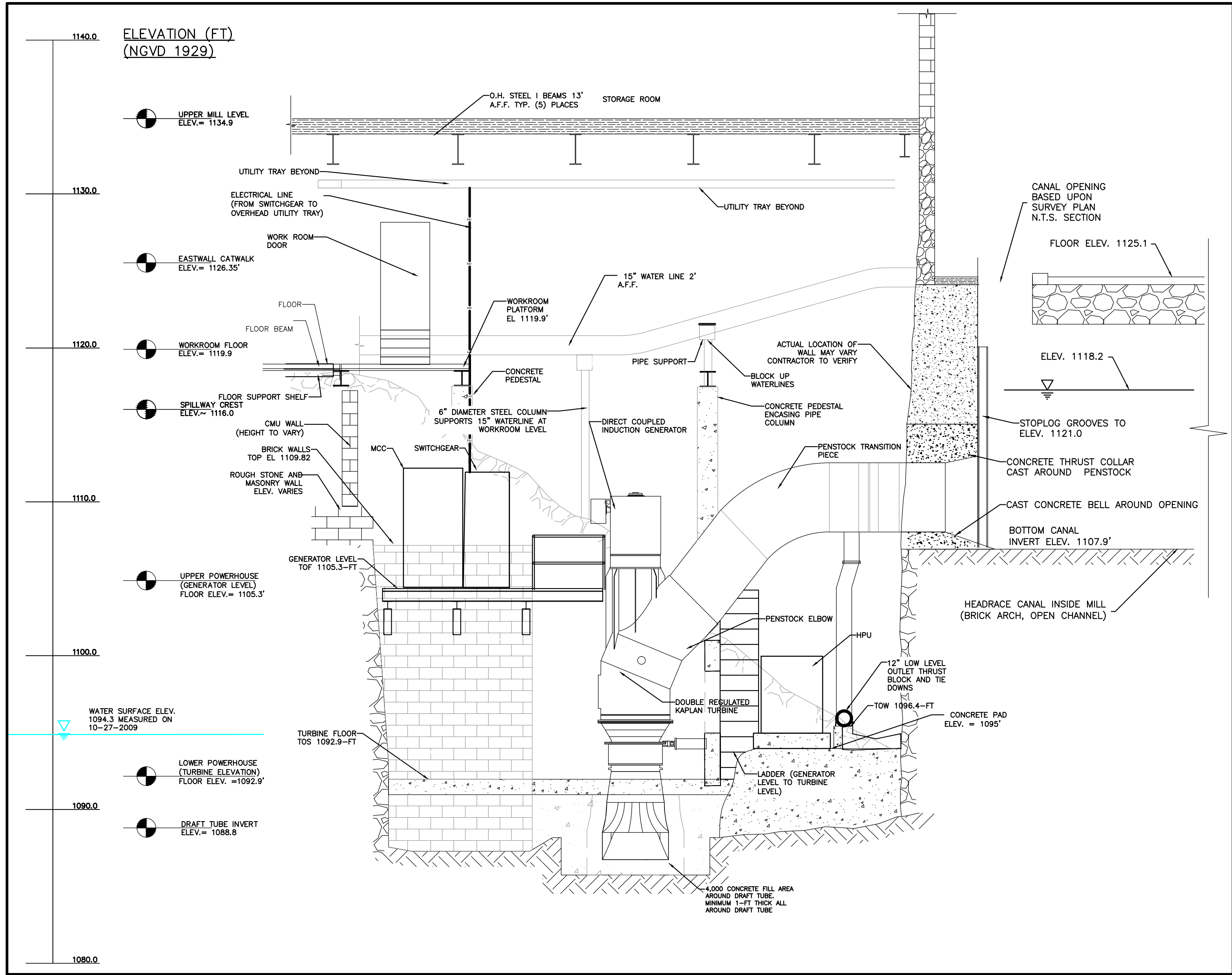
0	DRAFT EXEMPTION APP	CWC	8/9/2010
1	DRAFT EXEMPTION APP	CWC	1/28/2011
2	EXEMPTION APP DEFICIENCIES	CWC	6/17/2011
3	RECORD DRAWING	CWC	4/29/2014

REV. NO.	DESCRIPTION	BY	DATE
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GZA GeoEnvironmental, Inc.
Engineers and Scientists
249 VANDERBILT AVENUE
NORWOOD, MASSACHUSETTS 02062
(781) 278-3700

PROJ MGR: KDE REVIEWED BY: CWC
DESIGNED BY: CNF OPERATOR: CNF

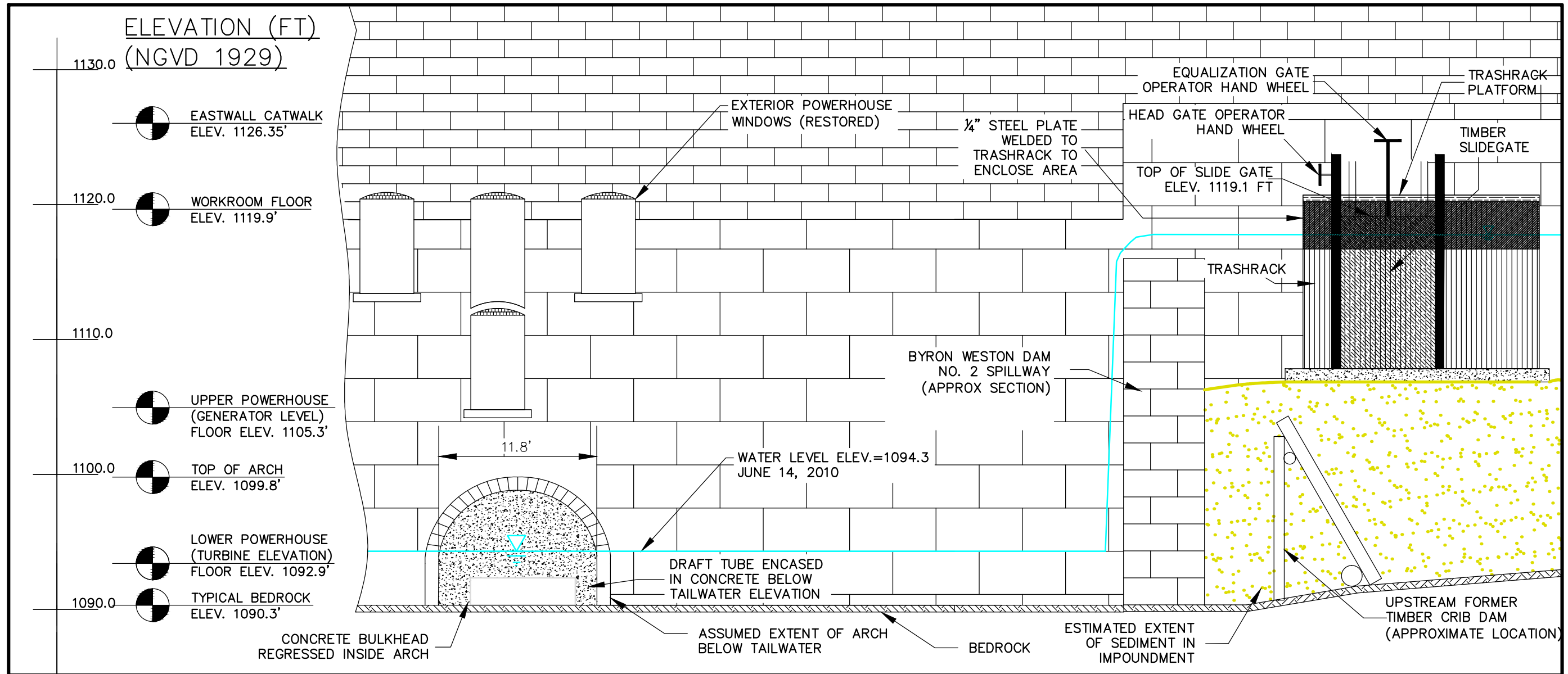
BYRON WESTON HYDROELECTRIC PROJECT DALTON, MASSACHUSETTS CRANE & COMPANY			
FLOW PROFILE THROUGH SYSTEM			
Approximate Scale:	Date:	Project No.:	Drawing No.:
See Drawing	04-29-2014	P-13583	F-3



SECTION VIEW INSIDE OF POWERHOUSE AREA (B F3)

SCALE: 1 INCH = 5 FEET

0 2.5' 5' 10'



POWERHOUSE EXTERIOR ELEVATION AT TAILRACE (C F3)

SCALE: 1 INCH = 8 FEET

0 4 FT 8 FT 16 FT

Critical Energy Infrastructure Information (CEII)
material under 18 CFR §388.133(c)

0	DRAFT EXEMPTION APP	CWC	8/9/2010
1	DRAFT EXEMPTION APP	CWC	1/28/2011
2	EXEMPTION APP DEFICIENCIES	CWC	6/17/2011
3	RECORD DRAWING	CWC	4/29/2014
REV. NO.	DESCRIPTION	BY	DATE

GZA GeoEnvironmental, Inc.
Engineers and Scientists
249 VANDERBILT AVENUE
NORWOOD, MASSACHUSETTS 02062
(781) 278-3700

PROJ MGR: KDE REVIEWED BY: CWC
DESIGNED BY: CNF OPERATOR: CNF

BYRON WESTON HYDROELECTRIC PROJECT
DALTON, MASSACHUSETTS
CRANE & COMPANY

POWERHOUSE SECTIONS

Approximate Scale:	Date:	Project No.:	Drawing No.:
See Drawing	04-29-2014	P-13583	F-4



Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 2 – Determination of Applicability

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

A. General Information

Important:

When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



From:

Dalton
Conservation Commission

To: Applicant

Crane & Company

Name

30 South Street

Mailing Address

Dalton

MA

01226

City/Town

State

Zip Code

Property Owner (if different from applicant):

Name

Mailing Address

City/Town

State

Zip Code

1. Title and Date (or Revised Date if applicable) of Final Plans and Other Documents:

Request for Determination of Applicability

April 20, 2011

Title

Date

Title

Date

Title

Date

2. Date Request Filed:

April 25, 2011

B. Determination

Pursuant to the authority of M.G.L. c. 131, § 40, the Conservation Commission considered your Request for Determination of Applicability, with its supporting documentation, and made the following Determination.

Project Description (if applicable):

Install a solid metal plate that connects the trashrack to the top of the platform. The metal plate will be utilized to exclude fish and debris from entering the intake. The wooden plate will also be utilized to assist in clearing debris from the trashrack by providing a smooth transition from trashrack to platform.

Project Location:

800 Main Street

Street Address

110

Assessors Map/Plot Number

Dalton

City/Town

202

Parcel/Lot Number



Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 2 – Determination of Applicability

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

B. Determination (cont.)

The following Determination(s) is/are applicable to the proposed site and/or project relative to the Wetlands Protection Act and regulations:

Positive Determination

Note: No work within the jurisdiction of the Wetlands Protection Act may proceed until a final Order of Conditions (issued following submittal of a Notice of Intent or Abbreviated Notice of Intent) or Order of Resource Area Delineation (issued following submittal of Simplified Review ANRAD) has been received from the issuing authority (i.e., Conservation Commission or the Department of Environmental Protection).

☐ 1. The area described on the referenced plan(s) is an area subject to protection under the Act. Removing, filling, dredging, or altering of the area requires the filing of a Notice of Intent.

☐ 2a. The boundary delineations of the following resource areas described on the referenced plan(s) are confirmed as accurate. Therefore, the resource area boundaries confirmed in this Determination are binding as to all decisions rendered pursuant to the Wetlands Protection Act and its regulations regarding such boundaries for as long as this Determination is valid.

☐ 2b. The boundaries of resource areas listed below are not confirmed by this Determination, regardless of whether such boundaries are contained on the plans attached to this Determination or to the Request for Determination.

☐ 3. The work described on referenced plan(s) and document(s) is within an area subject to protection under the Act and will remove, fill, dredge, or alter that area. Therefore, said work requires the filing of a Notice of Intent.

☐ 4. The work described on referenced plan(s) and document(s) is within the Buffer Zone and will alter an Area subject to protection under the Act. Therefore, said work requires the filing of a Notice of Intent or ANRAD Simplified Review (if work is limited to the Buffer Zone).

☐ 5. The area and/or work described on referenced plan(s) and document(s) is subject to review and approval by:

Name of Municipality

Pursuant to the following municipal wetland ordinance or bylaw:

Name

Ordinance or Bylaw Citation



Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 2 – Determination of Applicability

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

B. Determination (cont.)

- ☐ 6. The following area and/or work, if any, is subject to a municipal ordinance or bylaw but not subject to the Massachusetts Wetlands Protection Act:

- ☐ 7. If a Notice of Intent is filed for the work in the Riverfront Area described on referenced plan(s) and document(s), which includes all or part of the work described in the Request, the applicant must consider the following alternatives. (Refer to the wetland regulations at 10.58(4)c. for more information about the scope of alternatives requirements):

- ☐ Alternatives limited to the lot on which the project is located.
- ☐ Alternatives limited to the lot on which the project is located, the subdivided lots, and any adjacent lots formerly or presently owned by the same owner.
- ☐ Alternatives limited to the original parcel on which the project is located, the subdivided parcels, any adjacent parcels, and any other land which can reasonably be obtained within the municipality.
- ☐ Alternatives extend to any sites which can reasonably be obtained within the appropriate region of the state.

Negative Determination

Note: No further action under the Wetlands Protection Act is required by the applicant. However, if the Department is requested to issue a Superseding Determination of Applicability, work may not proceed on this project unless the Department fails to act on such request within 35 days of the date the request is post-marked for certified mail or hand delivered to the Department. Work may then proceed at the owner's risk only upon notice to the Department and to the Conservation Commission. Requirements for requests for Superseding Determinations are listed at the end of this document.

- ☐ 1. The area described in the Request is not an area subject to protection under the Act or the Buffer Zone.
- ☒ 2. The work described in the Request is within an area subject to protection under the Act, but will not remove, fill, dredge, or alter that area. Therefore, said work does not require the filing of a Notice of Intent.
- ☐ 3. The work described in the Request is within the Buffer Zone, as defined in the regulations, but will not alter an Area subject to protection under the Act. Therefore, said work does not require the filing of a Notice of Intent, subject to the following conditions (if any).

- ☐ 4. The work described in the Request is not within an Area subject to protection under the Act (including the Buffer Zone). Therefore, said work does not require the filing of a Notice of Intent, unless and until said work alters an Area subject to protection under the Act.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
WPA Form 2 – Determination of Applicability
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

B. Determination (cont.)

- ☐ 5. The area described in the Request is subject to protection under the Act. Since the work described therein meets the requirements for the following exemption, as specified in the Act and the regulations, no Notice of Intent is required:

Exempt Activity (site applicable statutory/regulatory provisions)

- ☐ 6. The area and/or work described in the Request is not subject to review and approval by:

Name of Municipality

Pursuant to a municipal wetlands ordinance or bylaw.

Name

Ordinance or Bylaw Citation

C. Authorization

This Determination is issued to the applicant and delivered as follows:

☐ by hand delivery on

☒ by certified mail, return receipt requested on

Date

June 7, 2011

Date

This Determination is valid for three years from the date of issuance (except Determinations for Vegetation Management Plans which are valid for the duration of the Plan). This Determination does not relieve the applicant from complying with all other applicable federal, state, or local statutes, ordinances, bylaws, or regulations.

This Determination must be signed by a majority of the Conservation Commission. A copy must be sent to the appropriate DEP Regional Office (see <http://www.mass.gov/dep/aboutregion.findyour.htm>) and the property owner (if different from the applicant).

Signatures:

Ether Balardini
Valerie A. Gero
Domenick F. Sacco

Edward Gero
T. Becker

June 7, 2011

Date



Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 2 – Determination of Applicability

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

D. Appeals

The applicant, owner, any person aggrieved by this Determination, any owner of land abutting the land upon which the proposed work is to be done, or any ten residents of the city or town in which such land is located, are hereby notified of their right to request the appropriate Department of Environmental Protection Regional Office (see <http://www.mass.gov/dep/about/region.findyour.htm>) to issue a Superseding Determination of Applicability. The request must be made by certified mail or hand delivery to the Department, with the appropriate filing fee and Fee Transmittal Form (see Request for Departmental Action Fee Transmittal Form) as provided in 310 CMR 10.03(7) within ten business days from the date of issuance of this Determination. A copy of the request shall at the same time be sent by certified mail or hand delivery to the Conservation Commission and to the applicant if he/she is not the appellant. The request shall state clearly and concisely the objections to the Determination which is being appealed. To the extent that the Determination is based on a municipal ordinance or bylaw and not on the Massachusetts Wetlands Protection Act or regulations, the Department of Environmental Protection has no appellate jurisdiction.



Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
Request for Departmental Action Fee Transmittal Form
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

A. Request Information

Important:
When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



1. Person or party making request (if appropriate, name the citizen group's representative):

Name

Mailing Address

City/Town

State

Zip Code

Phone Number

Fax Number (if applicable)

Project Location

Mailing Address

City/Town

State

Zip Code

2. Applicant (as shown on Notice of Intent (Form 3), Abbreviated Notice of Resource Area Delineation (Form 4A); or Request for Determination of Applicability (Form 1)):

Name

Mailing Address

City/Town

State

Zip Code

Phone Number

Fax Number (if applicable)

3. DEP File Number:

B. Instructions

1. When the Departmental action request is for (check one):
- ☐ Superseding Order of Conditions (\$100 for individual single family homes with associated structures; \$200 for all other projects)
 - ☐ Superseding Determination of Applicability (\$100)
 - ☐ Superseding Order of Resource Area Delineation (\$100)

Send this form and check or money order for the appropriate amount, payable to the *Commonwealth of Massachusetts* to:

Department of Environmental Protection
Box 4062
Boston, MA 02211



Massachusetts Department of Environmental Protection

Bureau of Resource Protection - Wetlands

Request for Departmental Action Fee Transmittal Form

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

B. Instructions (cont.)

2. On a separate sheet attached to this form, state clearly and concisely the objections to the Determination or Order which is being appealed. To the extent that the Determination or Order is based on a municipal bylaw, and not on the Massachusetts Wetlands Protection Act or regulations, the Department has no appellate jurisdiction.
3. Send a **copy** of this form and a **copy** of the check or money order with the Request for a Superseding Determination or Order by certified mail or hand delivery to the appropriate DEP Regional Office (see <http://www.mass.gov/dep/about/region/findyour.htm>).
4. A copy of the request shall at the same time be sent by certified mail or hand delivery to the Conservation Commission and to the applicant, if he/she is not the appellant.



Appendix G – Supplemental Documentation for Threatened and Endangered Species

FEDERALLY LISTED ENDANGERED AND THREATENED SPECIES IN MASSACHUSETTS

COUNTY	SPECIES	FEDERAL STATUS	GENERAL LOCATION/HABITAT	TOWNS
Barnstable	Piping Plover	Threatened	Coastal Beaches	All Towns
	Roseate Tern	Endangered	Coastal beaches and the Atlantic Ocean	All Towns
	Northeastern beach tiger beetle	Threatened	Coastal Beaches	Chatham
	Sandplain gerardia	Endangered	Open areas with sandy soils.	Sandwich and Falmouth.
	Northern Red-bellied Cooter	Endangered	Inland Ponds and Rivers	Bourne (north of the Cape Cod Canal)
	Red Knot ¹	Threatened	Coastal Beaches and Rocky Shores, sand and mud flats	Coastal Towns
	Northern Long-eared Bat	Threatened Final 4(d) Rule	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide
Berkshire	Bog Turtle	Threatened	Wetlands	Egremont and Sheffield
	Northern Long-eared Bat	Threatened Final 4(d) Rule	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide
Bristol	Piping Plover	Threatened	Coastal Beaches	Fairhaven, Dartmouth, Westport
	Roseate Tern	Endangered	Coastal beaches and the Atlantic Ocean	Fairhaven, New Bedford, Dartmouth, Westport
	Northern Red-bellied Cooter	Endangered	Inland Ponds and Rivers	Taunton
	Red Knot ¹	Threatened	Coastal Beaches and Rocky Shores, sand and mud flats	Coastal Towns
	Northern Long-eared Bat	Threatened Final 4(d) Rule	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide
Dukes	Roseate Tern	Endangered	Coastal beaches and the Atlantic Ocean	All Towns
	Piping Plover	Threatened	Coastal Beaches	All Towns
	Northeastern beach tiger beetle	Threatened	Coastal Beaches	Aquinnah and Chilmark
	Sandplain gerardia	Endangered	Open areas with sandy soils.	West Tisbury
	Red Knot ¹	Threatened	Coastal Beaches and Rocky Shores, sand and mud flats	Coastal Towns
	Northern Long-eared Bat	Threatened Final 4(d) Rule	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide

Updated 02/05/2016

**FEDERALLY LISTED ENDANGERED AND THREATENED SPECIES
IN MASSACHUSETTS**

COUNTY	SPECIES	FEDERAL STATUS	GENERAL LOCATION/HABITAT	TOWNS
Essex	Small whorled Pogonia	Threatened	Forests with somewhat poorly drained soils and/or a seasonally high water table	Gloucester, Essex and Manchester
	Piping Plover	Threatened	Coastal Beaches	Gloucester, Essex, Ipswich, Rowley, Revere, Newbury, Newburyport and Salisbury
	Red Knot ¹	Threatened	Coastal Beaches and Rocky Shores, sand and mud flats	Coastal Towns
	Northern Long-eared Bat	Threatened Final 4(d) Rule	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide
Franklin	Northeastern bulrush	Endangered	Wetlands	Montague, Warwick
	Dwarf wedgemussel	Endangered	Mill River	Whately
	Northern Long-eared Bat	Threatened Final 4(d) Rule	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide
Hampshire	Small whorled Pogonia	Threatened	Forests with somewhat poorly drained soils and/or a seasonally high water table	Hadley
	Puritan tiger beetle	Threatened	Sandy beaches along the Connecticut River	Northampton and Hadley
	Dwarf wedgemussel	Endangered	Rivers and Streams.	Hatfield, Amherst and Northampton
	Northern Long-eared Bat	Threatened Final 4(d) Rule	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide
Hampden	Small whorled Pogonia	Threatened	Forests with somewhat poorly drained soils and/or a seasonally high water table	Southwick
	Northern Long-eared Bat	Threatened Final 4(d) Rule	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide
Middlesex	Small whorled Pogonia	Threatened	Forests with somewhat poorly drained soils and/or a seasonally high water table	Groton
	Northern Long-eared Bat	Threatened Final 4(d) Rule	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide
Nantucket	Piping Plover	Threatened	Coastal Beaches	Nantucket
	Roseate Tern	Endangered	Coastal beaches and the Atlantic Ocean	Nantucket
	American burying beetle	Endangered	Upland grassy meadows	Nantucket
	Red Knot ¹	Threatened	Coastal Beaches and Rocky Shores, sand and mud flats	Coastal Towns
	Northern Long-eared Bat	Threatened Final 4(d) Rule	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide

**FEDERALLY LISTED ENDANGERED AND THREATENED SPECIES
IN MASSACHUSETTS**

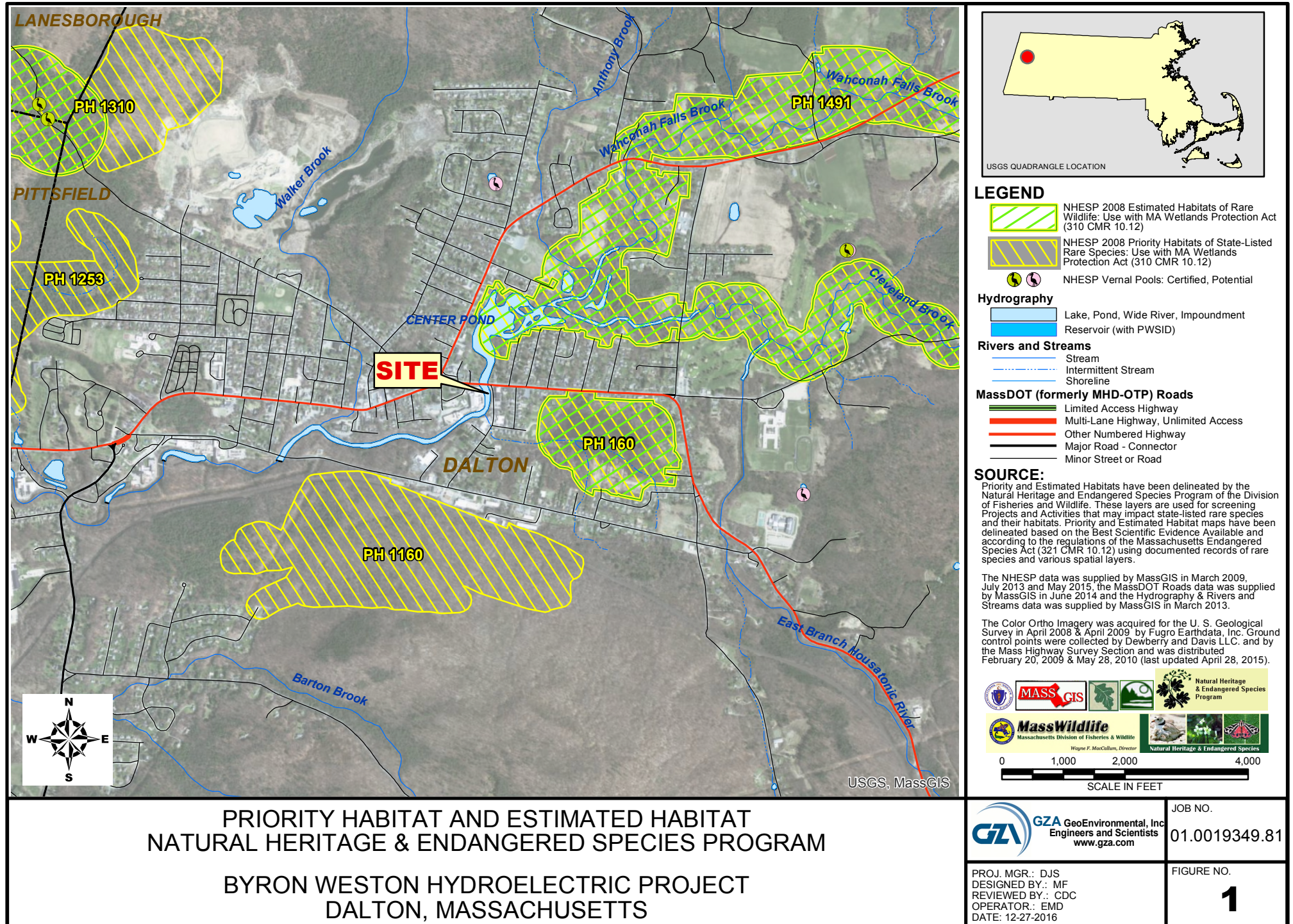
COUNTY	SPECIES	FEDERAL STATUS	GENERAL LOCATION/HABITAT	TOWNS
Plymouth	Piping Plover	Threatened	Coastal Beaches	Scituate, Marshfield, Duxbury, Plymouth, Wareham and Mattapoisett
	Northern Red-bellied Cooter	Endangered	Inland Ponds and Rivers	Kingston, Middleborough, Carver, Plymouth, Bourne, Wareham, Halifax, and Pembroke
	Roseate Tern	Endangered	Coastal beaches and the Atlantic Ocean	Plymouth, Marion, Wareham, and Mattapoisett.
	Red Knot ¹	Threatened	Coastal Beaches and Rocky Shores, sand and mud flats	Coastal Towns
	Northern Long-eared Bat	Threatened Final 4(d) Rule	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide
Suffolk	Piping Plover	Threatened	Coastal Beaches	Revere, Winthrop
	Red Knot ¹	Threatened	Coastal Beaches and Rocky Shores, sand and mud flats	Coastal Towns
	Northern Long-eared Bat	Threatened Final 4(d) Rule	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide
Worcester	Small whorled Pogonia	Threatened	Forests with somewhat poorly drained soils and/or a seasonally high water table	Leominster
	Northern Long-eared Bat	Threatened Final 4(d) Rule	Winter- mines and caves, Summer – wide variety of forested habitats	Statewide

¹Migratory only, scattered along the coast in small numbers

-Eastern cougar and gray wolf are considered extirpated in Massachusetts.

-Endangered gray wolves are not known to be present in Massachusetts, but dispersing individuals from source populations in Canada may occur statewide.

-Critical habitat for the Northern Red-bellied Cooter is present in Plymouth County.





MassWildlife

Commonwealth of Massachusetts

Division of Fisheries & Wildlife

Wayne F. MacCallum, *Director*

April 30, 2010

Chad Cox
GZA GeoEnvironmental
1 Edgewater Drive
Norwood MA 02062

RE: Project Location: Byron Weston Dam No. 2
Town: DALTON
NHESP Tracking No.: 08-25116

To Whom It May Concern:

Thank you for contacting the Natural Heritage and Endangered Species Program ("NHESP") of the MA Division of Fisheries & Wildlife for information regarding state-listed rare species in the vicinity of the above referenced site. Although this project site is not currently located within Priority Habitat as indicated in the *Massachusetts Natural Heritage Atlas* (13th Edition), the NHESP has received information about the presence of two state-listed dragonflies in the vicinity of the subject site. As a result, this project site, or a portion thereof, may be mapped as Priority Habitat in a future edition of the *Massachusetts Natural Heritage Atlas*.

The following state-listed rare species have been found in the vicinity of the site:

<u>Scientific name</u>	<u>Common Name</u>	<u>Taxonomic Group</u>	<u>State Status</u>
<i>Boyeria grafiana</i>	Ocellated Darner	Dragonfly	Special Concern
<i>Stylurus scudderi</i>	Zebra Clubtail	Dragonfly	Special Concern

The species listed above are protected under the Massachusetts Endangered Species Act (MESA) (M.G.L. c. 131A) and its implementing regulations (321 CMR 10.00). State-listed wildlife are also protected under the state's Wetlands Protection Act (WPA) (M.G.L. c. 131, s. 40) and its implementing regulations (310 CMR 10.00). Fact sheets for most state-listed rare species can be found on our website (www.nhesp.org).

This evaluation is based on the most recent information available in the NHESP database, which is constantly being expanded and updated through ongoing research and inventory. If you have any questions regarding this letter please contact Emily Holt, Endangered Species Review Assistant, at (508) 389-6361.

Sincerely,

Thomas W. French, Ph.D.
Assistant Director

www.masswildlife.org

Division of Fisheries and Wildlife

Field Headquarters, North Drive, Westborough, MA 01581 (508) 389-6300 Fax (508) 389-7891

An Agency of the Department of Fish and Game



**Natural Heritage
& Endangered Species
Program**

www.mass.gov/nhesp

Massachusetts Division of Fisheries & Wildlife

**Ocellated Darner
*Boyeria grafiana***

State Status: **Special Concern**

Federal Status: **None**

DESCRIPTION: The Ocellated Darner is a large, semi-aquatic insect of the order Odonata, suborder Anisoptera (the dragonflies), and family Aeshnidae (the darners). Like all adult dragonflies, the Ocellated Darner has a long, slender abdomen, four wings with dense venation, and a large head with huge eyes and powerful, chewing mouth parts. The Darners are among the largest of the dragonflies, and are further characterized by exceptionally large eyes that wrap around the head and meet along a seam on the top of the head. The Ocellated Darner is dull brown overall with two yellow or greenish spots on the sides of the thorax (winged and legged segment behind the head) and green or greenish-yellow stripes on the top of the thorax. The abdomen is marked with small, dull green to yellow lateral markings. The sexes are similar in appearance, though the pale markings tend to be somewhat brighter and more distinct on males. Both males and females have long, ovate terminal appendages (reproductive structures). The Ocellated Darner is one of two species of spotted darners (*Boyeria*) in North America. Both are readily separated from the other groups of darners by the two pale spots on each side of the thorax.

Ocellated Darners range from about 2.4 to 2.6 inches (60-66 mm) in overall length, with a wingspan averaging approximately 3.4 inches (84 - 88 mm).

The nymphs are long and slender, ranging up to 1.5 inches (38 mm) in length when fully developed. They are dark in coloration with a pale spot on the top of the seventh abdominal segment. They can be identified using various characteristics, as per the keys of Walker (1958), Soltesz (1996), and Needham et al. (2000).



Photo: Blair Nikula

SIMILAR SPECIES: The Ocellated Darner is very similar in appearance to the closely related, but more common and widespread, Fawn Darner (*B. vinosa*). The two can be reliably differentiated only in the hand, using a combination of characteristics. Ocellated Darners average darker and grayer overall than the paler brown Fawn Darner, with the thoracic markings tending to be more pale green to greenish-yellow (vs. yellow in Fawn Darner) and more oval in shape. Fawn Darners have small, dark patches at the base of the wings, and the wings often have a faint amber wash, both characteristics that are typically lacking in Ocellated Darners. However, all of these characteristics are variable and separation of these two species can be difficult.

HABITAT: Ocellated Darners nymphs inhabit clear, shallow, rocky, swift-flowing streams and large, rocky, poorly vegetated lakes. Adults also inhabit nearby uplands, often forests with mixed coniferous and

A Species of Greatest Conservation Need in the Massachusetts State Wildlife Action Plan

Massachusetts Division of Fisheries & Wildlife

1 Rabbit Hill Rd., Westborough, MA; tel: 508-389-6300; fax: 508-389-7890; www.mass.gov/dfw

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deciduous trees. In Massachusetts, Ocellated Darners have been found only in shaded, clear, cold, rocky streams and rivers.

LIFE-HISTORY/BEHAVIOR: The males patrol up and down the shoreline, searching for females. They fly low over the water (generally within a foot of the surface), poking in and out of shoreline indentations and projections, circling around protruding rocks and vegetation. Their flight is swift and very erratic, making them difficult to catch. Unlike most odonates, Ocellated Darners are crepuscular and most active late in the day, often flying until well after sunset. They seem to prefer shaded rather than sunlit areas, and are often active on overcast days. Males have been observed patrolling early in the morning in Massachusetts. Unlike many darners, they are rarely seen away from water and apparently do not take part in the feeding swarms typical of most other species in the family. Ocellated Darners have a late flight season, with most records occurring from August to mid-September.

When not flying, the adults rest by hanging vertically from vegetation in woodlands adjacent to their breeding habitats.

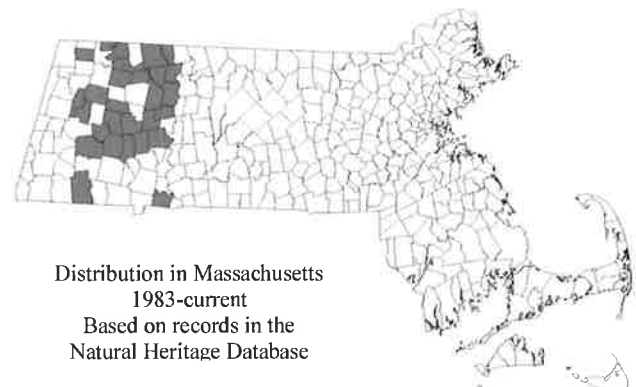
Very little has been published on the life history of Ocellated Darners. However, the closely related Fawn Darner (*B. vinosa*) is better known and presumably the two species share similar life histories. The nymphs are aquatic and seem to spend most of their time clinging upside-down to the underside of rocks and submerged sticks and can often be located by turning over these objects. Darner nymphs are voracious predators and typically are among the dominant predators in their aquatic habitats. Although nothing has been published on the development time of Ocellated Darner nymphs, the nymphs of other species in the family spend anywhere from one to four years developing.

When ready to eclose (transform from nymph to adult), the nymphs crawl out of the water onto exposed rocks, emergent vegetation, or shoreline vegetation. After pulling free from their nymphal skin (exuviae), the teneral (the period when the exoskeleton has yet to harden and the flight muscles have not fully developed) adult dragonflies fly off to nearby upland areas where they spend several days feeding and maturing. Adult Darners feed on a variety of aerial insect prey, which they capture in flight with their legs. The legs are lined

with spines which allow the dragonfly to securely grasp their prey.

When ready to breed, the males return to their aquatic habitats and take up their shoreline patrols, looking to mate with females. Females are generally not seen at these male-dominated wetlands until the brief period when they are ready to mate and lay eggs. When a male encounters a female, he attempts to grasp her in the back of her head with claspers located on the end of his abdomen. If the female is receptive, she allows the male to grasp her, then curls the tip of her abdomen upward to connect with the male's sexual organs located on the underside of his second abdominal segment, thus forming the familiar heart-shaped "wheel" typical of all Odonata: the male above and the female below. In this position, the pair flies off to mate, generally hidden high in nearby trees where they are less vulnerable to predators.

Females have been observed in Massachusetts dipping their abdomen into the water and mud along river banks, presumably laying eggs. Like other darners, female Ocellated Darners have a long, thin ovipositor projecting from the underside of the end of the abdomen. They use this ovipositor to slice into emergent vegetation and rotting, submerged logs where they lay their eggs. It is not known how long the eggs take to develop into nymphs.



RANGE: Ocellated Darners range through eastern North America from Minnesota, Ontario and Nova Scotia, south to Georgia and Mississippi. The species is fairly common and widespread in Canada and northern New England, but is rather rare and local in the south, where

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it is confined to higher elevations, primarily in the Appalachians.

POPULATION STATUS IN MASSACHUSETTS:

Ocellated Darners are listed as a Species of Special Concern in Massachusetts. As with all species listed in Massachusetts, individuals of the species are protected from take (picking, collecting, killing, sale, etc...) and sale under the Massachusetts Endangered Species Act. Most reports to date come from the Green, Deerfield, and Westfield river systems (all tributaries of the Connecticut River). An historical record from Wareham in Plymouth County seems questionable and requires confirmation.

The late flight season and inconspicuous habits of Ocellated Darners have likely resulted in populations of the species being overlooked. There are a number of streams and lakes in western Massachusetts that seem to have suitable habitat and further field work will likely reveal additional sites, particularly in Berkshire County.

MANAGEMENT RECOMMENDATIONS: As for many rare species, the exact needs for management of Ocellated Darners are not known. As with most odonate species, water quality is of primary concern to the well-being of Ocellated Darners. Although the known Massachusetts sites seem to be fairly well-protected, many of these rivers are paralleled by roadways for much of their length, and salt and other road contaminant run-off is of concern. Siltation from construction or erosion may also cause problems. Low-level recreational use from fisherman and canoeists probably has little impact on odonate populations, but should be monitored. The upland borders of these river systems are also crucial to the well-being of odonate populations as they are critical for feeding, resting, and maturation. Development of these areas should be discouraged, and the preservation of remaining undeveloped uplands should be a priority.

REFERENCES:

- Dunkle, S.W. 2000. Dragonflies Through Binoculars. Oxford University Press.
- Needham, J.G., M.J. Westfall, Jr., and M.L. May. 2000. Dragonflies of North America. Scientific Publishers.
- Nikula, B., J.L. Ryan, and M.R. Burne. 2007. A FieldGuide to the Dragonflies and Damselflies of Massachusetts. Massachusetts Natural Heritage and Endangered Species Program.
- Soltesz, K. 1996. Identification Keys to Northeastern Anisoptera Larvae. Center for Conservation and Biodiversity, University of Connecticut.
- Walker, E.M. 1958. The Odonata of Canada and Alaska, Vol. II. University of Toronto Press.

OCELLATED DARNER FLIGHT PERIOD:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Updated 2015

A Species of Greatest Conservation Need in the Massachusetts State Wildlife Action Plan

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Natural Heritage & Endangered Species Program

Massachusetts Division of Fisheries & Wildlife
1 Rabbit Hill Road, Westborough, MA 01581
tel: (508) 389-6360, fax: (508) 389-7891
www.nhesp.org

Zebra Clubtail *Stylurus scudderi*

State Status: **None**
Federal Status: **None**

DESCRIPTION: The Zebra Clubtail (*Stylurus scudderi*) is a large insect belonging to the order Odonata, sub-order Anisoptera (the dragonflies), and family Gomphidae (clubtails). Clubtails are a distinctive group of dragonflies that generally inhabit flowing waters, though they can be found at a variety of habitats, including ponds and lakes. Clubtails also have the distinction of being the only group of dragonflies in Massachusetts to have widely separated eyes. The name clubtail refers to a swelling in the distal segments of these dragonflies' abdomens, creating a form not unlike a club that varies in width from species to species. The Zebra Clubtail possesses a rather wide club, nearly as wide as the thorax (section behind the head), which includes the seventh, eighth, and ninth segments (dragonflies and damselflies have ten abdominal segments). The Zebra Clubtail is a very striking insect with black and yellow patterning (which prompted its naming) and bright green eyes. The face is green with black cross stripes. The dark brown thorax has two large buff white stripes on each side. The black abdomen is marked with pale yellow rings. Abdominal segments eight and nine have a large yellowish spot located laterally on each side, while segment seven has a smaller spot in the same location. The three pairs of powerful legs are jet black and lined with spines which aid in catching the small aerial insects these insects feed on. Zebra Clubtails perch horizontally on rocks, logs, vegetation or the ground with their wings held horizontal, like those of an airplane.

Adult Zebra Clubtails range from 2 to 2.3 inches (52 to 59 mm) in length. Although male and female Zebra Clubtails appear similar in their coloration, the female is slightly larger with a reduced "club."

SIMILAR SPECIES: Although many of the clubtails are similar in appearance, the Zebra Clubtail is a large and distinctively marked species. A combination of factors, including its ringed abdomen, green eyes, terminal abdominal appendages (males), hamules (males) and vulvar lamina (females), help to easily distinguish this species from all other dragonflies in Massachusetts (Needham *et al.* 1999). The nymphs can be distinguished by characteristics of the abdominal segments and palpal lobes as shown in the keys in Walker (1958) and Soltesz (1996).

HABITAT: Zebra Clubtails inhabit medium-sized forested streams which usually have some intermittent rapids. These streams are generally sandy-bottomed with slow to moderate flow. Elsewhere within its range, the Zebra Clubtail has occasionally been found on large lakes.



LIFE-HISTORY/BEHAVIOR: The Zebra Clubtail is a late flying species. Emergence in Massachusetts probably occurs in early July. Following maturation, which may take a week, Zebra Clubtails can be seen at breeding habitat from mid-July through early September.

Dragonflies are an understudied group of insects. As a result there has been little published on their habits and general life histories. This is true for the Zebra Clubtail, for which there is a paucity of published material. However, information that has been published on other related species is most likely applicable.

During their complete life cycle, dragonflies go through two distinct stages, a nymph stage where they are wholly aquatic, and an aerial adult stage. Zebra Clubtail nymphs spend much of their time buried in the sand at the bottom of their stream habitat where they wait to ambush almost any animal that is a suitable size.

ZEBRA CLUBTAIL FLIGHT PERIOD

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

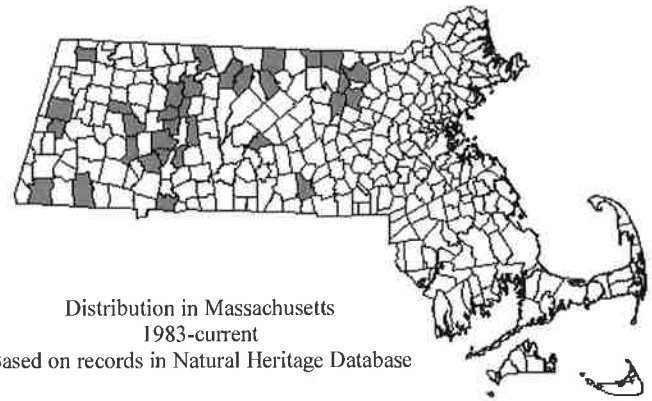
Dragonfly and damselfly nymphs are unique in their mode of prey capture. They have a hinged labium (lower lip) which can be extended rapidly to secure their prey. The victim can then be moved back to the mandibles to be eaten. The wide variety of prey includes aquatic insects, small fish, and tadpoles. While in the nymph stage, the dragonflies will molt up to 10 times, growing each time. When the nymph reaches a certain size, they enter the last developmental stage. Although it is not known how long it takes for Zebra Clubtail nymphs to fully develop, in similarly sized dragonflies it takes about a year.

The final stage of development in dragonflies is emergence from the nymph to the flying adult. The nymph of the Zebra Clubtail generally emerges on the bank of the stream no more than 3 feet above the surface of the water. Although most dragonflies emerge during the early morning, or at night, the Zebra Clubtail has often been found emerging during the middle part of the day. Most dragonflies do not emerge at this time, apparently because predation may be highest during these hours. Upon reaching a secure location, the adult pushes out of the nymphal skin. During the first few hours following emergence, the adult dragonfly is very soft and thus vulnerable to predators. To avoid predation, the newly emerged adults will disperse into surrounding woodlands where they will spend a week or more. This time of wandering is spent maturing and feeding. Dragonflies are aerial predators that feed on small flying insects such as flies and mosquitoes. When not feeding, Zebra Clubtails spend most of their time resting, sitting horizontally on the surfaces of leaves.

Zebra Clubtails breed in late summer, mostly from mid-July through August, though sometimes continuing into September. Male Zebra Clubtails patrol the stream, flying low and quickly over the surface of the water in search of females. They frequently land on the bank, logs, rocks and occasionally shoreline vegetation. When a female is found, the male grabs her and secures her with his terminal abdominal appendages which fit into special grooves in back of her eyes. The female swings the tip of her abdomen, where her reproductive organs are located, towards the male's hamules, located on the under side of the second abdominal segment, forming the "wheel position" with the male on top and the female below. When a male Zebra Clubtail secures a female, the pair leaves the stream and flies up into forest, usually to the tops of the trees, to mate. Oviposition occurs after mating has been completed. Female Zebra Clubtails oviposit alone by rapidly flying over the surface of the water and dipping the tip of her abdomen into the water every few feet. Her flight is very erratic, which may help protect her from potential predators during this time of vulnerability.

RANGE: The Zebra Clubtail is found throughout much of the eastern United States. It ranges from Nova Scotia west to Ontario and south to Georgia, Tennessee and Michigan. The Zebra Clubtail has been found in every New England state, though it appears to be absent from the southeast coastal plain.

POPULATION STATUS IN MASSACHUSETTS: The Zebra Clubtail is not listed as a rare species in Massachusetts. It was formerly listed as a Special of Special Concern.



Distribution in Massachusetts
1983-current
Based on records in Natural Heritage Database

MANAGEMENT RECOMMENDATIONS: As for many dragonfly species, the exact management needs of Zebra Clubtails are not known. Water quality certainly is a primary concern. Potential threats to the water quality of the rivers in which this species lives include industrial pollution from businesses located along the river, salt and other road contaminant run-off, and siltation from construction or erosion. The disruption of natural flooding regimes by dams and water diversion projects also may have a negative impact on odonate populations. Extensive use of the river by power boats and jet skis is a serious concern, particularly during the mid- to late-summer emergence period of Zebra Clubtails. Many species of clubtails and other riverine odonates undergo emergence near the water on exposed rocks or vegetation, or exposed sections of the river bank, where they are imperiled by the wakes of high speed watercraft. Low-level recreational use from fisherman and canoeists probably has little impact on odonate populations, but should be monitored. The upland borders of these river systems are also crucial to the well-being of odonate populations as they are critical for feeding, resting, and maturation. Development of these areas should be discouraged and preservation of the remaining undeveloped upland bordering the river should be a top priority.

REFERENCES:

- Dunkle, S. W. 2000. *Dragonflies Through Binoculars*. Oxford University Press.
- Needham, J. G., M. J. Westfall, Jr., and M. L. May. 2000. *Dragonflies of North America*. Scientific Publishers.
- Nikula, B., J. L. Ryan, and M. R. Burne. 2007. *A Field Guide to the Dragonflies and Damselflies of Massachusetts*, 2nd ed. Massachusetts Natural Heritage and Endangered Species Program.
- Soltész, K. 1996. *Identification Keys to Northeastern Anisoptera Larvae*. Center for Conservation and Biodiversity, University of Connecticut.
- Walker, E. M. 1958. *The Odonata of Canada and Alaska*, Vol. II. University of Toronto Press.

Synopsis

As required by the Paperwork Reduction Act of 1995 (44 U.S.C. 3507), the FCC is notifying the public that it received final OMB approval on December 17, 2015, for the information collection requirements contained in the modifications to the Commission's rules in 47 CFR part 5. Under 5 CFR part 1320, an agency may not conduct or sponsor a collection of information unless it displays a current, valid OMB Control Number. No person shall be subject to any penalty for failing to comply with a collection of information subject to the Paperwork Reduction Act that does not display a current, valid OMB Control Number. The OMB Control Number is 3060-0065. The foregoing notice is required by the Paperwork Reduction Act of 1995, Public Law 104-13, October 1, 1995, and 44 U.S.C. 3507.

The total annual reporting burdens and costs for the respondents are as follows:

OMB Control Number: 3060-0065.

OMB Approval Date: December 17, 2015.

OMB Expiration Date: December 31, 2018.

Title: Radio Experimentation and Market Trials—Streamlining Rules.

Form Number: FCC Form 442.

Respondents: Business or other for-profit entities; not-for-profit institutions, and individuals or household.

Number of Respondents and Responses: 495 respondents; 560 responses.

Estimated Time per Response: 4 hours.

Frequency of Response: On-occasion reporting requirements; recordkeeping requirements; and third party disclosure.

Obligation to Respond: Required to obtain or retain benefits. The statutory authority for this information collection is contained in sections 47 U.S.C. Sections 4, 302, 303, 306, and 307 of the Communications Act of 1934, as amended.

Total Annual Burden: 3,049 hours.

Total Annual Cost: \$41,600.

Nature and Extent of Confidentiality: There is no need for confidentiality, except for personally identifiable information individuals may submit, which is covered by a system of records, FCC/OET-1, "Experimental Radio Station License Files," 71 FR 17234, April 6, 2006.

Privacy Act: No impact(s).

Needs and Uses: On January 31, 2013, the Commission adopted a Report and Order, in ET Docket No. 10-236 and 06-155; FCC 13-15, which updates part 5

of the CFR—"Experimental Radio Service" (ERS). The Commission's recent Report and Order revises and streamlines rules for Experimental licenses. The new rules provide additional license categories to potential licensees. The new license categories are: (1) Program Experimental Radio License; (2) Medical Testing Experimental Radio License; and (3) Compliance Testing Experimental Radio License, including testing of radio frequency equipment in an Open Area Test Site.

Federal Communications Commission.

Sheryl Todd,

Deputy Secretary.

[FR Doc. 2015-33250 Filed 1-13-16; 8:45 am]

BILLING CODE 6712-01-P

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

[Docket No. FWS-R5-ES-2011-0024; 4500030113]

RIN 1018-AY98

Endangered and Threatened Wildlife and Plants; 4(d) Rule for the Northern Long-Eared Bat

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Final rule.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), finalize a rule under authority of section 4(d) of the Endangered Species Act of 1973 (Act), as amended, that provides measures that are necessary and advisable to provide for the conservation of the northern long-eared bat (*Myotis septentrionalis*), a bat species that occurs in 37 States, the District of Columbia, and 13 Canadian Provinces.

DATES: This rule is effective February 16, 2016.

ADDRESSES: This final 4(d) rule, the final environmental assessment, biological opinion, and list of references are available on the Internet at <http://www.regulations.gov> under Docket No. FWS-R5-ES-2011-0024 and at <http://www.fws.gov/midwest/Endangered>. Comments and materials we received, as well as supporting documentation we used in preparing this final 4(d) rule, are available for public inspection at <http://www.regulations.gov>, and by appointment, during normal business hours at: U.S. Fish and Wildlife Service, Twin Cities Ecological Services Field Office, 4101 American Blvd. East,

Bloomington, MN 55425; telephone (612) 725-3548, ext. 2201; or facsimile (612) 725-3609.

FOR FURTHER INFORMATION CONTACT:

Peter Fasbender, Field Supervisor, U.S. Fish and Wildlife Service, Twin Cities Ecological Services Field Office, 4101 American Blvd. East, Bloomington, MN 55425; telephone (612) 725-3548, ext. 2210; or facsimile (612) 725-3609. Persons who use a telecommunications device for the deaf (TDD) may call the Federal Information Relay Service (FIRS) at 800-877-8339.

SUPPLEMENTARY INFORMATION:

Executive Summary

The need for the regulatory action and how the action will meet that need: Consistent with section 4(d) of the Act, this final 4(d) rule provides measures that are tailored to our current understanding of the conservation needs of the northern long-eared bat.

On April 2, 2015, we published a document that is both a final rule to list the northern long-eared bat as a threatened species and an interim 4(d) rule to provide measures that are necessary and advisable to provide for the conservation of the northern long-eared bat. At that time, we opened a 90-day public comment period on the interim rule, and we committed to publish a final 4(d) rule by December 31, 2015, and to complete review pursuant to the National Environmental Policy Act (NEPA). Previously, on January 16, 2015, we published a proposed 4(d) rule with a 60-day public comment period. Therefore, we have had two comment periods totaling 150 days on two versions of the 4(d) rule.

Statement of legal authority for the regulatory action: Under section 4(d) of the Act, the Secretary of the Interior has discretion to issue such regulations she deems necessary and advisable to provide for the conservation of the species. The Secretary also has the discretion to prohibit by regulation, with respect to a threatened species, any act prohibited by section 9(a)(1) of the Act.

Summary of the major provisions of the regulatory action: This final species-specific 4(d) rule prohibits purposeful take of northern long-eared bats throughout the species' range, except in instances of removal of northern long-eared bats from human structures, defense of human life (including public health monitoring), removal of hazardous trees for protection of human life and property, and authorized capture and handling of northern long-eared bats by individuals permitted to conduct these same activities for other

bats until May 3, 2016. After May 3, 2016, individuals who wish to capture and handle northern long-eared bats for recovery purposes will need a permit pursuant to section 10(a)(1)(A) of the Act.

Incidental take resulting from otherwise lawful activities will not be prohibited in areas not yet affected by white-nose syndrome (WNS). WNS is a fungal disease affecting many hibernating U.S. bat species. Ninety- to one-hundred-percent mortality has been seen in bats affected by the disease in the eastern United States.

Take of northern long-eared bats in their hibernacula (which includes caves, mines, and other locations where bats hibernate in winter) is prohibited in areas affected by WNS, unless permitted under section 10(a)(1)(A) of the Act. Take of northern long-eared bats inside of hibernacula may include disturbing or disrupting hibernating individuals when they are present as well as the physical or other alteration of the hibernaculum's entrance or environment when bats are not present if the result of the activity will impair essential behavioral patterns, including sheltering northern long-eared bats.

For northern long-eared bats outside of hibernacula, we have established separate prohibitions from take for activities involving tree removal and activities that do not involve tree removal. Incidental take of northern long-eared bats outside of hibernacula resulting from activities other than tree removal is not prohibited. Incidental take resulting from tree removal is prohibited if it: (1) Occurs within a 0.25 mile (0.4 kilometer) radius of known northern long-eared bat hibernacula; or (2) cuts or destroys known occupied maternity roost trees, or any other trees within a 150-foot (45-meter) radius from the known maternity tree during the pup season (June 1 through July 31). Incidental take of northern long-eared bats as a result of the removal of hazardous trees for the protection of human life and property is also not prohibited.

Peer review and public comment: We sought comments on our proposed 4(d) rule from independent specialists to ensure that this rule is based on scientifically sound data, assumptions, and analyses. We also considered all comments and information we received during the comment periods on the proposed and interim 4(d) rules.

Previous Federal Actions

Please refer to the proposed (78 FR 61046; October 2, 2013) and final (80 FR 17974; April 2, 2015) listing rules for the northern long-eared bat for a

detailed description of previous Federal actions concerning this species. On January 16, 2015, we published a proposed 4(d) rule (80 FR 2371) for the northern long-eared bat and on April 2, 2015, we published an interim 4(d) rule (80 FR 17974) for this species.

Background

The northern long-eared bat is a wide-ranging species that is found in a variety of forested habitats in summer and hibernates in caves, mines, and other locations in winter. WNS is the main threat to this species and has caused a precipitous decline in bat numbers (in many cases, 90–100 percent) where the disease has occurred. Declines in the numbers of northern long-eared bats are expected to continue as WNS extends across the species' range. For more information on the northern long-eared bat, its habitat, and WNS, please refer to the October 2, 2013, proposed listing (78 FR 61046) and the April 2, 2015, final listing (80 FR 17974) rules.

The Act (16 U.S.C. 1531 *et seq.*) does not specify particular prohibitions, or exceptions to those prohibitions, for threatened species. Instead, under section 4(d) of the Act, the Secretary of the Interior has the discretion to issue such regulations as she deems necessary and advisable to provide for the conservation of such species. The Secretary also has the discretion to prohibit by regulation, with respect to any threatened wildlife species, any act prohibited under section 9(a)(1) of the Act with respect to endangered species. Exercising this discretion under section 4(d) of the Act, the Service developed general prohibitions (50 CFR 17.31) and exceptions to those prohibitions (50 CFR 17.32) under the Act that apply to most threatened wildlife species.

In addition, for threatened species, under the authority of section 4(d) of the Act, the Service may develop prohibitions and exceptions that are tailored to the specific conservation needs of the species. In such cases, some of the prohibitions and authorizations under 50 CFR 17.31 and 17.32 may be appropriate for the species and be incorporated into a separate, species-specific, rule under section 4(d) of the Act. These rules will also include provisions that are tailored to the specific conservation needs of the threatened species and may be more or less restrictive than the general provisions at 50 CFR 17.31.

Definitions

This final rule uses several definitions and provisions contained in the Act and its implementing regulations.

The Act and its implementing regulations (50 CFR part 17) define take as harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct.

The term "harass" (50 CFR 17.3) means an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering.

The term "harm" (50 CFR 17.3) means an act which actually kills or injures wildlife. Such act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering.

"Purposeful take" includes the capture and handling of individual bats. Take in this manner includes both capture and handling to remove bats from human structures and take that is for research purposes (e.g., attaching a radiotracking device). Other purposeful take would include intentional removal of bats from hibernacula or the intentional killing or harassing of bats under any circumstance.

"Human structures" are defined as houses, garages, barns, sheds, and other buildings designed for human entry.

"Incidental take" is defined at 50 CFR 17.3 as any taking otherwise prohibited, if such taking is incidental to, and not the purpose of, an otherwise lawful activity. Examples of incidental take (or non-purposeful take as it is sometimes referred to in this rule) include land-management actions, such as implementation of forestry practices, where bats may be harmed, harassed, or killed as a result of those otherwise lawful actions. The actions contemplated in this rule include a wide range of actions for purposes such as right-of-way development and maintenance, forestry, land use for development unrelated to wildlife management, management of lands as habitats other than bat habitat (e.g., prairie), energy production and transmission, and other activities.

Incidental take within the context of this rule is regulated in distinct and separate manners relative to the geographic location of the activity in question. For the purposes of this rule, we have developed a map associated with the occurrence and spread of WNS. This map will be updated by the first of each month as the disease spreads throughout the range of the species and

posted at <http://www.fws.gov/midwest/Endangered>.

"Known hibernacula" are defined as locations where northern long-eared bats have been detected during hibernation or at the entrance during fall swarming or spring emergence.

"Known, occupied maternity roost trees" are defined as trees that have had female northern long-eared bats or juvenile bats tracked to them or the presence of females or juveniles is known as a result of other methods.

"Tree removal" is defined as cutting down, harvesting, destroying, trimming, or manipulating in any other way the trees, saplings, snags, or any other form of woody vegetation likely to be used by northern long-eared bats.

WNS Zone

The WNS zone, as mapped, provides the boundary for the distinction of implementation of this rule. To estimate the area impacted by WNS, we have used data on the presence of the fungus causing the disease, called *Pseudogymnoascus destructans*, or *Pd*, or evidence of the presence of the disease (WNS) in the bats within a hibernaculum. Our final listing determination provides additional information concerning *Pd* and WNS (80 FR 17993; April 2, 2015). Confirmed evidence of infection at a location within a county is mapped as a positive detection for the entire county. In addition, we have added a 150-mile (241-kilometer (km)) buffer to the *Pd*-positive county line to account for the spread of the fungus from one year to the next. In instances where the 150-mile (241-km) buffer line bisects a county, the entire county is included in the WNS zone.

Over the past 5 years, an average of 96 percent of the new *Pd* or WNS counties in any single year were within 150 miles (241 km) of a county that was *Pd*- or WNS-positive in a prior year (Service 2015, unpublished data). *Pd* is generally present for a year or two before symptoms of WNS appear and mortality of bats begins to occur. Given the relatively short amount of time between detection and population-level impacts, it is important that we protect those buffer areas and the bats within them with the same regulations as those in known WNS positive counties. Therefore, the positive counties, plus a buffer around them, are the basis for the WNS zone map.

Summary Comparison of the Interim 4(d) Rule and This Final Rule

Based on information we received in comment periods on the proposed and interim 4(d) rules (see Summary of

Comments and Recommendations below), we revised the provisions of the interim 4(d) rule to better reflect the disproportionate effect that the disease, WNS, has had and will continue to have, we believe, on northern long-eared bat populations.

In the interim rule, we used the term "white-nose syndrome buffer zone" to identify "the portion of the range of the northern long-eared bat" within 150 miles (241 km) of the boundaries of U.S. counties or Canadian districts where the fungus *Pseudogymnoascus destructans* (*Pd*) or WNS had been detected. For purposes of clarification, in this final rule, we have changed the term "white-nose syndrome buffer zone" to "white-nose syndrome zone" or "WNS zone." And we state that the "WNS zone" is "the set of counties within the range of the northern long-eared bat" within 150 miles (241 km) of the boundaries of U.S. counties or Canadian districts where *Pd* or WNS had been detected.

The interim 4(d) rule generally applies the prohibitions of 50 CFR 17.31 and 17.32 to the northern long-eared bat, which means that the interim rule, among other things, prohibits the purposeful take of northern long-eared bats throughout the species' range, but the interim rule includes exceptions to the purposeful take prohibition. The exceptions for purposeful take are: (1) In instances of removal of northern long-eared bats from human structures (if actions comply with all applicable State regulations); and (2) for authorized capture, handling, and related activities of northern long-eared bats by individuals permitted to conduct these same activities for other bat species until May 3, 2016. Under the interim rule, incidental take is not prohibited outside the WNS zone if the incidental take results from otherwise lawful activities. Inside the WNS zone, there are exceptions for incidental take for the following activities, subject to certain conditions: Implementation of forest management; maintenance and expansion of existing rights-of-way and transmission corridors; prairie management; minimal tree removal; and removal of hazardous trees for the protection of human life and property.

This final 4(d) rule does not generally apply the prohibitions of 50 CFR 17.31 to the northern long-eared bat. This rule continues to prohibit purposeful take of northern long-eared bats throughout the species' range, except in certain cases, including instances of removal of northern long-eared bats from human structures and for authorized capture, handling, and related activities of northern long-eared bats by individuals permitted to conduct these same

activities for other bat species until May 3, 2016. After May 3, 2016, a permit pursuant to section 10(a)(1)(A) of the Act is required for the capture and handling of northern long-eared bats. Under this rule, incidental take is still not prohibited outside the WNS zone.

We have revised the interim rule's language concerning incidental take inside the WNS zone. Under this final rule, within the WNS zone, incidental take is prohibited only if: (1) Actions result in the incidental take of northern long-eared bats in hibernacula; (2) actions result in the incidental take of northern long-eared bats by altering a known hibernaculum's entrance or interior environment if the alteration impairs an essential behavioral pattern, including sheltering northern long-eared bats; or (3) tree-removal activities result in the incidental take of northern long-eared bats when the activity either occurs within 0.25 mile (0.4 kilometer) of a known hibernaculum, or cuts or destroys known occupied maternity roost trees, or any other trees within a 150-foot (45-meter) radius from the maternity roost tree, during the pup season (June 1 through July 31). Take of northern long-eared bats in their hibernacula may include disturbing or disrupting hibernating individuals when they are in the hibernacula. Take of northern long-eared bat also includes the physical or other alteration of the hibernaculum's entrance or environment when bats are not present if the result of the activity will impair essential behavioral patterns, including sheltering northern long-eared bats. Any take resulting from otherwise lawful activities outside known hibernacula, other than tree removal, is not prohibited, as long as it does not change the bat's access to or quality of a known hibernaculum for the species. This final rule makes these revisions because, in areas impacted by WNS, the most important conservation actions for the northern long-eared bat are to protect bats in hibernacula and maternity roost trees, and to continue to monitor populations in summer habitat (e.g., identify where the species continues to survive after the detection of *Pd* or WNS and determine the factors influencing its resilience), while developing methods to abate WNS as quickly as possible.

Under this rule, we individually set forth prohibitions on possession and other acts with unlawfully taken northern long-eared bats, and on import and export of northern long-eared bats. These prohibitions were included in the interim 4(d) through the general application of the prohibitions of 50 CFR 17.31 to the northern long-eared bat. Under this rule, take of the northern

long-eared bat is also not prohibited for the following: Removal of hazardous trees for protection of human life and property; take in defense of life; and take by an employee or agent of the Service, of the National Marine Fisheries Service, or of a State conservation agency that is operating a conservation program pursuant to the terms of a cooperative agreement with the Service. Regarding these three exceptions, take in defense of life was not included in the interim 4(d) rule, but the other two exceptions were, either through the general application of 50 CFR 17.31 or through a specific exception included in the interim 4(d) rule.

Provisions of the 4(d) Rule for the Northern Long-Eared Bat

For a threatened species, the Act does not specify prohibitions, or exceptions to those prohibitions, relative to take of the species. Instead, under Section 4(d) of the Act, the Secretary has discretion to issue regulations deemed to be necessary and advisable for the conservation of a threatened species. By regulation, the Secretary has determined that take prohibitions for endangered species are also applicable to threatened species unless a special rule is issued under section 4(d) for a particular threatened species. Under this 4(d) rule, we have applied several of the prohibitions specified in the Act for endangered species and the provisions of 50 CFR 17.32 (permit regulations) to the northern long-eared bat as described below.

For this 4(d) rule, the Service has completed a biological opinion under Section 7 of the Act on our action of finalizing this rule. In addition, the biological opinion provides for streamlined consultation for all federal agency actions that may affect the northern long-eared bat; therefore, the scope of the biological opinion included the finalization and implementation of the 4(d) rule. The biological opinion resulted in a non-jeopardy determination. Provided Federal action agencies follow the criteria outlined in this rule and implement the streamlined consultation process outlined in the biological opinion, their section 7 consultation requirements will be met. If unable to follow these criteria, standard section 7 procedures will apply.

Exceptions to the Purposeful Take Prohibition

We have exempted the purposeful take of northern long-eared bats related to the protection of human health and safety. A very small percentage of bats

may be infected with rabies or other diseases that can be transmissible to humans. When there is the possibility that a person has been exposed to a diseased bat, it is important that they coordinate with medical professionals (e.g., doctor, local health department) to determine the appropriate response. When warranted to protect human health and safety, we have exempted from the take prohibition of northern long-eared bats in defense of one's own life or the lives of others, including for public health monitoring purposes (*i.e.*, collecting a bat after human exposure and submitting for disease testing).

We have also exempted the purposeful take of northern long-eared bats related to removing the species from human structures, but only if the actions comply with all applicable State regulations. Northern long-eared bats have occasionally been documented roosting in human-made structures, such as houses, barns, pavilions, sheds, cabins, and bat houses (Mumford and Cope 1964, p. 480; Barbour and Davis 1969, p. 77; Cope and Humphrey 1972, p. 9; Amelon and Burhans 2006, p. 72; Whitaker and Mumford 2009, p. 209; Timpone et al. 2010, p. 119; Joe Kath 2013, pers. comm.). We conclude that the overall impact of bat removal from human structures is not expected to adversely affect conservation and recovery efforts for the species. In addition, we provide the following recommendations:

- Minimize use of pesticides (*e.g.*, rodenticides) and avoid use of sticky traps as part of bat evictions/exclusions.
- Conduct exclusions during spring or fall unless there is a perceived public health concern from bats present during summer and/or winter.
- Contact a nuisance wildlife specialist for humane exclusion techniques.

We have exempted the purposeful take that results from actions relating to capture, handling, and related activities for northern long-eared bats by individuals permitted to conduct these same activities for other species of bats until May 3, 2016. Under the interim rule, for a period of 1 year from the interim rule's effective date (May 3, 2016), we had exempted the purposeful take that is caused by the authorized capture, handling, and related activities (*e.g.*, attachment of radio transmitters for tracking) of northern long-eared bats by individuals permitted to conduct these same activities for other bats. We have continued the exemption through the expiration date established by the interim rule. After May 3, 2016, a permit pursuant to section 10(a)(1)(A) of the Act is required for the capture and

handling of northern long-eared bats, except that associated with bat removal from human structures. We determined that it was important to regulate the intentional capture and handling of northern long-eared bats through the Act's scientific permit process to help ensure that the surveyor's qualifications and methods used are adequate to protect individual bats and provide reliable survey results.

Incidental Take Outside of the WNS Zone Not Prohibited

Incidental take in areas that have not yet been impacted by WNS (*i.e.*, in areas outside the WNS zone) is not prohibited by this final rule. We believe the level of take associated with on-going land management and development actions, including all actions that may incidentally take the northern long-eared bat, do not individually or cumulatively affect healthy bat populations. As noted in our decision to list the northern long-eared bat as a threatened species, WNS is the primary cause of the species' decline, and we would not have listed the northern long-eared bat if not for the impact of WNS. In addition, we conclude that regulating incidental take in areas not affected by WNS is not expected to change the rate at which WNS progresses across the range of the species. In other words, regulating incidental take outside the WNS zone will not influence the future impact of the disease throughout the species' range or the status of the species. For these reasons, we have concluded that the prohibition of incidental take outside of the WNS zone is not necessary and advisable for the protection and recovery of the species. Incidental take, therefore, is not prohibited outside of the WNS zone.

Prohibitions and Exemptions Related to Incidental Take Inside the WNS Zone

Our approach to designing the regulatory provisions for the northern long-eared bat inside the WNS zone reflects the significant role WNS plays as the central threat affecting the species. For other threatened species, habitat loss or other limiting factors usually contribute to the decline of a species. In these situations, regulations are needed to address either the habitat loss or the other limiting factors.

The northern long-eared bat is not habitat-limited and has demonstrated a great deal of plasticity within its environment (*e.g.*, living in highly fragmented forest habitats to contiguous forest blocks from the southern United States to Canada's Yukon Territory) in the absence of WNS. For the northern long-eared bat, land management and

development actions that have been ongoing for centuries (e.g., forest management, forest conversion) have not been shown to have significant negative impacts to northern long-eared bat populations.

As WNS continues to move across the range of the species, northern long-eared bat populations have declined and will continue to decline. Declines in northern long-eared bat populations in WNS-positive regions have been significant, and northern long-eared bats are now relatively rare on those landscapes. As populations decline as a result of WNS, the chances of any particular activity affecting northern long-eared bats becomes more remote. Therefore, in the WNS zone, we focused the regulatory provisions on sensitive life stages at known, occupied maternity roost trees and hibernacula.

We developed regulations that provide some level of protection to the species where it persists in the face of WNS. However, we have provided flexibility so that the regulated public will seek to conserve the species and foster its recovery at sites where it has been lost should tools to address WNS become available or where the species shows signs of resilience. Further, because we believe recovery of this species will require many partnerships across the species' range, minimizing regulatory impacts on activities inconsequential to northern long-eared bat populations provides an important step in building partnerships for the species' recovery.

The northern long-eared bat is a forest-dependent species, typically roosting in trees. In establishing regulations that are necessary and advisable for the conservation of the species, we have tailored species-specific regulatory provisions toward potential impacts to trees. For the incidental take of bats outside of hibernacula, we have specifically established two sets of provisions: the first set applies to activities that do not involve tree removal and the second applies to activities that do involve tree removal. By tree removal, we mean cutting down, harvesting, destroying, trimming, or manipulating in any other way the trees, saplings, snags, or any other form of woody vegetation that is likely to be used by the northern long-eared bat.

In this final 4(d) rule, we have limited the prohibition of incidental take of northern long-eared bats to specific circumstances. This does not mean that all activities that could result in the incidental take of the northern long-eared bat will do so. The relative exposure of the species and the species

response to a potential stressor are critical considerations in evaluating the potential for incidental take to occur. For example, under the discussion of tree removal, below, we describe what is prohibited by the final 4(d) rule in the WNS zone and provide examples of how other activities could be implemented in a way that avoids the potential for incidental take.

Hibernacula

Northern long-eared bats predominantly overwinter in hibernacula that include caves and abandoned mines. For additional details about the characteristics of the hibernacula selected by northern long-eared bats, see the final listing determination (80 FR 17974; April 2, 2015). Northern long-eared bats have shown a high degree of philopatry (using the same site over multiple years) for a hibernaculum (Pearson 1962, p. 30), although they may not return to the same hibernaculum in successive seasons (Caceres and Barclay 2000, p. 2).

Hibernacula are so significant to the northern long-eared bat that they are considered a primary driver in the species distribution (e.g., Kurta 1982, p. 302). Northern long-eared bats are documented in hibernacula in 29 of the 37 states in the species' range. Other States within the species' range have no known hibernacula, which may reflect that no suitable hibernacula are present, a limited survey effort, or the northern long-eared bat's use of sites not previously identified as suitable.

In general, bats select hibernacula because they have characteristics that allow the bats to meet specific life-cycle requirements. Factors influencing a hibernaculum's suitability include its physical structure (e.g., openings, interior space, depth), air circulation, temperature profile, and location relative to foraging sites (Tuttle and Stevenson 1978, pp. 108–121).

Overwinter survival can be a particularly challenging period in the northern long-eared bat's life cycle. Hibernating bats appear to balance their physical condition (e.g., fat reserves upon entering hibernation), hibernacula characteristics (e.g., temperature variation, humidity), social resources (e.g., roosting singly or in groups), and metabolic condition (i.e., degree of torpor, which is the state of mental or physical inactivity) to meet overwinter survival needs. The overwinter physiological needs of the species include maintaining body temperature above freezing, minimizing water loss, meeting energetic needs until prey again become available, and responding to

disturbance or disease. Because of this complex interplay of hibernacula characteristics and bat physiology, changes to hibernacula can significantly impact their suitability as well as the survival of any hibernating bats.

In general, northern long-eared bats arrive at hibernacula in August or September, enter hibernation in October and November, and emerge from the hibernacula in March or April (Caire et al. 1979, p. 405; Whitaker and Hamilton 1998, p. 100; Amelon and Burhans 2006, p. 72). However, hibernation may begin as early as August (Whitaker and Rissler 1992b, p. 56). Northern long-eared bats have been observed moving among hibernacula throughout the winter (Griffin 1940a, p. 185; Whitaker and Rissler 1992a, p. 131; Caceres and Barclay 2000, pp. 2–3). Whitaker and Mumford (2009, p. 210) found that this species flies in and out of some mines and caves in southern Indiana throughout the winter.

Human disturbance of hibernating bats has long been considered a threat to cave-hibernating bat species like the northern long-eared bat. Modifications to bat hibernacula can affect the microclimate (e.g., temperature, humidity) of the subterranean habitat, and thus the ability of the cave or mine to support hibernating bats, including the northern long-eared bat. Anthropogenic modifications to cave and mine entrances may not only alter flight characteristics and access (Spanjer and Fenton 2005, p. 1110), but may change airflow and alter internal microclimates of the caves and mines, eliminating their utility as hibernacula (Service 2007, p. 71). For example, Richter et al. (1993, p. 409) attributed the decline in the number of Indiana bats at Wyandotte Cave, Indiana (which harbors one of the largest known populations of hibernating Indiana bats (*Myotis sodalis*)), to an increase in the cave's temperature resulting from restricted airflow caused by a stone wall erected at the cave's entrance. In addition to the direct access modifications to caves discussed above, debris buildup at entrances or on cave gates can also significantly modify the cave or mine site characteristics by restricting airflow and the course of natural water flow. Water-flow restriction could lead to flooding, thus drowning hibernating bats (Amelon and Burhans 2006, p. 72). Thomas (1995, p. 942) used infrared detectors to measure flight activity in hibernating northern long-eared bats and little brown bats in response to the presence of a human observer. Flight activity significantly increased with the presence of an observer, beginning within 30 minutes

of the visit, peaking 1.0 to 7.5 hours later, and remaining significantly above baseline level for 2.5 to 8.5 hours. These results suggest that hibernating bats are sensitive to non-tactile stimuli and arouse and fly following human visits. Boyles and Brack's (2009) model predicted that the survival rate of hibernating little brown bats drops from 96 percent to 73 percent with human visitations to hibernacula. Prior to the outbreak of WNS, Amelon and Burhans (2006, p. 73) indicated that "the widespread recreational use of caves and indirect or direct disturbance by humans during the hibernation period pose the greatest known threat to [the northern long-eared bat]."

Hibernacula and surrounding forest habitats play important roles in the life cycle of the northern long-eared bat beyond the time when the bats are overwintering. In both the early spring and fall, the hibernacula and surrounding forested habitats are the focus of bat activity in two separate periods referred to as "spring staging" and "fall swarming."

During the spring staging, bats begin to gradually emerge from hibernation, exit the hibernacula to feed, but re-enter the same or alternative hibernacula to resume daily bouts of torpor (Whitaker and Hamilton 1998, p. 100). The staging period for the northern long-eared bat is likely short in duration (Whitaker and Hamilton 1998, p. 100; Caire et al. 1979, p. 405). In Missouri, Caire et al. (1979, p. 405) found that northern long-eared bats moved into the staging period in mid-March through early May. In Michigan, Kurta et al. (1997, p. 478) determined that by early May, two-thirds of the *Myotis* species, including the northern long-eared bat, had dispersed to summer habitat.

Beginning in mid to late summer, after their young have gained some level of independence, northern long-eared bats exhibit a behavior near hibernacula referred to as swarming. Both male and female northern long-eared bats are present at swarming sites (often with other species of bats). During this period, heightened activity and congregation of transient bats around caves and mines is observed, followed later by increased sexual activity and bouts of torpor prior to winter hibernation (Fenton 1969, p. 601; Parsons et al. 2003, pp. 63–64; Davis and Hitchcock 1965, pp. 304–306). The purposes of swarming behavior may include introduction of juveniles to potential hibernacula, copulation, and stopping over sites on migratory pathways between summer and winter regions (Kurta et al. 1997, p. 479; Parsons et al. 2003, p. 64; Lowe 2012,

p. 51; Randall and Broders 2014, pp. 109–110). The swarming season for some species of the genus *Myotis* begins shortly after females and young depart maternity colonies (Fenton 1969, p. 601). For the northern long-eared bat, the swarming period may occur between July and early October, depending on latitude within the species' range (Fenton 1969, p. 598; Kurta et al. 1997, p. 479; Lowe 2012, p. 86; Hall and Brenner 1968, p. 780; Caire et al. 1979, p. 405). The northern long-eared bat may investigate several cave or mine openings during the transient portion of the swarming period, and some individuals may use these areas as temporary daytime roosts or may roost in forest habitat adjacent these sites (Kurta et al. 1997, pp. 479, 483; Lowe 2012, p. 51). Little is known about northern long-eared bat roost selection outside of caves and mines during the swarming period (Lowe 2012, p. 6).

Based on the importance of hibernacula to northern long-eared bats, take is prohibited in and around the hibernacula within the WNS zone, including activities that may alter the hibernacula at any time of the year. Further, we have determined that when the conservation measures for the northern long-eared bat included in this final 4(d) rule are applied to areas within 0.25 mile (0.4 km) of the hibernacula, the potential for negative impacts to individuals is significantly reduced.

Activities Not Involving Tree Removal Are Not Prohibited

Under this final 4(d) rule, activities within the WNS zone not involving tree removal are not prohibited provided they do not result in the incidental take of northern long-eared bats in hibernacula or otherwise impair essential behavioral patterns at known hibernacula. In our final listing determination (80 FR 17974; April 2, 2015), we identified a number of activities not involving tree removal that may have direct or indirect effects on northern long-eared bats. These activities have the potential to cause the incidental take of northern long-eared bats and include activities such as the operation of utility-scale wind-energy turbines, application of pesticides, and prescribed fire (this is not an exhaustive list; it is merely representative of activities that may result in take of northern long-eared bats).

At the time of our listing determination and the interim 4(d) rule (80 FR 17974; April 2, 2015), we stated that we had no compelling evidence that these activities would have significant effects on the northern long-

eared bat when considered alone.

However, we thought these factors may have a cumulative effect on this species when considered in concert with WNS. After additional consideration and our review of public comments received on the proposed and interim 4(d) rules, we did not find compelling evidence that regulating these potential cumulative effects would result in significant impacts at the species level. Effects to relatively small numbers of individuals are not anticipated to impair conservation efforts or the recovery potential of the species.

Wind-Energy Facilities

Wind-energy facilities are found scattered throughout the range of the northern long-eared bat, and many new facilities are anticipated to be constructed over the next 15 years (United States Department of Energy 2008, unpaginated). We reviewed post-construction mortality monitoring studies conducted at various times from 1998 through 2014 at 81 unique operating wind-energy facilities in the range of the northern long-eared bat in the United States and Canada (Service 2015, unpublished data). In these studies, 43 northern long-eared bat mortalities were documented at 19 of the sites. The northern long-eared bat fatalities comprised less than 1 percent of all documented bat mortalities. In most cases, the level of effort for most post-construction monitoring studies is not sufficient to confidently exclude the possibility that infrequent fatalities are being missed, but finding none or only small numbers over many sites and years can suggest the order of what may be missed. Thus while sustained mortality at particular facilities could potentially cause declines in local populations of the northern long-eared bat, if that is in fact occurring, it does not appear to be wide-spread at least when compared to other bat species which are nearly always found in fatality monitoring at wind facilities. At those sites with a northern long-eared bat fatality where multiple years of monitoring data were also available for review ($n = 12$), fatalities of northern long-eared bats were only reported in multiple years at two of the sites and for the other 10 sites only a single fatality was reported over multiple years of monitoring. For example, one site reported one northern long-eared bat fatality in 2008, but none in 2009, 2010, or 2011. Further, the number of fatalities of northern long-eared bats found at any given site has been relatively small (e.g., most often a single fatality was found, but in all cases no more than six), and typically most sites (62 out of 81) found

no northern long-eared bat fatalities at all. There is a great deal of uncertainty related to extrapolating these numbers to generate an estimate of total northern long-eared bat mortality at wind-energy facilities due to variability in post-construction survey effort and methodology (Huso and Dalthorp 2014, pp. 546–547). Further, bat mortality can vary between years and between sites, and detected carcasses are only a small percentage of total bat mortalities. However, even with those limitations, northern long-eared bats were rarely detected as mortalities, even when they were known to be common on the landscape around the wind-energy facility.

We recognize that several wind energy facilities have completed, or are currently working to complete, habitat conservation plans (HCPs; permit pursuant to section 10(a)(1)(B) of the Act) for other listed bat species where the number of fatalities reported is also very low. When the take of an endangered species is reasonably certain to occur, we recommend that a project proponent secure incidental take coverage pursuant to section 10 of the Act. Over the operational life of a wind energy facility (typically anticipated to be at least 20 to 30 years), the take of listed species may be reasonably certain to occur, even if the level of mortalities annually is anticipated to be quite low. However, this does not mean that prohibiting that incidental take in the case of a threatened species is necessary and advisable for the conservation of such a species. For the northern long-eared bat, we do not anticipate that the fatalities that will be caused by wind energy would meaningfully change the species' status in the foreseeable future.

In addition, the wind industry has recently published best management practices establishing voluntary operating protocols, which they expect "to reduce impacts to bats from operating wind turbines by as much as 30 percent" (AWEA 2015, unpaginated). Given the large numbers of other bat species impacted by wind energy (Hein et al. 2013, p. 12) and the economic importance of bats in controlling agricultural or forest pest species (Boyles et al. 2011, pp. 41–42; Maine and Boyles, 2015, p. 12442), we anticipate that these new standards will be adopted by the wind-energy sector and ultimately required by wind-energy-siting regulators at State and local levels. We recommend that wind facilities adopt these operating protocols.

Our primary reason for not establishing regulatory criteria for wind-energy facilities is that the best available

information does not indicate significant impacts to northern long-eared bats from such operations. We conclude that there may be adverse effects posed by wind-energy development to individual northern long-eared bats; however, there is no evidence suggesting that effects from wind-energy development has led to significant declines in this species, nor is there evidence that regulating the incidental take that is occurring would meaningfully change the conservation or recovery potential of the species in the face of WNS. Furthermore, with the adoption by wind-energy facilities of the new voluntary standards, risk to all bats, including the northern long-eared bat, should be further reduced.

Environmental Contaminants

Environmental contaminants, in particular insecticides, pesticides, and inorganic contaminants, such as mercury and lead, may also have detrimental effects on individual northern long-eared bats. However, across the wide-range of the species, it is unclear whether environmental contaminants, regardless of the source (e.g., pesticide applications, industrial waste-water), would be expected to cause population-level impacts to the northern long-eared bat either independently or in concert with WNS. Historically, the most intensively-studied contaminants in bats have been the organochlorine insecticides (OCs; O'Shea and Clark 2002, p. 238). During wide-spread use of OCs in the 1960s and 1970s, lethal pesticide poisoning was demonstrated in gray bats (*Myotis grisescens*), Mexican free-tailed bats (*Tadarida brasiliensis*), and Indiana bats (*Myotis sodalis*) (O'Shea and Clark 2002, p. 239, 242). Since the phasing out of OCs in the United States, the effects of chemical contaminants on bats have been less well studied (O'Shea and Johnston 2009, p. 501); however, a few recent studies have demonstrated the accumulation of potentially toxic elements and chemicals in North American bats. For instance, Yates et al. (2014, pp. 48–49) quantified total mercury (Hg) levels in 1,481 fur samples and 681 blood samples from 10 bat species captured across 8 northeastern U.S. States and detected the highest Hg levels in tri-colored bats (*Perimyotis subflavus*), little brown bats (*Myotis lucifugus*) and northern long-eared bats. More recently, Secord et al. (2015) analyzed tissue samples from 48 northeastern bat carcasses of four species, including northern long-eared bats, and detected accumulations of several contaminants of emerging concern (CECs), including most

commonly polybrominated diphenyl ethers (PDBEs; 100 percent of samples), salicylic acid (81 percent), thiabendazole (50 percent), and caffeine (23 percent). Digoxigenin, ibuprofen, warfarin, penicillin V, testosterone, and N,N-diethyl-meta-toluamide (DEET) were also present in at least 15 percent of samples. Compounds with the highest concentrations were bisphenol A (397 ng/g), PDBE congeners 28, 47, 99, 100, 153, and 154 (83.5 ng/g), triclosan (71.3 ng/g), caffeine (68.3 ng/g), salicylic acid (66.4 ng/g), warfarin (57.6 ng/g), sulfathiazole (55.8 ng/g), tris(1-chloro-2-propyl) phosphate (53.8 ng/g), and DEET (37.2 ng/g).

Although there is the potential for direct and indirect contaminant-related effects, mortality or other population-level impacts have not been reported for northern long-eared bats. Long-term sublethal effects of environmental contaminants on bats are largely unknown; however, environmentally relevant exposure levels of various contaminants have been shown to impair nervous system, endocrine, and reproductive functioning in other wildlife (Yates et al. 2014, p. 52; Köhler and Triebelskorn 2013, p. 761; Colborn et al. 1993, p. 378). Moreover, bats' high metabolic rates, longevity, insectivorous diet, migration-hibernation patterns of fat deposition and depletion, and immune impairment during hibernation, along with potentially exacerbating effects of WNS, likely increase their risk of exposure to and accumulation of environmental toxins (Secord et al. 2015, p. 411, Yates et al. 2014, p. 46, Geluso et al. 1976, p. 184; Quarles 2013, p. 4, O'Shea and Clark 2002, p. 238). Following WNS-caused population declines in northeastern little brown bats, Kannan et al. (2010) investigated whether exposure to toxic contaminants could be a contributing factor in WNS-related mortality. Although high concentrations of polychlorinated biphenyls (PCBs), PBDEs, polybrominated biphenyls (PBBs), and chlordanes were found in the fat tissues of WNS-infected bats in New York, relative concentrations in bats from an uninfected population in Kentucky were also high (Kannan et al. 2010, p. 615). The authors concluded that the study's sample sizes were too small to accurately associate contaminant exposure with the effects of WNS in bats (Kannan et al. 2010, p. 618), but argued that additional research is needed. Despite the lack of knowledge on the effects of various contaminants on northern long-eared bats, we recognize the potential for direct and indirect consequences.

However, contaminant-related mortality has not been reported for northern long-eared bats. Additionally, Ingersoll (2013, p. 9) suggested it was unclear what other threats or combination of threats other than WNS (e.g., changes to critical roosting or foraging habitat, collisions, effects from chemicals) may be responsible for recent bat declines.

Prescribed Fire

Prescribed fire is a useful forest-management tool. However, there are potential negative effects from prescribed burning, including direct mortality to the northern long-eared bat. Therefore, when using prescribed burning as a management tool, fire frequency, timing, location, and intensity all need to be considered to lower the risk of incidental take of bats. Carter et al. (2002, pp. 140–141) suggested that the risk of direct injury and mortality to southeastern forest-dwelling bats resulting from summer prescribed fire is generally low. During warm temperatures, bats are able to arouse from short-term torpor quickly. Northern long-eared bats use multiple roosts, switch roost trees often, and could likely use alternative roosts in unburned areas, should fire destroy the current roost. Non-volant pups are likely the most vulnerable to death and injury from fire. Although most eastern bat species are able to carry their young for some time after they are born (Davis 1970, pp. 187–189), the degree to which this behavior would allow females to relocate their young if fire threatens the nursery roost is unknown. The potential for death or injury resulting from prescribed burning depends largely on site-specific circumstances, e.g., fire intensity near the maternity roost tree and the height above ground of pups in the maternity roost tree. Not all fires through maternity roosting areas will kill or injure all pups present.

Bats are known to take advantage of fire-killed snags and continue roosting in burned areas. Boyles and Aubrey (2006, pp. 111–112) found that, after years of fire suppression, initial burning created abundant snags, which evening bats (*Nycticeius humeralis*) used extensively for roosting. Johnson et al. (2010, pp. 115) found that after burning, male Indiana bats roosted primarily in fire-killed maples. In the Daniel Boone National Forest, Lacki et al. (2009, p. 5) radio-tracked adult female northern long-eared bats before and after prescribed fire, finding more roosts (74.3 percent) in burned habitats than in unburned habitats. Burning may create more suitable snags for roosting through exfoliation of bark (Johnson et al. 2009a, p. 240), mimicking trees in the

appropriate decay stage for roosting bats. In addition to creating snags and live trees with roost features, prescribed fire may enhance the suitability of trees as roosts by reducing adjacent forest clutter. Perry et al. (2007, p. 162) found that five of six species, including northern long-eared bat, roosted disproportionately in stands that were thinned and burned 1 to 4 years prior but that still retained large overstory trees.

The use of prescribed fire, where warranted, will, in any given year, impact only a small proportion of the northern long-eared bat's range during the bats active period. In addition, there are substantial benefits of prescribed fire for maintaining forest ecosystems. For example, the U.S. Forest Service's Southern Region manages approximately 10.9 million acres (4.4 million hectares (ha)) of land, and the maximum estimate of acres where prescribed fire is employed annually during the active period of northern long-eared bats (April through October) was 320,577 acres (129,732 ha), which is less than 3 percent of the National Forest regional lands. Similarly, the Forest Service's Eastern Region manages 15 Forests in 13 States that include about 12.2 million acres (4.88 million ha), of which 11.3 million acres (4.52 million ha) are forested habitat. The U.S. Forest Service anticipates applying prescribed burning to 107,684 acres (43,073 ha) or about 1 percent of the forested habitat across the eastern region annually. In addition, only 17,342 acres (6,937 ha) (i.e., 0.15 percent of the forested habitat) of prescribed burning annually is anticipated to occur during the non-volant period on the eastern forests.

Further, there are substantial benefits of prescribed fire for maintaining forest ecosystems, such as providing the successional and disturbance processes that renew the supply of suitable roost trees (Silvis et al. 2012, pp.6–7), as well as helping to ensure a varied and reliable prey base (Dodd et al. 2012, p. 269). There is no evidence that prescribed fire has led to population-level declines in this species nor is there evidence that regulating the incidental take that might occur would meaningfully change the conservation status or recovery potential of the species in the face of WNS.

Hazardous Tree Removal Is Not Prohibited

Under this final 4(d) rule, incidental take that is caused by removal and management of hazardous trees is not prohibited. The removal of these hazardous trees may be widely

dispersed, but limited, and should result in very minimal incidental take of northern long-eared bats. We recommend, however, that removal of hazardous trees be done during the winter, wherever possible, when these trees will not be occupied by northern long-eared bats. We conclude that the overall impact of removing hazardous trees is not expected to adversely affect conservation and recovery efforts for the species.

Activities Involving Tree Removal

We issued the interim species-specific rule under section 4(d) of the Act in recognition that WNS is the primary threat to the species' continued existence. We further recognized that all other (non-WNS) threats cumulatively were not impacting the species at the population level. Therefore, we apply the take prohibitions only to activities that we have determined may impact the species in its most vulnerable life stages, allowing for management flexibility and a limited regulatory burden.

In this final 4(d) rule, we have determined that the conservation of the northern long-eared bat is best served by limiting the prohibitions to the most vulnerable life stages of the northern long-eared bat (i.e., while in hibernacula or in maternity roost trees) within the WNS zone and to activities, tree removal in particular, that are most likely to affect the species. We have also revised some of the conservation measures. To further simplify the regulation, we have established separate prohibitions for activities involving tree removal and those that do not involve tree removal. Within the WNS zone incidental take outside of hibernacula that results from tree removal is only prohibited when it (1) Occurs within 0.25 miles (0.4 km) of known northern long-eared bat hibernacula; or (2) cuts or destroys known occupied maternity roost trees, or any other trees within a 150-foot (45-meter) radius from the known occupied maternity trees, during the pup season (June 1 through July 31).

Forest Management

Forest management maintains forest habitat on the landscape, and the impacts from management activities are, for the most part, temporary in nature. Forest management is the practical application of biological, physical, quantitative, managerial, economic, social, and policy principles to the regeneration, management, utilization, and conservation of forests to meet specified goals and objectives (Society of American Foresters, http://dictionary.offorestry.org/dict/term/forest_

management). It includes a broad range of silvicultural practices and this discussion specifically addresses tree-removal practices (e.g., timber harvest) associated with forest management. Timber harvesting includes a wide variety of practices from selected removal of individual trees to clearcutting. Impacts to northern long-eared bats from forest management would be expected to range from positive (e.g., maintaining or increasing suitable roosting and foraging habitat within northern long-eared bat home ranges) to neutral (e.g., minor amounts of forest removal, forest management in areas outside northern long-eared bat summer home ranges, forest management away from hibernacula) to negative (e.g., death of adult females or pups or both resulting from the removal of maternity roost trees).

The best available data indicate that the northern long-eared bat shows a varied degree of sensitivity to timber-harvesting practices. For example, Menzel et al. (2002, p. 112) found northern long-eared bats roosting in intensively managed stands in West Virginia, indicating that there were sufficient suitable roosts (primarily snags) remaining for their use. At the same study site, Owen et al. (2002, p. 4) concluded that northern long-eared bats roosted in areas with abundant snags, and that in intensively managed forests in the central Appalachians, roost availability was not a limiting factor. Northern long-eared bats often chose black locust and black cherry as roost trees, which were quite abundant and often regenerate quickly after disturbance (e.g., timber harvest). Similarly, Perry and Thill (2007, p. 222) tracked northern long-eared bats in central Arkansas and found roosts were located in eight forest classes with 89 percent occurring in three classes of mixed pine-hardwood forest. The three classes of mixed pine-hardwood forest that supported the majority of the roosts were partially harvested/thinned, unharvested (50 to 99 years old), and group-selection harvested (Perry and Thill 2007, pp. 223–224).

Certain levels of timber harvest may result in canopy openings, which could result in more rapid development of young bats. In central Arkansas, Perry and Thill (2007, pp. 223–224) found female bat roosts were more often located in areas with partial harvesting than males, with more male roosts (42 percent) in unharvested stands than female roosts (24 percent). They postulated that females roosted in relatively more open forest conditions because they may receive greater solar radiation, which may increase

developmental rates of young or permit young bats a greater opportunity to conduct successful initial flights (Perry and Thill 2007, p. 224). Cryan et al. (2001, p. 49) found several reproductive and non-reproductive female northern long-eared bat roost areas in recently harvested (less than 5 years) stands in the Black Hills of South Dakota in which snags and small stems (diameter at breast height (dbh)) of 2 to 6 inches (5 to 15 centimeters) were the only trees left standing; however, the largest colony (n = 41) was found in a mature forest stand that had not been harvested in more than 50 years.

Forest size and continuity are also factors that define the quality of habitat for roost sites for northern long-eared bats. Lacki and Schwierjohann (2001, p. 487) stated that silvicultural practices could meet both male and female roosting requirements by maintaining large-diameter snags, while allowing for regeneration of forests. Henderson et al. (2008, p. 1825) also found that forest fragmentation affects northern long-eared bats at different scales based on sex; females require a larger unfragmented area with a large number of suitable roost trees to support a colony, whereas males are able to use smaller, more fragmented areas. Henderson and Broders (2008, pp. 959–960) examined how female northern long-eared bats use the forest-agricultural landscape on Prince Edward Island, Canada, and found that bats were limited in their mobility and activities are constrained when suitable forest is limited. However, they also found that bats in a relatively fragmented area used a building for colony roosting, which suggests an alternative for a colony to persist in an area with fewer available roost trees.

In addition to impacts on roost sites, we considered effects of forest-management practices on foraging and traveling behaviors of northern long-eared bats. In southeastern Missouri, the northern long-eared bat showed a preference for contiguous tracts of forest cover (rather than fragmented or wide open landscapes) for foraging or traveling, and different forest types interspersed on the landscape increased likelihood of occupancy (Yates and Muzika 2006, p. 1245). Similarly, in West Virginia, female northern long-eared bats spent most of their time foraging or travelling in intact forest, diameter-limit harvests (70 to 90 year-old stands with 30 to 40 percent of basal area removed in the past 10 years), and road corridors, with no use of deferment harvests (similar to clearcutting) (Owen et al. 2003, p. 355). When comparing use and availability of habitats, northern

long-eared bats preferred diameter-limit harvests and forest roads. In Alberta, Canada, northern long-eared bats avoided the center of clearcuts and foraged more in intact forest than expected (Patriquin and Barclay 2003, p. 654). On Prince Edward Island, Canada, female northern long-eared bats preferred open areas less than forested areas, with foraging areas centered along forest-covered creeks (Henderson and Broders 2008, pp. 956–958). In mature forests in South Carolina, 10 of the 11 stands in which northern long-eared bats were detected were mature stands (Loeb and O'Keefe 2006, p. 1215). Within those mature stands, northern long-eared bats were more likely to be recorded at points with sparse or medium vegetation rather than points with dense vegetation, suggesting that some natural gaps within mature forests can provide good foraging habitat for northern long-eared bats (Loeb and O'Keefe 2006, pp. 1215–1217). However, in southwestern North Carolina, Loeb and O'Keefe (2011, p. 175) found that northern long-eared bats rarely used forest openings, but often used roads. Forest trails and roads may provide small gaps for foraging and cover from predators (Loeb and O'Keefe 2011, p. 175). In general, northern long-eared bats appear to prefer intact mixed-type forests with small gaps (i.e., forest trails, small roads, or forest-covered creeks) in forest with sparse or medium vegetation for forage and travel rather than fragmented habitat or areas that have been clearcut.

Impacts to northern long-eared bats from forest management would be expected to vary depending on the timing of tree removal, location (within or outside northern long-eared bat home range), and extent of removal. While bats can flee during tree removal, removal of occupied roosts (during spring through fall) may result in direct injury or mortality to some percentage of northern long-eared bats. This percentage would be expected to be greater if flightless pups or inexperienced flying juveniles were also present. Forest management outside of northern long-eared bat summer home ranges or away from hibernacula would not be expected to affect the conservation of the species.

Forest management is not usually expected to result in a permanent loss of suitable roosting or foraging habitat for northern long-eared bats. On the contrary, forest management is expected to maintain a forest over the long term for the species. However, localized temporary reductions in suitable roosting and/or foraging habitat can occur from various forest practices (e.g.,

clearcuts). As stated above, northern long-eared bats have been found in forests that have been managed to varying degrees, and as long as there is sufficient suitable roosting and foraging habitat within their home range and travel corridors between those areas, we would expect northern long-eared bat colonies to continue to occur in managed landscapes. However, in areas with WNS, northern long-eared bats may be less resilient to stressors and maternity colonies are smaller. Given the low inherent reproductive potential of northern long-eared bats (one pup per female per year), death of adult females or pups or both during tree felling could reduce the long-term viability of some of the WNS-impacted colonies if they are also in the relatively small percentage of forest habitat directly affected by forest management.

As we documented in the interim 4(d) rule, forestry management and silviculture are vital to the long-term survival and recovery of the species. Based on information obtained during comment periods, approximately 2 percent of forests in States within the range of the northern long-eared bat are impacted by forest management activities annually (Boggess et al., 2014, p.9). Of this amount, in any given year, a smaller fraction of forested habitat would be impacted during the active season when female bats and pups are most vulnerable. Therefore, we have determined that when the prohibitions for the northern long-eared bat included in this final 4(d) rule are applied to forest management activities, the potential impacts will be significantly reduced.

Forest Conversion

In our listing determination for the northern long-eared bat, we noted that current and future forest conversion may have negative additive impacts where the species has been impacted by WNS (80 FR 17991; April 2, 2015). Our assessment was based largely on the species' summer-home-range fidelity and the potential for increased energetic demands for individuals where the loss of summer habitat had been removed or degraded (e.g., fragmentation). We noted that forest conversion "can result in a myriad of effects to the species, including direct loss of habitat, fragmentation of remaining habitat, and direct injury or mortality" (80 FR 17993; April 2, 2015). In the interim 4(d) rule we exempted most forest-management activities except for the conversion of mature hardwood or mixed forest into intensively managed monoculture-pine plantation stands, or non-forested landscape (80 FR 18025; April 2, 2015).

Many of the comments on the proposed and interim 4(d) rules noted that habitat is not limiting for the northern long-eared bat. As we documented in the final listing determination (80 FR 1802; April 2, 2015), the extent of conversion from forest to other land cover types has been fairly consistent with conversion to forest (cropland reversion/plantings). Further, the recent past and projected amounts of forest loss to conversion was, and is anticipated to be, only a small percentage of the total amount of forest habitat. For example by 2060, 4 to 8 percent of the forested area found in 2007 across the conterminous United States is expected to be lost (U.S Forest Service 2012, p. 12). The northern long-eared bat has been documented to use a wide variety of forest types across its wide range. Therefore, we agree that the availability of forested habitat does not now, nor will it likely in the future, limit the conservation of the northern long-eared bat.

We have determined that when the prohibitions for the northern long-eared bat included in this final 4(d) rule are applied to forest-conversion activities, the potential for negative additive impacts to individuals or colonies is significantly reduced. As WNS impacts bat populations, unoccupied, suitable forage and roosting habitat will be increasingly available for remaining bats.

Tree-Removal Conservation Measures

Under this final 4(d) rule, incidental take within the WNS zone involving tree removal is not prohibited if two conservation measures are followed. The first measure is the application of a 0.25 mile (0.4 km) buffer around known occupied northern long-eared bat hibernacula. The second conservation measure is that the activity does not cut or destroy known occupied maternity roost trees, or any other trees within a 150-foot (45-m) radius around the maternity roost tree, during the pup season (June 1 through July 31). The rationale for these measures is discussed below.

Conservation Measure 1: Tree Removal Near Known Northern Long-eared Bat Hibernacula

"Known hibernacula" are defined as locations where one or more northern long-eared bats have been detected during hibernation or at the entrance during fall swarming or spring emergence. Given the documented challenges of surveying for northern long-eared bats in the winter (use of cracks, crevices that are inaccessible to surveyors), any hibernacula with

northern long-eared bats observed at least once, will continue to be considered "known hibernacula" as long as the hibernacula remains suitable for the northern long-eared bat. A hibernaculum remains suitable for northern long-eared bats even when *Pd* or WNS has been detected.

We have adopted the 0.25-mile (0.4-km) buffer around known northern long-eared bat hibernacula for several reasons: (1) It will help to protect microclimate characteristics of the hibernacula; (2) for many known hibernacula, bats use multiple entrances that may not be reflected in the primary location information (e.g., bats may use other smaller entrances that are often spread out from the main entrance accessed for surveys or other purposes) and the hibernacula may have extensive underground features that extend out from known entrances; (3) in the late summer and fall when bat behavior begins to center on hibernacula (swarming), it appears that northern long-eared bats may roost in a widely dispersed area, which may reduce the potential that any activity outside of this buffer would significantly affect the species; (4) outside of the maternity period, northern long-eared bats have demonstrated the ability to adapt to forest-management-related and other types of disturbances; and (5) regardless of the buffer size, bats will remain fully protected from take while in the hibernacula, when they are most vulnerable.

The microclimate, temperature, humidity, and air and water flow within a hibernaculum are all important variables that could potentially be impacted by forest management or other activities when conducted in proximity to a hibernaculum. A 0.25-mile (0.4-km) buffer will protect the hibernaculum's microclimate. Studies that have evaluated the depth of edge influence from forest edge or tree removal on temperature, humidity, wind speed, and light penetration suggest that although highly variable among forest types and other site-specific factors (such as aspect and season), the depth of edge influence can range from 164 feet (50 m) (Matlack 1993, p. 193) to over 1,312 feet (400 m) (Chen et al. 1995, p. 83). However, the hibernacula often selected by northern long-eared bats are "large, with large passages" (Raesly and Gates 1987, p. 20), and may be less affected by relatively minor surficial micro-climatic changes that might result from the limited exempted activities outside of the 0.25-mile (0.4-km) buffer. Further, bats rarely hibernate near the entrances of structures (Grieneisen 2011, p. 10), as these areas can be subject to greater

predation (Grieneisen 2011, p. 10; Kokurewicz 2004, p. 131) and daily temperature fluctuations (Grieneisen 2011, p. 10). Davis et al. (1999, p. 311) reported that partial clearcutting “appears not to affect winter temperatures deep in caves.” Caviness (2003, p. 130) reported that prescribed burns were found to have no notable influence on bats hibernating in various caves in the Ozark National Forest. All bats present in caves at the beginning of the burn were still present and in “full hibernation” when the burn was completed, and bat numbers increased in the caves several days after the burn. There were minute changes in relative humidity and temperature during the burn, and elevated short-term levels of some contaminants from smoke were noted.

Northern long-eared bat hibernacula can be large and complex and, spatially, may not be fully represented in locational information contained in species records by State or Federal agencies or by natural heritage programs. A 0.25-mile (0.4-km) buffer will help protect the spatial extent of many known hibernacula. For example, one limestone mine in Ohio used by northern long-eared bats had approximately 44 miles (71 km) of passages and multiple entrances (Brack 2007, p. 740). In northern Michigan, bats (including northern long-eared bats) occupied mines that were more structurally complex and longer (1,007 ft \pm 2,837 ft (307m \pm 865 m) than mines that were unoccupied, and the occupied mines had a total length of passages that ranged from 33 feet to 4 miles (10 meters to 6.4 kilometers) (Kurta and Smith 2014, p. 592).

Only a relatively small proportion of the areas where swarming northern long-eared bats may occur are likely to be affected by tree-removal activity. There are over 1,500 known hibernacula for the species in the United States (Service 2015, unpublished data), several known in Canada, and potentially many others yet to be identified. Lowe (2012, p. 58) reported that the roosts of northern long-eared bats were evenly distributed over distances within 4.6 miles (7.3 km) from a swarming site. If the northern long-eared bat's potential swarming habitat (including foraging habitat during that period) can be approximated as the forest habitat within 5 miles (8.1 km) of hibernacula, that equates to a 50,265 acre (20,342 ha) area per hibernaculum. In any given year, only a small proportion of the forest habitat within the potential swarming habitat is likely to be impacted by tree-removal activities (e.g., generally 2 percent of forests are

managed in any given year and over 1,500 hibernacula documented as used by the species). Similarly, forest conversion is anticipated to be relatively small compared to available habitat; therefore, based on our current understanding of potential swarming-habitat, on the scale of 50,000 acres (20,342ha) per hibernaculum, the relatively small foot-print of activities not prohibited by this final rule are unlikely to affect the conservation or recovery potential of the species. Raesly and Gates (1987, p. 24) evaluated external habitat characteristics of hibernacula and reported that for the northern long-eared bat the percentage of cultivated fields within 0.6 miles (1 km) of the hibernacula was greater (52.6 percent) for those caves used by the species, than for those caves not used by the species (37.7 percent), suggesting that the removal of some forest around a hibernacula can be consistent with the species needs.

Outside of the maternity period, northern long-eared bats have demonstrated the ability to respond successfully to forest-management-related and other types of disturbances. Therefore, the limited disturbance associated with incidental-take exceptions outside of the 0.25-mile (0.4-km) buffer on hibernacula is consistent with the conservation of the species. For example, Silvis et al.'s (2015, p.1) experimental removal of roosts suggested that the “loss of a primary roost or 20 percent of secondary roosts in the dormant season may not cause northern long-eared bats to abandon roosting areas or substantially alter some roosting behaviors in the following active season when tree-roosts are used.”

Prior to WNS, the most significant risk identified for northern long-eared bat conservation was direct human disturbance while bats are hibernating (e.g., Olson et al. 2011, p. 228; Bilecki 2003, p. 55; Service 2012, unpublished data). This final 4(d) rule (within the WNS zone) addresses these impacts.

We have prohibited incidental take of northern long-eared bats under specific tree-removal circumstances; however, that does not mean that all activities involving tree-removal activities within the 0.25-mile (0.4-k) buffer of hibernacula will result in take. For example, a timber harvest might be conducted within 0.25 miles (0.4 km) of a hibernaculum at a time when bats are unlikely to be roosting in trees within the buffer (e.g., winter), which fully protects any bats in the hibernaculum as well as the hibernaculum's suitability for bats (*i.e.*, access, microclimate), and does not significantly change the

suitability of the habitat for foraging by northern long-eared bats or perhaps even improves prey availability. In such a case, the timber harvest, although closer than 0.25 miles (0.4 km) to the hibernaculum, is not likely to result in incidental take so we would not recommend that the harvester seek authorization for incidental take pursuant to the Act. For activities planned within 0.25 miles (0.4 km) of hibernaculum, we encourage you to contact the local Ecological Services Field Office (<http://www.fws.gov/offices>) to help evaluate the potential for take of northern long-eared bats.

Conservation Measure 2: Tree Removal Near Known Maternity Roost Trees

Female northern long-eared bats roost communally in trees in the summer (Foster and Kurta 1999, p. 667) and exhibit fission-fusion behavior (Garraway and Broders 2007, p. 961), where members frequently roost together (fusion), but the composition and size of the groups is not static, with individuals frequently departing to be solitary or to form smaller or different groups (fission) (Barclay and Kurta 2007, p. 44). As part of this behavior, northern long-eared bats switch tree roosts often (Sasse and Pekins 1996, p. 95), typically every 2 to 3 days (Foster and Kurta 1999, p. 665; Owen et al. 2002, p. 2; Carter and Feldhamer 2005, p. 261; Timpone et al. 2010, p. 119). In Missouri, the longest time spent roosting in one tree was 3 nights (Timpone et al. 2010, p. 118). Bats switch roosts for a variety of reasons, including temperature, precipitation, predation, parasitism, sociality, and ephemeral roost sites (Carter and Feldhamer 2005, p. 264).

Maternity colonies, consisting of females and young, are generally small, numbering from about 30 (Whitaker and Mumford 2009, p. 212) to 60 individuals (Caceres and Barclay 2000, p. 3); however, one group of 100 adult females was observed in Vermilion County, Indiana (Whitaker and Mumford 2009, p. 212) and Lereculeur (2013, p. 25) documented a colony of at least 116 northern long-eared bats. In West Virginia, maternity colonies in two studies had a range of 7 to 88 individuals (Owen et al. 2002, p. 2) and 11 to 65 individuals, with a mean size of 31 (Menzel et al. 2002, p. 110). Lacki and Schwierjohann (2001, p. 485) found that the number of bats within a given roost declined as the summer progressed. Pregnant females formed the largest aggregations (mean=26) and post-lactating females formed the smallest aggregation (mean=4). Their largest overall reported colony size was 65 bats.

Northern long-eared bats change roost trees frequently, but use roost areas repeatedly and to a lesser extent, reuse specific roosts (e.g., Cryan et al. 2001, p. 50; Foster and Kurta 1999, p. 665). The northern long-eared bat appears to be somewhat flexible in tree-roost selection, selecting varying roost tree species and types of roosts throughout its range. Females tend to roost in more open areas than males, likely due to the increased solar radiation, which aids pup development (Perry and Thill 2007, p. 224). Fewer trees surrounding maternity roosts may also benefit juvenile bats that are starting to learn to fly (Perry and Thill 2007, p. 224). Female roost-site selection, in terms of canopy cover and tree height, changes depending on reproductive stage; relative to pre- and post-lactation periods, lactating northern long-eared bats have been shown to roost higher in tall trees situated in areas of relatively less canopy cover and lower tree density (Garraway and Broders 2008, p. 91).

The northern long-eared bat's tendency for frequent roost switching may help them avoid or respond effectively to disturbance by people outside of the maternity season. The frequent-roost-switching behavior of northern long-eared bat suggests that they are adapted to responding quickly to changes in roost availability (ephemeral roosts), changing environmental conditions (temperature), prey availability, or physiological needs (torpor, reproduction). In a study of radio-tracked northern long-eared bats responding to the disturbance from prescribed fire (Dickinson et al. 2009, pp. 55–57), the bats appeared “to limit their exposure to conditions created by fire. At no point did they fly outside of their typical home range area, nor did they travel far from the burn itself.” While some of the bats soon returned to areas recently burned, by day 6 and 7 post burn, they “appeared to return to pre-burn norms in terms of emergence time, length of foraging bouts, and use of the burn unit and adjacent habitats.” Carter et al. (2000, pp 139–140), noted that “During the summer months, bats are able to arouse quickly as the difference between the ambient temperature and active body temperature of bats is less. Most bat species utilizing trees and snags have multiple roosts throughout the forest (Sasse and Pekins 1996; Callahan et al. 1997; Menzel et al. 1998; Foster and Kurta 1999; Menzel et al. 2001), providing alternate roosts should the current roost be destroyed by fire.” Sparks et al. (2008, pp. 207–208) documented that northern long-eared

bats released in the open during the day demonstrated a successful rapid “flight-to-cover” response.

Adult females give birth to a single pup (Barbour and Davis 1969, p. 104). Birthing within the colony tends to be synchronous, with the majority of births occurring around the same time (Krochmal and Sparks 2007, p. 654). Parturition (birth) likely occurs in late May or early June (Caire et al. 1979, p. 406; Easterla 1968, p. 770; Whitaker and Mumford 2009, p. 213), but may occur as late as July (Whitaker and Mumford 2009, p. 213). Upon birth, the pups are unable to fly, and females return to nurse the pups between foraging bouts at night. In other *Myotis* species, mother bats have been documented carrying flightless young to a new roosting location (Humphrey et al. 1977, p. 341). The ability of a mother to move young may be limited by the size of the growing pup. Juvenile volancy (flight) often occurs by 21 days after birth (Krochmal and Sparks 2007, p. 651; Kunz 1971, p. 480) and has been documented as early as 18 days after birth (Krochmal and Sparks 2007, p. 651). Prior to gaining the ability to fly, juvenile bats are particularly vulnerable to tree-removal activities. Based on this information, we have determined that the most sensitive period to protect pups at maternity roost trees is from June 1 through July 31 (the “pup season”).

Known occupied maternity roost trees are defined as trees that have had female northern long-eared bats or juvenile bats tracked to them or the presence of female or juvenile bats is known as a result of other methods. Once documented, northern-long eared bats are known to continue to use the same roosting areas. Therefore, a tree will be considered to be a “known, occupied maternity roost” as long as the tree and surrounding habitat remain suitable for northern long-eared bats. The incidental take prohibition for known, occupied maternity roosts trees applies only during the pup season (June 1 through July 31).

In addition to protecting the known roosts, we have also included in this conservation measure avoiding the cutting or destroying of any other trees within a 150-foot (45-meter) radius from the known, occupied maternity roost tree during the pup season (June 1 through July 31). Leaving a buffer of other trees around the maternity roost tree will help to protect the roost tree from damage or destruction that may be caused by other nearby trees being removed as well as helping protect the roost tree from wind throw and micro-climate changes. O’Keefe (2009 p. 42)

documented that a 39-foot (12-meter) buffer around a maternity roost tree during a harvest in May allowed the roost to be successfully used through late July and that one buffered tree was used 2 years in a row. We have adopted a standard for exception of take that is almost four times that which proved effective in this example, in order to better account for the variation in forest types used by the northern long-eared bat and a variety of slopes that might influence how large a buffer may need to be in order to prove effective. Roost trees used by northern long-eared bats are often in fairly close proximity to each other within the species’ summer home range. For female northern long-eared bats, the mean distance between roosts was reported as 63m to 600m from a variety of studies published 1996 through 2014 (Foster and Kurta 1999 p. 665; Cryan et al. 2001, p. 46; Swier 2003, pp. 58–59; Jackson 2004, p. 89; Henderson and Broders 2008, p. 958; Johnson et al. 2009, p. 240; Badin 2014, p. 76; Bohrman and Fecske, unpublished data). Further, within that data, the distance between roosts was reported as small as 5 meters in one study (Badin 2014, p. 76) and 36 meters in another (Jackson 2004, p. 89). As Sasse 1995, p. 23, noted “some roost sites appeared to be ‘clustered’ together.” Therefore, even this modest additional buffer may also protect other roosts trees used by female northern long-eared bats during the maternity period that have not yet been documented. In addition, because colonies occupy more than one maternity roost in a forest stand and individual bats frequently change roosts, in some cases a portion of a colony or social network is likely to be protected by multiple 150-foot buffers during the maternity season.

Currently, since most States and natural heritage programs do not track roosts and many have not tracked any northern long-eared bat occurrences, we recognize that not all northern long-eared bat maternity roost sites are known. Therefore, this measure will not protect an unknown maternity roosts unless it falls under one of the buffers related to protecting a known roost or hibernaculum.

Although not fully protective of every individual, the conservation measures identified in this final rule help protect maternity colonies. This final species-specific rule under section 4(d) of the Act provides the regulatory flexibility for certain activities to occur that have not been the cause of the species’ imperilment, while allowing us to focus conservation efforts on WNS, promoting

conservation of the species across its range.

Additional Prohibitions and Exceptions

In this final 4(d) rule we carry forward other standard prohibitions and exceptions that are typically applied to threatened species and are currently applicable under the interim rule for the northern long-eared bat. These prohibitions included the possession of and other acts with unlawfully taken northern long-eared bats, as well as import and export. We also included standard exemptions, including all the permitting provisions of 50 CFR 17.32 and the exemption for employees or agents of the Service, of the National Marine Fisheries Service, or of a State conservation agency when acting in the course of their official duties to take northern long-eared bats covered by an approved cooperative agreement to carry out conservation programs.

Summary of Comments and Recommendations on the Proposed and Interim 4(d) Rules

The northern long-eared bat was listed as a threatened species under the Act, with an interim rule under section 4(d) of the Act, on April 2, 2015 (80 FR 17974). At that time, the Service invited public comments on the interim 4(d) rule for 90 days, ending July 1, 2015. The Service had already received comments for 60 days on its proposed 4(d) rule (80 FR 2371, January 16, 2015). In total, the Service received approximately 40,500 comments on the proposed and interim 4(d) rules. We discuss them below.

Peer Reviewer Comments

1. *Comment:* Peer reviewer(s) commented that the 0.25-mile (radius) around hibernacula is an inadequate buffer. There were additional suggestions for alternative buffer distances as well as more detail on how activities might be limited within those buffers. A specific suggestion of a 1.6-mile buffer was made, with a statement that most forest practices could occur within the buffer provided that the trees were not completely removed (conversion). In addition, a suggestion of 0.5-mile buffer was made.

Our Response: We have revised the approach used in this final 4(d) rule to ensure that hibernating northern long-eared bats in the WNS zone are protected from incidental take independent of the buffer size used in the conservation measure. In addition, all northern long-eared bats both in and outside of the WNS zone are protected from purposeful take (e.g., killing or intentionally harassing northern long-

eared bats), including while in the hibernacula where they are most vulnerable. We have retained the 0.25-mile buffer (0.25-mile radius around known hibernacula entrance/access points used by bats) to further protect the hibernaculum and associated forested habitat for several reasons (see discussion above under *Conservation Measure 1: Tree Removal Near Known Northern Long-eared Bat Hibernacula*). Some of the peer-reviewers recommended that within the hibernacula buffer that certain limited activities should be allowed (e.g., timber harvest that only removes a small percentage of the forest habitat when bats are not active). As discussed above under *Conservation Measure 1: Tree Removal Near Known Northern Long-eared Bat Hibernacula*, not all tree-removal activities within the buffer of hibernacula will result in take. For example, a timber harvest might be conducted within the buffer when bats are unlikely to be roosting in trees (e.g., winter) that fully protects any bats in the hibernaculum as well as the hibernaculum's suitability for bats (i.e., access, microclimate), and does not significantly change the suitability of the habitat for foraging by northern long-eared bats or perhaps even improves prey availability. In such a case, the timber harvest, although within the buffer, is not likely to result in incidental take so we would not recommend that the harvester seek authorization for incidental take pursuant to the Act. Because the buffer only applies to actions that result in incidental take of the northern long-eared bat, we determined that there was no need to attempt to exempt activities (e.g., a limited timber harvest) where incidental take is unlikely.

2. *Comment:* Peer reviewer(s) commented that the WNS buffer zone should be removed and protections should occur throughout the range of the species.

Our Response: We have established prohibitions on the purposeful take of northern long eared bats throughout the species range. However, because WNS is the most significant threat known to be imperiling the species, we have determined that in areas where WNS has not been detected, additional prohibitions are not warranted. We recognize that the WNS zone will change over time. We remain committed to regularly updating the WNS zone map as new information about the spread of the *Pd* fungus becomes known.

3. *Comment:* Peer reviewer(s) commented that the WNS buffer zone should be expanded and/or changed to

accommodate a more site-specific approach, based on proximity to hibernacula, for example.

Our Response: We reevaluated the approach to the WNS zone in this final rule and determined that the 150-mile buffer used for the interim 4(d) rule appears to be very effective in capturing counties where new *Pd* detections are reported, in particular when looking at the new occurrences over the last 5 years. For more details of this analysis, please see our discussion in the WNS Zone section of this rule.

4. *Comment:* Peer reviewer(s) commented that the Service's definitions relative to forestry practices should be more precise and should use silviculture terminology.

Our Response: We have revised the prohibitions to no longer use specific forestry practices or silviculture terminology. Take of the northern long-eared bat within the context of forest management is not prohibited provided that conservation measures to protect hibernacula and known maternity roost trees are implemented as described in this rule.

5. *Comment:* Peer reviewer(s) recommended that the seasonal restrictions for the northern long-eared bat "pup season" be expanded and/or based on climate and geography within the species' range.

Our Response: We recognize that in some areas or in some years the period when young northern long-eared bats are non-volant may be earlier or later than the June and July timeframe. The timing of when northern long-eared bats give birth is likely a complex interplay of a variety of factors affecting fetal development (e.g., condition of the mother, temperature, prey availability), and similar factors may also influence the time required for young to develop the ability to fly. In addition, a study in West Virginia documented that the peak pregnancy and lactation dates shifted post WNS (Francel et al. 2012, p. 36). However, looking across a variety of studies, the June and July timeframe appears to generally capture what is typically reported as the non-volant period for northern long-eared bats across much of their range within the United States. We have determined that a single timeframe for implementing the prohibition on maternity roost tree removal provides clarity for the regulated public. In addition, while it does not modify the incidental take prohibition established in these regulations, our local field offices may be able to provide more refined local estimates of the non-volant period for specific areas. Project planners may choose to use these local estimates for

planning purposes where they are available.

6. *Comment:* Peer reviewer(s) recommended year-round protections for maternity roost trees or conversely that we remove entirely the protections for maternity trees because it is ineffective and serves as a disincentive for conducting surveys.

Our Response: Although northern long-eared bats have been documented to use some roost trees over multiple years, in many cases it is because the tree is dead or dying or has structural defects that provides the roosting features attractive to the species. Further, maternity roost trees are used only briefly (e.g., northern long-eared bats typically change roosts every few days, and only a relatively small percentage of those are used more than once in any one season). Given that maternity roosts trees are ephemeral on the landscape and used for very short periods of time in the active season, we determined that year-round protections for known, occupied maternity roost trees are not warranted. We considered removing the protections for known, occupied maternity roosts as recommended by another peer reviewer, but instead modify the protection so as to minimize the disincentive for conducting surveys. In developing this final rule, we kept protections for known, occupied maternity roosts for two reasons: (1) While it may be unlikely, in cases where a tree was about to be removed, but was known to be occupied by northern long-eared bats, they would have some protections while the young could not fly; and (2) we wanted known, occupied maternity roosts to be given consideration because they help to signal to project planners an area that is likely to be used by northern long-eared bats in the future (as this species has a high degree of site fidelity). We refined the protection for known, occupied maternity roosts to make it as practical to implement as possible in order to minimize the disincentive created for conducting surveys. Many forest managers implement similar types of relatively small seasonal buffers to protect other species of sensitive wildlife (e.g., around nesting raptors) and therefore we do not view this provision as a real disincentive to conducting surveys. Please see the *Conservation Measure 2: Tree Removal Near Known Maternity Roost Trees* section of this rule for additional details. We believe that the seasonal restriction helps to protect the most vulnerable life stages, in this case the non-volant pups, and is adequate for the purposes of this rule.

7. *Comment:* Peer reviewer(s) recommended that pregnant females should be protected as part of the seasonal restriction criteria.

Our Response: We recognize that pregnant females may be in torpor or less able to flee in early spring. However, we did not have information on how pregnancy in northern long-eared bats influenced the degree of torpor or their ability to flee from disturbance. As discussed in this rule, we expect only a small percentage of the species' forested habitat to be affected by activities (e.g., tree removal, prescribed fire) that might impact a pregnant northern long-eared bats in torpor and, therefore, we expect only small proportion of the species' population to be potentially exposed to these activities. Because of the relatively small exposure and uncertainty about how pregnancy affects degree of torpor or ability to flee, we have not expanded the seasonal protections for this purpose. We believe that seasonal restrictions help protect the vulnerable pup stage, when young pups cannot fly, and are adequate for the purposes of this rule.

8. *Comment:* Peer reviewer(s) stated that the conservation efforts will not be effective because the natural heritage data are limited with respect to known maternity roost trees and hibernacula.

Our Response: We agree that the data are limited and this can be challenging from the implementation and/or project planning perspective. However, we have purposefully limited protections where possible, to minimize the potential disincentive to continue to survey for the species. However, we anticipate that information in State natural heritage data bases will continue to improve post-listing.

9. *Comment:* Peer reviewer expressed concern with allowing lethal take of northern long-eared bats from human dwellings.

Our Response: We encourage the non-lethal removal of northern long-eared bats from human structures, preferably by excluding them outside of the maternity period, whenever possible. However, because of the potential for human health considerations, we have not required this as part of the exception to the purposeful take prohibition. We have limited this take to houses, garages, barns, sheds, and other buildings designed for human entry.

Public Comments

General

10. *Comment:* Commenters from many development sectors requested that their activities be included in the

suite of exempted activities under the 4(d) rule (specific sectors addressed below).

Our Response: In general, this final rule has been restructured to clarify prohibitions to take rather than to rely on a list of excepted activities. Prohibitions are applied in this final rule where necessary and advisable for the conservation of the species. Therefore, the various "sectors" do not need to be identified or "excepted" to apply rule provisions.

Forest Management

11. *Comment:* Several commenters recommended that forest conversion be included as an excepted activity. Comments were specific to conversion of hardwood forests to pine plantations, managed pine forest, pine ecosystem, and the Service's characterization of pine stands as monoculture stands representing poor bat habitat.

Our Response: Incidental take resulting from forest management, including forest conversion, is not a prohibited action pursuant to this final 4(d) rule provided conservation measures to protect known hibernacula and known, occupied maternity roost trees are employed. Please see sections above titled Forest Management and Forest Conversion.

12. *Comment:* Commenters stated that forest management must occur to avoid habitat deterioration to poor quality bat habitat. They further stated that forest health depends upon active management including tree removal and clearcutting.

Our Response: We agree that forest management can be very important in creating or maintaining forest successional patterns that help to ensure suitable trees are available for roosting northern long-eared bats. Further, forest management can help to increase prey availability or suitability of foraging habitat. Please see our discussion above under Forest Management for additional details. Incidental take resulting from forest management is not prohibited pursuant to this final 4(d) rule provided conservation measures to protect known hibernacula and known maternity roost trees are employed.

13. *Comment:* Commenters suggested that the Service consider exemptions for sustainable forest practices implemented under a sustainable forest management plan or sustainable forestry certificate program.

Our Response: We considered incorporating other possible conservation measures related to forest management and conversion. However, given the overall small percentage of the species' range potentially affected by

these activities in any given year, it was not clear that additional conditions related to incidental take from forest management or conversion would meaningfully change the conservation outlook for the species. Further, adding protections with uncertain benefits, but with large potential public impacts can hinder support for species conservation. Incidental take resulting from forest management is not prohibited pursuant to this final 4(d) rule provided conservation measures to protect known hibernacula and known, occupied maternity roost trees are employed.

14. *Comment:* Commenters stated that the Service should focus on the elimination of WNS rather than regulating timber harvest in summer habitat.

Our Response: Efforts to address the threat posed by WNS are on-going by the Service and many partners across the species range. Incidental take resulting from forest management or forest conversion is not prohibited pursuant to this final 4(d) rule provided conservation measures to protect known hibernacula and known, occupied maternity roost trees are employed.

15. *Comment:* A commenter stated that the Service should halt commercial timber harvest and another commenter suggested restricting the removal of snags and coarse woody debris in areas populated by the species.

Our Response: The northern long-eared bat is not limited in terms of habitat availability for feeding, breeding, and sheltering in the summer (non-hibernating) months. Please see the discussions under Forest Management and Forest Conversion above in this rule. We have carefully considered the value of habitat protection for the species. We have determined that protection of summer habitat is not required for species conservation except where trees may be occupied by young, non-volant (flightless) pups and for areas immediately surrounding hibernacula where they swarm and feed just prior to hibernation and when they emerge from hibernation in the spring. Due to this swarming behavior and the vulnerability of bats when hibernating, we have determined that take prohibitions are necessary and advisable in winter habitat (hibernacula), where bats are subject to the effects of WNS. In addition, we have determined that protection of known, occupied maternity roost trees is necessary and advisable in order to protect young pups.

16. *Comment:* The Service should increase protections to avoid impacts to bats from the point that they emerge from hibernation to the end of the

maternity/pup season. Forest management should only be done in a manner that retains sufficient vegetative cover and protects northern long-eared bats at the maternity colony level.

Our Response: We considered incorporating other possible conservation measures related to forest management and conversion. However, given the overall small percentage of the species' range potentially affected by these activities in any given year, it was not clear that additional conditions related to the incidental take from forest management or conversion would meaningfully change the conservation outlook for the species. Further, adding protections with uncertain benefits, but with large potential public impacts can hinder support for the species conservation. We have determined that protection of known, occupied maternity roost trees during the months of June and July is an adequate conservation measure for the protection of non-volant pups.

17. *Comment:* Commenter(s) suggested an exemption for invasive species management in forested landscapes.

Our Response: Outside of hibernacula, this final rule does not prohibit take from activities other than tree removal. Therefore, incidental take associated with management of invasive species using pesticides or other interventions is not prohibited. Where intervention involves tree removal, conservation measures must be followed to comply with this rule. However, entities that cannot apply the required conservation measures have other means to have take excepted, such as section 10 permits or section 7 incidental take authorization.

Human Structures

18. *Comment:* Commenters suggested expansion of the definition of human structures/dwellings to include bridges, culverts, cattle passes, and other human-made structures.

Our Response: This final rule does not prohibit direct take of northern long-eared bats occupying human structures defined as houses, garages, barns, sheds, and other buildings designed for human entry. While we encourage landowners and project proponents to find other mechanisms to avoid killing or injuring bats that occupy bridges, culverts, and other structures, incidental take is not prohibited by this rule. While bridge and culvert use for the species has been documented, it is relatively uncommon compared to tree or other types of roost sites (e.g., barns) and, therefore, did not warrant specific provisions in this final rule. Within the WNS zone, however,

project proponents must apply conservation measures to avoid habitat removal around hibernacula and to avoid cutting or destroying known, occupied maternity roost trees or any other trees within a 150-foot radius from the maternity roost tree during June and July.

19. *Comment:* Commenters stated that take of northern long-eared bat in human dwellings should not be exempted and requested that the Service provide rationale for determining that this exemption is necessary.

Our Response: We encourage the non-lethal removal of northern long-eared bats from human structures whenever possible, preferably by excluding them from the structure outside of the maternity period. However, because of the potential for human health considerations, we have not required this as part of the exception to the purposeful take prohibition. Please see the discussion under Exceptions to the Purposeful Take Prohibition in this rule for additional details. Take of northern long-eared bats to remove them from human structures is not prohibited.

Hazardous Tree Removal

20. *Comment:* Several comments requested clarification and/or expansion of the exception to take for removal of hazardous trees.

Our Response: Our intent is to provide for the removal of hazardous trees for the protection of human life and property. This is not the same as hazard tree removal within the context of forest management or rights-of-way management where hazard trees are identified as trees that are in danger of falling. Incidental take of northern long-eared bats from hazardous tree removal in the context of rights-of-way management is not prohibited by the final 4(d) rule provided conservation measures to protect known hibernacula and known, occupied maternity roost trees are applied.

Minimal Tree Removal

21. *Comment:* Several commenters requested that minimal tree removal be expanded to a larger acreage.

Our Response: Conversion of forested cover to alternate uses is not prohibited under this final rule, provided that conservation measures are followed when those activities occur within the WNS zone. For a discussion of this issue, please see Forest Conversion section in this rule.

22. *Comment:* Several commenters stated that the exemption for minimal tree removal should be expanded to other (non-forest) industry entities and should include all activities that have a

minimal effect on the northern long-eared bat.

Our Response: Conversion of forested acreages to alternate uses is not prohibited under this final rule, provided that conservation measures are followed. This is applicable to all entities that may engage in activities that remove trees or convert forested acres. See the Forest Conversion section in this rule.

Oil and Gas Industry

23. *Comment:* A number of commenters from the oil and gas industry stated that the industry should be included within exemptions from take prohibitions because: (1) Their impact on northern long-eared bat habitat is small compared to forest management impacts; (2) habitat is revegetated following pipeline installation; (3) oil and gas exploration and transport are not the stated primary threat to the species (WNS is the primary threat); and (4) adequate regulatory mechanisms exist for mitigating industry environmental impacts.

Our Response: Take of northern long-eared bats attributable to habitat conversion and habitat loss is not prohibited under this final 4(d) rule, provided that developers and project proponents follow conservation measures described herein when activities occur within the WNS zone. See the Forest Conversion section in this rule.

Rights-of-Way

24. *Comment:* Commenter(s) stated that loss of habitat attributable to clearing for linear projects is miniscule compared to habitat conversion due to forest management.

Our Response: Incidental take attributable to maintenance, development, and rights-of-way expansion is not prohibited by this final 4(d) rule, provided conservation measures contained herein are followed when activities occur within the WNS zone.

25. *Comment:* Commenter(s) stated that the exception, as proposed and implemented via the interim rule, should be expanded to greater than 100-feet and should be clarified.

Our Response: Incidental take attributable to maintenance, development, and rights-of-way expansion is not prohibited by this final 4(d) rule, provided conservation measures contained herein are followed when activities occur within the WNS zone.

26. *Comment:* Commenter(s) stated that the exception for rights-of-way

should be expanded to include new rights-of-way and transmission corridors.

Our Response: Incidental take attributable to maintenance, development, and rights-of-way expansion is not prohibited by this final 4(d) rule, provided conservation measures contained herein are followed when activities occur within the WNS zone.

27. *Comment:* Commenter(s) disagree with the Service's assertion that vegetation removal within or adjacent to rights-of-way is a small-scale alteration of habitat.

Our Response: It is within the context of the species range and potential for available habitat that right-of-way development, maintenance or expansion are small scale alterations of forest habitat. The extent of conversion from forest to other land cover types has been fairly consistent with conversion to forest (cropland reversion/plantings). Further, the recent past and projected amounts of forest loss to conversion from all sources was and is anticipated to be only a small percentage of the total amount of forest habitat. For example by 2060, 4 to 8 percent of forest area found in 2007 across the conterminous United States is expected to be lost (U.S Forest Service 2012, p. 12). We have not broadened the incidental prohibition related to habitat loss because WNS is the predominant threat to the species. Summer habitat does not now or in the future appear likely to be a limiting factor for the species; therefore, we have focused the protections on vulnerable individuals in summer habitat and protecting the winter habitat, where sensitivity to the effects of WNS is heightened.

28. *Comment:* Commenter(s) requested that the Service expand the rights-of-way exemption to include access roads and infrastructure required to deliver services.

Our Response: Incidental take attributable to maintenance, development, and rights-of-way expansion is not prohibited by this final 4(d) rule, provided conservation measures contained herein are followed when activities occur within the WNS zone. This includes related activities such as access road clearing and facilities related to delivery of services. In the case where tree removal is the activity in question, incidental take is not prohibited provided that the conservation measures herein are followed when those activities occur within the WNS zone.

29. *Comment:* Commenter suggested that the final 4(d) rule should prohibit all tree clearing activities related to the

maintenance, repair, and creation of rights-of-way.

Our Response: The northern long-eared bat is not limited in terms of habitat availability for feeding, breeding, and sheltering in the summer (non-hibernating) months. We have carefully considered the value of habitat protection for the species. We have determined that protection of summer habitat is not required for species conservation except where trees are known to be occupied by northern long-eared bats when the young are non-volant (flightless) and for areas immediately surrounding hibernacula where they swarm and feed just prior to hibernation and when they emerge from hibernation in the spring.

Solar Energy

30. *Comment:* Commenter(s) requested that solar energy development be provided an exemption under the 4(d) rule.

Our Response: Solar energy developers will need to consider the impacts of their development and operations in light of the prohibitions of this rule. Incidental take outside of the WNS zone is not prohibited. Incidental take from tree-removal activities within the WNS zone is prohibited under specific conditions related to known hibernacula and known, occupied maternity roost trees (see Activities Involving Tree Removal section above for details).

Agriculture

31. *Comment:* Commenter(s) requested that agricultural activities be included in the suite of exempted activities under the 4(d) rule.

Our Response: We have substantially revised the prohibitions and exceptions in this final rule that may apply to agricultural activities. Agricultural producers/operators will need to consider the impacts of their activities in light of the prohibitions of this rule. Incidental take outside of the WNS zone is not prohibited. Incidental take from tree removal activities within the WNS zone is prohibited under specific conditions related to known hibernacula and known, occupied maternity roost trees (see Activities Involving Tree Removal, above, for details). This final rule has been restructured in a manner that it applies prohibitions where necessary and advisable for conservation of the species. Therefore, agricultural development and operations do not need to be specifically "excepted" in order to apply the rule's provisions.

Caves and Mines

32. *Comment:* Commenter(s) requested an exemption for show caves and cave tours.

Our Response: Hibernating bats are very sensitive to disturbance as discussed in greater detail under the Hibernacula section of this document. This final rule prohibits the incidental take of northern long-eared bats in hibernacula inside the WNS zone as well as the purposeful take (e.g., purposefully harassing or killing) of northern long-eared bats in hibernacula both inside and outside of the WNS zone. When this species occupies caves or mines used by people regardless of the purpose, the provisions of this 4(d) rule apply. Show cave or mine activities inside the WNS zone that do not result in the incidental take of northern long-eared bats are not prohibited. In other words, if northern long-eared bats are not being disrupted from their normal hibernation behaviors (e.g., by avoiding areas with hibernating bats, limiting noise and lighting in areas used by bats), we do not consider human use of the cave or mine to be a "take" of the bats.

33. *Comment:* Commenter(s) stated that an exemption should be made available for mining, mineral exploration, and coal extraction activities.

Our Response: Incidental take of northern long-eared bats that results from tree-removal activity, including mining operations, is prohibited in some circumstances (see Activities Involving Tree Removal, above). However, hibernating bats are very sensitive to disturbance, as discussed in greater detail under the Hibernacula section of this rule. This final rule prohibits the incidental take of northern long-eared bats in hibernacula inside the WNS zone as well as the purposeful take (e.g., purposefully harassing or killing) of northern long-eared bats in hibernacula both inside and outside of the WNS zone. Inside the WNS zone, the take of northern long-eared bats in mines and man-made tunnels for mineral or coal extraction includes any activity that kills, injures, harms, or harasses the species. Mining, mineral exploration, and coal extraction activities will need to work with the Service to find alternative means to authorize take, such as through a section 10 permitting process or section 7 process where applicable. Mining activities inside the WNS zone that do not result in the incidental take of northern long-eared bats are not prohibited. In other words, if northern long-eared bats are not being killed, injured, or otherwise disrupted from

their normal hibernation behaviors by the mining operations, we do not consider those activities to be a "take" of the bats.

34. *Comment:* Commenter(s) suggested that activities designed to reclaim abandoned mines or maintain cave environments for the benefit of wildlife species should be exempt under the 4(d) rule.

Our Response: We agree that beneficial reclamation and maintenance should be encouraged. However, exception from take prohibitions through a species-specific 4(d) rule is not the appropriate mechanism for authorizing this activity. Where abandoned mines and cave environments are in use by northern long-eared bats, take associated with maintenance is prohibited; however, we encourage project proponents to work with the Service to implement best management practices to avoid or minimize the effects of their actions in the interest of habitat improvement. We will work with project proponents to determine alternate ways to authorize activities, such as section 10 permits or section 7 incidental take authorization.

Mosquito Control

35. *Comment:* Commenter challenges the Service's assertion that chemicals used in mosquito control (malathion and others of comparable risk to mammals) pose a risk to northern long-eared bats; commenter further requests an exemption for mosquito control activities, especially where there is a public health risk.

Our Response: Please see the Environmental Contaminants section of this rule for details concerning our evaluation of the risks from pesticide applications. After careful consideration of the available information, we do not include in this rule a prohibition on the incidental take of northern long-eared bats as result of pesticide application provided the application is a "lawful activity," that is, it must comply all applicable State laws. Any northern long-eared bat unlawfully taken pursuant to a State pesticide law would be a violation of this final 4(d) rule.

Adequacy and Clarity of 0.25 Mile Hibernacula Buffer

36. *Comment:* Commenter(s) suggested that this buffer is too restrictive for landowners.

Our Response: The Service has determined that a protective buffer around known hibernacula is necessary and advisable for the conservation of the species. Please see the discussion under *Conservation Measure 1: Tree Removal Near Known Northern Long-eared Bat*

Hibernacula of this rule for our explanation of the need for this buffer. As described in that section, we have prohibited incidental take of northern long-eared bats under specific tree-removal circumstances; however, that does not mean that all activities involving tree-removal activities within the 0.25-mile (0.4-km) buffer of hibernacula will result in take. For example, a timber harvest might be conducted within 0.25 miles (0.4 km) of a hibernaculum at a time when bats are unlikely to be roosting in trees within the buffer (e.g., winter) that fully protects any bats in the hibernaculum as well as the hibernaculum's suitability for bats (i.e., bat's access, microclimate), and does not significantly change the suitability of the habitat for foraging by northern long-eared bats or perhaps even improves prey availability. In such a case, the timber harvest, although closer than 0.25 miles (0.4 km) to the hibernaculum, is not likely to result in incidental take, so we would not recommend that the timber harvester seek authorization for incidental take pursuant to the Act. Further, while incidental take of northern long-eared bats within that buffer is prohibited (in the WNS zone), it may be authorized on a case-by-case basis with further coordination with the Service at a local level. Take may be authorized through section 10 or section 7 of the Act. In addition, it is our expectation that project modifications may be made that would protect the hibernaculum and allow for the project proponent's objectives to be met.

37. *Comment:* Commenter(s) seek clarification on whether the buffer and prohibition to clearcutting (within the buffer) is a year-round restriction.

Our Response: Yes, the protection of the hibernaculum and a buffer around it is a year round protective measure and applies to all types of tree-removal activities in the WNS zone.

38. *Comment:* Commenter(s) suggested that the buffer around hibernacula be limited to fall swarming and spring emergence when northern long-eared bats are present.

Our Response: We have determined that protective measures must be considered year-round for several reasons, including that habitat lost outside of the spring emergence and fall swarming period could affect the suitability of those habitats later during spring emergence or fall swarming. Further, we have included the buffer on hibernacula for several reasons beyond protecting foraging habitat during fall swarming and spring emergence. In particular, the buffer will help to protect the micro-climate characteristics of

hibernacula and other entrances used by bats that may not be reflected in the primary location information for hibernacula. For example, many caves or abandoned mines used may have entrances used by bats that are not reflected in the general location information for those sites that are used by people; a buffer helps to protect less prominent features that may be important to bats. Projects may be able to be planned or modified within those buffer areas to retain sufficient habitat and avoid harm; however, the Service considers coordination on a case-by-case basis to be important to assure necessary conservation.

39. *Comment:* Several commenter(s) suggested an increased buffer area around hibernacula would be more appropriate.

Our Response: We have revised the approach used in this final 4(d) rule to ensure that hibernating northern long-eared bats in the WNS zone are protected from incidental take independent of the buffer size used in the conservation measure. In addition, all northern long-eared bats both inside and outside of the WNS zone are protected from purposeful take (e.g., killing or intentionally harassing northern long-eared bats), including while in hibernacula where they are most vulnerable. We have retained the 0.25-mile buffer (0.25-mile radius from known hibernacula entrance/access points used by bats) to further protect the hibernacula and associated forested habitat for several reasons (see discussion above under *Conservation Measure 1: Tree Removal Near Known Northern Long-eared Bat Hibernacula*).

40. *Comment:* Commenter(s) expressed concern with implementing measures when they do not have data/information on known hibernacula.

Our Response: The Service recognizes the challenges associated with data sharing and data management. Many states share data management concerns and guard data carefully. We encourage landowners to continue to work with your State natural resources and natural heritage staff to evaluate your ownership for the presence of these important resources. When seeking information on the presence of hibernacula within your project boundary, our expectation is that a project proponent will complete due diligence to determine available data. However, if information is not available, we recognize that the project proponent that has made reasonable efforts to determine whether there are known hibernacula on the property is in the position of not knowing if no data have been provided.

Maternity Roost Tree Restrictions

41. *Comment:* Commenter(s) expressed concerns about having adequate information to identify maternity roost trees.

Our Response: We recognize the challenges associated with data sharing. Please see response to Comment 40. While not required by this rule, the Service recommends summer surveys to definitively locate maternity roost trees.

42. *Comment:* Commenter(s) requested that we clarify that roost trees means maternity roost trees.

Our Response: We have made this final 4(d) rule specific to maternity roost trees.

43. *Comment:* Commenter(s) expressed disagreement with the 0.25 mile buffer around known, occupied roost trees. Some commented that this buffer was too small, while some commented that it was too large.

Our Response: In the interim 4(d) rule (80 FR 17974; April 2, 2015), the buffer around known, occupied roost trees applied only to some types of tree-removal activities (e.g., forest management, rights-of-ways, prairie management) and excluded only clearcuts (and similar harvest methods). Given the relatively small percent of forest habitat anticipated to be impacted by forest management or conversion (see Forest Management and Forest Conversion, above of this rule for more details), we revised the buffer around the known maternity roost trees. As explained in more detail under *Conservation Measure 2: Tree Removal Near Known Maternity Roost Trees*, we have made the buffer more broadly applicable to all tree-removal activities, but have narrowed it in size to provide protection for the maternity roost tree, while minimizing the potential that the protective measure would serve as impediment to conducting new surveys. We have reduced the buffer around known, occupied maternity roost trees to a radius of 150 feet around the known, occupied maternity roost tree.

44. *Comment:* Commenter(s) stated that the Service should require surveys to determine where roost trees are located.

Our Response: The Act does not require a private landowner to survey his or her property to determine whether endangered or threatened wildlife and plants occupy their land. We encourage landowners to voluntarily seek additional information to conserve natural resources in their land use/land management actions; however, we will not require surveys to locate northern long-eared bats and maternity roost trees on private property.

Residential Housing Development

45. *Comment:* Commenter(s) requested that northern long-eared bat take be excepted for the purposes of residential housing development.

Our Response: Take resulting from removal of summer habitat (tree removal) is not prohibited provided the conservation measures set forth in this rule are followed when the habitat removal occurs within the WNS zone. The provisions of this final rule have been restructured to clarify prohibitions rather than rely on a list of excepted activities.

Wind Energy Development

46. *Comment:* Commenter(s) requested that northern long-eared bat take be excepted for the purposes of renewable energy development and operation (wind energy).

Our Response: Incidental take resulting from wind energy development and operation is not prohibited, provided that the conservation measures set forth in this rule are followed to protect hibernacula and known, occupied maternity roost trees. We strongly encourage voluntary conservation measures and best management practices such as feathering or elevated cut-in speeds to reduce impacts to northern long-eared bats and other bats; however, we have not prohibited incidental take attributable to wind energy in this final rule. Please see the Wind Energy Facilities section of this rule for additional details.

Natural Resource Management

47. *Comment:* Commenter(s) requested that northern long-eared bat take be excepted when activities are included in Department of Defense integrated natural resource management plans, providing for activities such as recreational activities, burns, and other temporary but insignificant effects on the northern long-eared bat.

Our Response: Incidental take resulting from activities described as recreational activities and beneficial wildlife habitat management/maintenance is not prohibited, provided that the conservation measures set forth in this rule are followed when the activity occurs inside the WNS zone. We have completed a section 7 analysis on the provisions of this final 4(d) rule to ensure that actions completed in accordance with the final rule are not likely to jeopardize the continued existence of the species. Where these resource management activities do not fit within the final rule, section 7 consultation would need to be

completed to authorize incidental take of the northern long-eared bat.

Compliance and Monitoring

48. *Comment:* Commenter(s) recommended that surveys be required and that landowners be required to report on their activities in order to receive the benefits of the 4(d) rule.

Our Response: While we welcome landowners' efforts to determine where bats may be located on their property, the Act does not require that a landowner survey his or her property to find species. We are not mandating that surveys be completed as part of this rule.

Alternate Section 4(d) Provisional Language

49. *Comment:* One organization commented on behalf of its members and 14 other environmental organizations (collectively referenced as "the Center") in support of the adoption of a different 4(d) rule and in opposition of the Service's proposed and the interim 4(d) rules.

Our Response: The remaining paragraphs (under the heading Summary of Comments and Recommendations on the Proposed and Interim 4(d) Rules) pertain to the comments we received from the Center. With respect to the overarching comment that our 4(d) rule does not conserve the species, we believe that our final 4(d) rule provides for the "necessary and advisable" conservation of the species, as described herein. For further information, please see our Determination section, below.

With respect to the Center's proposed 4(d) language, we note that the proposed language defines specific prohibitions and would make a regulatory determination of "take" to include a number of actions. These include cave and mine entry without implementing decontamination protocols; transporting equipment into caves and mines or between caves and mines between the WNS zone and non-WNS zone; cave and mine entry during hibernation periods; activities associated with hydraulic fracturing within 5 miles of a hibernaculum, within 1.5 miles of an occupied roost tree, or within 3 miles of an acoustic detection or bat capture record; noise disturbance activities within a 0.5-mile radius of a hibernaculum during the hibernation period; and disruption of water sources within hibernacula. With respect to protection of hibernacula, take of northern long-eared bats is prohibited. Establishing the causal connection between a variety of activities such as those the Center proposed to be defined

as prohibitions is beyond the scope of this rule. We have addressed hibernacula protection provisions in this rule under the section entitled *Conservation Measure 1: Tree Removal Near Known Northern Long-eared Bat Hibernacula*. Protections in this final rule are adequate to protect the species.

In addition to the Center's suggested language for hibernacula prohibitions, they recommended language regarding prohibitions for prescribed burning and aerial spraying. Based on our analysis, we conclude that prescribed burning and aerial spraying do not have a measurable population-level impact on the species and regulation of those activities will not meaningfully impact the species' ability to recover. For further information on prescribed fire impacts, see Prescribed Fire above. For further information on aerial spraying of pesticides, please see the Environmental Contaminants section above.

The final prohibition suggested by the Center was the operation of utility-scale wind projects, specifically during the hours from dusk to sunrise during the fall swarming season, at low wind speeds, and within 5 miles of a hibernaculum. Incidental take resulting from the operation of wind energy facilities is not prohibited by this final 4(d) rule and a complete discussion of known impacts to the species may be found in the Wind Energy Facilities section above.

Finally, the Center provided suggested regulatory text for exemptions from prohibitions that included language for seasonal restrictions, clearing restrictions, mandatory measures for hibernacula protection (gate installation), water quality protection measures, and data collection and reporting requirements. We recognize the effort that has gone into the development of this alternative language. However, we have carefully considered the measures that are necessary for the protection of the species. Our final rule has been developed based on the Service's desire to implement protective measures that will make a meaningful impact on species conservation and recovery. As stated elsewhere in this document (see Determination section, below), we have provided regulatory flexibility while implementing protective measures where we have determined those measures to be necessary and advisable for conservation of the species.

Determination

Section 4(d) of the Act states that "the Secretary shall issue such regulations as she deems 'necessary and advisable' to provide for the conservation" of

species listed as threatened species. Conservation is defined in the Act to mean "to use and the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to [the Act] are no longer necessary."

The courts have recognized the extent of the Secretary's discretion under this standard to develop rules that are appropriate for the conservation of a species. For example, the Secretary may find that it is necessary and advisable not to include a taking prohibition, or to include a limited taking prohibition. See *Alsea Valley Alliance v. Lautenbacher*, 2007 U.S. Dist. Lexis 60203 (D. Or. 2007); *Washington Environmental Council v. National Marine Fisheries Service*, 2002 U.S. Dist. Lexis 5432 (W.D. Wash. 2002). In addition, as affirmed in *State of Louisiana v. Verity*, 853 F.2d 322 (5th Cir. 1988), the rule need not address all the threats to the species. As noted by Congress when the Act was initially enacted, "once an animal is on the threatened list, the Secretary has an almost infinite number of options available to him [her] with regard to the permitted activities for those species. [She] may, for example, permit taking, but not importation of such species," or she may choose to forbid both taking and importation but allow the transportation of such species, as long as the prohibitions, and exceptions to those prohibitions, will "serve to conserve, protect, or restore the species concerned in accordance with the purposes of the Act" (H.R. Rep. No. 412, 93rd Cong., 1st Sess. 1973).

Section 9 prohibits making it illegal for any person subject to the jurisdiction of the United States to violate any regulation pertaining to any threatened species of fish or wildlife listed pursuant to section 4 of the Act and promulgated by the Secretary pursuant to authority provided by the Act. Under this final 4(d) rule, incidental take of the northern long-eared bat will not be prohibited outside the WNS zone. Incidental take also will not be prohibited within the WNS zone, outside of hibernacula, provided that it occurs more than 0.25 miles (0.4 km) from a known hibernacula and does not result from an activity that cuts or destroys known occupied maternity roost trees, or any other trees within a 150-foot (45-m) radius from the maternity tree, during the pup season (June 1 through July 31).

Accordingly, we have determined that this provision is necessary and advisable for the conservation of the northern long-eared bat as explained below.

Although not fully protective of every individual, the conservation measures identified in this final rule help protect maternity colonies. This final species-specific rule under section 4(d) of the Act provides the flexibility for certain activities to occur that have not been the cause of the species' imperilment, while still promoting conservation of the species across its range.

The northern long-eared bat was listed as a threatened species under the Act, with an interim rule under section 4(d), on April 2, 2015 (80 FR 17974). At that time, the Service invited public comment on the interim 4(d) rule for 90 days, ending July 1, 2015. The Service had already received comments for 60 days on its proposed 4(d) rule (80 FR 2371; January 16, 2015). In total, the Service received approximately 40,500 comments on the proposed and interim 4(d) rules. For a complete discussion of the comments, as well as the Service's response to comments, see Summary of Comments and Recommendations on the Proposed and Interim 4(d) Rules, above.

Because the primary threat to the northern long-eared bat is a fungal disease known as WNS, the Service has tailored the final 4(d) rule to prohibit the take of northern long-eared bats from certain activities within areas where they are in decline, as a result of WNS, and within these areas we apply incidental take protection only to known, occupied maternity roost trees and known hibernacula. These protections will help to conserve the northern long-eared bat during its most vulnerable life stages (from birth to flight, or volancy) and during spring and fall swarming (near hibernacula).

In summary, this 4(d) rule is necessary and advisable to provide for the conservation of the northern long-eared bat because it provides for protection of known maternity roost trees and known hibernacula within the WNS zone. In addition, promulgation of this rule allows the conservation community to provide for species conservation where it can affect change, namely during the northern long-eared bat's most vulnerable life stages and where hibernation occurs. This final 4(d) rule allows the regulated public to manage lands in a manner that is lawful and compatible with species' survival, and it allows for protection of the species in a manner that the Secretary deems to be necessary and advisable for the conservation of the northern long-eared bat. By this rule, the Secretary deems that the prohibition of certain take, which is incidental to otherwise lawful activities that take bat habitat, is not necessary for the long-term survival

of the species. Furthermore, she acknowledges the importance of addressing the threat of WNS as the primary measure to arrest and reverse the decline of the species. Nothing in this 4(d) rule affects other provisions of the Act, such as designation of critical habitat under section 4, recovery planning under section 4(f), and consultation requirements under section 7.

Required Determinations

Regulatory Planning and Review

(Executive Orders 12866 and 13563)

Executive Order 12866 provides that the Office of Information and Regulatory Affairs (OIRA) in the Office of Management and Budget will review all significant rules. OIRA has determined that this rule is not significant. Executive Order 13563 reaffirms the principles of E.O. 12866 while calling for improvements in the nation's regulatory system to promote predictability, to reduce uncertainty, and to use the best, most innovative, and least burdensome tools for achieving regulatory ends. The executive order directs agencies to consider regulatory approaches that reduce burdens and maintain flexibility and freedom of choice for the public where these approaches are relevant, feasible, and consistent with regulatory objectives. E.O. 13563 emphasizes further that regulations must be based on the best available science and that the rulemaking process must allow for public participation and an open exchange of ideas. We have developed this final 4(d) rule in a manner consistent with these requirements.

Regulatory Flexibility Act (5 U.S.C. 601 *et seq.*)

Listing and status determinations under the Endangered Species Act of 1973, as amended (Act; 16 U.S.C. 1531 *et seq.*), and any prohibitions or protective measures afforded the species under the Act are exempt from the Regulatory Flexibility Act (RFA; 5 U.S.C. 601 *et seq.*), as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996). However, as this final 4(d) rule is being promulgated following the final listing of the northern long-eared bat, we evaluate whether the Regulatory Flexibility Act applies to this rulemaking.

Under the Regulatory Flexibility Act, whenever an agency must publish a notice of rulemaking for any proposed or final rule, it must prepare and make available for public comment a regulatory flexibility analysis that

describes the effects of the rule on small entities (small businesses, small organizations, and small government jurisdictions). However, no regulatory flexibility analysis is required if the head of the agency certifies the rule will not have a significant economic impact on a substantial number of small entities. SBREFA amended the RFA to require Federal agencies to provide a statement of the factual basis for certifying that the rule will not have a significant economic impact on a substantial number of small entities. Thus, for a regulatory flexibility analysis to be required, impacts must exceed a threshold for "significant impact" and a threshold for a "substantial number of small entities." See 5 U.S.C. 605(b). Based on the information that is available to us at this time, we certify that this rule will not have a significant economic impact on a substantial number of small entities. The following discussion explains our rationale.

On April 2, 2015 (80 FR 17974), we published the final determination to list the northern long-eared bat as a threatened species and an interim 4(d) rule. That rule became effective on May 4, 2015, and the interim 4(d) rule will remain in effect until this final rule becomes effective (see **DATES**, above). The interim 4(d) rule generally applies the prohibitions of 50 CFR 17.31 and 17.32 to the northern long-eared bat, which means that the interim rule, among other things, prohibits the purposeful take of northern long-eared bats throughout the species' range, but the interim rule includes exceptions to the purposeful take prohibition. The exceptions for purposeful take are: (1) In instances of removal of northern long-eared bats from human structures (if actions comply with all applicable State regulations); and (2) for authorized capture, handling, and related activities of northern long-eared bats by individuals permitted to conduct these same activities for other bat species until May 3, 2016. Under the interim rule, incidental take is not prohibited outside the WNS zone if the incidental take results from otherwise lawful activities. Inside the WNS zone, there are exceptions for incidental take for the following activities, subject to certain conditions: Implementation of forest management; maintenance and expansion of existing rights-of-way and transmission corridors; prairie management; minimal tree removal; and removal of hazardous trees for the protection of human life and property.

This final 4(d) rule does not generally apply the prohibitions of 50 CFR 17.31 to the northern long-eared bat. This rule continues to prohibit purposeful take of

northern long-eared bats throughout the species' range, except in certain cases, including in instances of removal of northern long-eared bats from human structures and for authorized capture, handling, and related activities of northern long-eared bats by individuals permitted to conduct these same activities for other bat species until May 3, 2016. After May 3, 2016, a permit pursuant to section 10(a)(1)(A) of the Act is required for the capture and handling of northern long-eared bats. Under this rule, incidental take is still not prohibited outside the WNS zone. Within the WNS zone, incidental take is prohibited only if: (1) Actions result in the incidental take of northern long-eared bats in hibernacula; (2) actions result in the incidental take of northern long-eared bats by altering a known hibernaculum's entrance or interior environment if the alteration impairs an essential behavioral pattern, including sheltering northern long-eared bats; or (3) tree-removal activities result in the incidental take of northern long-eared bats when the activity either occurs within 0.25 mile (0.4 kilometer) of a known hibernaculum, or cuts or destroys known, occupied maternity roost trees or any other trees within a 150-foot (45-meter) radius from the maternity roost tree during the pup season (June 1 through July 31). This approach allows more flexibility to affected entities and individuals in conducting activities within the WNS zone. Under this rule, we individually set forth prohibitions on possession and other acts with unlawfully taken northern long-eared bats, and on import and export of northern long-eared bats. These prohibitions were included in the interim 4(d) through the general application of the prohibitions of 50 CFR 17.31 to the northern long-eared bat. Under this rule, take of the northern long-eared bat is also not prohibited for the following: Removal of hazardous trees for protection of human life and property; take in defense of life; and take by an employee or agent of the Service, of the National Marine Fisheries Service, or of a State conservation agency that is operating a conservation program pursuant to the terms of a cooperative agreement with the Service. Regarding these three exceptions, take in defense of life was not included in the interim 4(d) rule, but the other two exceptions were, either through the general application of 50 CFR 17.31 or through a specific exception included in the interim 4(d) rule. Therefore, this final 4(d) rule will result in less restrictive regulations

under the Act than those set forth in the interim 4(d) rule.

We completed an analysis of the forested land area that may be impacted by this rulemaking. There are approximately 400,000,000 acres (161,874,256 ha) of forested habitat across the range of the northern long-eared bat, which includes 37 States and the District of Columbia. This rule may restrict land use activities on approximately 200,000 acres (80,937 ha). This area constitutes less than 0.05 percent of all forested habitat across the extensive range of the northern long-eared bat. Any impact in this very small portion of forested habitat is not expected to affect a substantial number of entities in any given sector, nor result in a significant economic impact on any given entity. For the above reasons, we certify that the final rule will not have a significant economic impact on a substantial number of small entities. Therefore, a final regulatory flexibility analysis is not required.

Energy Supply, Distribution, or Use—Executive Order 13211

Executive Order 13211 (Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use) requires agencies to prepare Statements of Energy Effects when undertaking certain actions. For reasons discussed within this final rule, we believe that the rule will not have any effect on energy supplies, distribution, or use. Therefore, this action is not a significant energy action, and no Statement of Energy Effects is required.

Unfunded Mandates Reform Act

In accordance with the Unfunded Mandates Reform Act (2 U.S.C. 1501 *et seq.*), we make the following findings:

(1) This final rule will not produce a Federal mandate. In general, a Federal mandate is a provision in legislation, statute, or regulation that would impose an enforceable duty upon State, local, or Tribal governments, or the private sector, and includes both "Federal intergovernmental mandates" and "Federal private sector mandates." These terms are defined in 2 U.S.C. 658(5)–(7). "Federal intergovernmental mandate" includes a regulation that "would impose an enforceable duty upon State, local, or [T]ribal governments" with two exceptions. It excludes "a condition of Federal assistance." It also excludes "a duty arising from participation in a voluntary Federal program," unless the regulation "relates to a then-existing Federal program under which \$500,000,000 or more is provided annually to State,

local, and [T]ribal governments under entitlement authority," if the provision would "increase the stringency of conditions of assistance" or "place caps upon, or otherwise decrease, the Federal Government's responsibility to provide funding," and the State, local, or Tribal governments "lack authority" to adjust accordingly. At the time of enactment, these entitlement programs were: Medicaid; AFDC work programs; Child Nutrition; Food Stamps; Social Services Block Grants; Vocational Rehabilitation State Grants; Foster Care, Adoption Assistance, and Independent Living; Family Support Welfare Services; and Child Support Enforcement. "Federal private sector mandate" includes a regulation that "would impose an enforceable duty upon the private sector, except (i) a condition of Federal assistance or (ii) a duty arising from participation in a voluntary Federal program."

(2) This final 4(d) rule will result in less restrictive regulations under the Act, as it pertains to the northern long-eared bat, than would otherwise exist without a 4(d) rule or under the interim 4(d) rule. As a result, we do not believe that this rule will significantly or uniquely affect small government entities. Therefore, a Small Government Agency Plan is not required.

Takings

In accordance with Executive Order 12630, this final rule will not have significant takings implications. We have determined that the rule has no potential takings of private property implications as defined by this Executive Order because this 4(d) rule will result in less-restrictive regulations under the Act than would otherwise exist. A takings implication assessment is not required.

Federalism

In accordance with Executive Order 13132, this final 4(d) rule does not have significant Federalism effects. A federalism summary impact statement is not required. This rule will not have substantial direct effects on the State, on the relationship between the Federal Government and the State, or on the distribution of power and responsibilities among the various levels of government.

Civil Justice Reform

In accordance with Executive Order 12988, the Office of the Solicitor has determined that this final rule does not unduly burden the judicial system and meets the requirements of sections 3(a) and 3(b)(2) of the Order.

Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.)

This rule does not contain collections of information that require approval by the Office of Management and Budget (OMB) under the Paperwork Reduction Act. This rule will not impose recordkeeping or reporting requirements on State or local governments, individuals, businesses, or organizations. An agency may not conduct or sponsor and a person is not required to respond to a collection of information unless it displays a currently valid OMB control number.

National Environmental Policy Act (42 U.S.C. 4321 et seq.)

We have prepared a final environmental assessment, as defined under the authority of the National Environmental Policy Act of 1969. For information on how to obtain a copy of the final environmental assessment, see ADDRESSES, above. The final environmental assessment will also be available on the Internet at <http://www.regulations.gov> and at <http://www.fws.gov/midwest/Endangered>.

Government-to-Government Relationship With Tribes

In accordance with the President's memorandum of April 29, 1994 (Government-to-Government Relations with Native American Tribal Governments; 59 FR 22951), Executive Order 13175 (Consultation and Coordination With Indian Tribal Governments), and the Department of the Interior's manual at 512 DM 2, we readily acknowledge our responsibility to communicate meaningfully with recognized Federal Tribes on a government-to-government basis. In accordance with Secretarial Order 3206 of June 5, 1997 (American Indian Tribal Rights, Federal-Tribal Trust Responsibilities, and the Endangered Species Act), we readily acknowledge our responsibilities to work directly with tribes in developing programs for healthy ecosystems, to acknowledge that tribal lands are not subject to the same controls as Federal public lands, to remain sensitive to Indian culture, and to make information available to tribes.

In October 2013, Tribes and multi-tribal organizations were sent letters inviting them to begin consultation and coordination with the service on the proposal to list the northern long-eared bat. In August 2014, several Tribes and multi-tribal organizations were sent an additional letter regarding the Service's intent to extend the deadline for making a final listing determination by 6 months. A conference call was also held

with Tribes to explain the listing process and discuss any concerns. Following publication of the proposed rule, the Service established three interagency teams (biology of the northern long-eared bat, non-WNS threats, and conservation measures) to ensure that States, Tribes, and other Federal agencies were able to provide input into various aspects of the listing rule and potential conservation measures for the species. Invitations for inclusion in these teams were sent to Tribes within the range of the northern long-eared bat and a few tribal representatives participated on those teams. Two additional conference calls (in January and March 2015) were held with Tribes to outline the proposed species-specific 4(d) rule and to answer questions. Through this coordination, some Tribal representatives expressed concern about how listing the northern long-eared bat may impact forestry practices, housing development programs, and other activities on Tribal lands.

References Cited

A complete list of references cited in this document is available on the Internet at <http://www.regulations.gov> and upon request from the Twin Cities Ecological Services Field Office (see FOR FURTHER INFORMATION CONTACT).

Authors

The primary authors of this document are the staff members of the Midwest Region of the U.S. Fish and Wildlife Service.

List of Subjects in 50 CFR Part 17

Endangered and threatened species, Exports, Imports, Reporting and recordkeeping requirements, Transportation.

Regulation Promulgation

Accordingly, we amend part 17, subchapter B of chapter I, title 50 of the Code of Federal Regulations, as follows:

PART 17—ENDANGERED AND THREATENED WILDLIFE AND PLANTS

■ 1. The authority citation for part 17 continues to read as follows:

Authority: 16 U.S.C. 1361–1407; 1531–1544; and 4201–4245, unless otherwise noted.

■ 2. Amend § 17.40 by revising paragraph (o) to read as follows:

§ 17.40 Special rules—mammals.

* * * * *

(o) Northern long-eared bat (*Myotis septentrionalis*). The provisions of this rule are based upon the occurrence of

white-nose syndrome (WNS), a disease affecting many U.S. bat populations. The term “WNS zone” identifies the set of counties within the range of the northern long-eared bat within 150 miles of the boundaries of U.S. counties or Canadian districts where the fungus *Pseudogymnoascus destructans* (Pd) or WNS has been detected. For current information regarding the WNS zone, contact your local Service ecological services field office. Field office contact information may be obtained from the Service regional offices, the addresses of which are listed in 50 CFR 2.2.

(1) *Prohibitions.* The following prohibitions apply to the northern long-eared bat:

(i) Purposeful take of northern long-eared bat, including capture, handling, or other activities.

(ii) Within the WNS zone:

(A) Actions that result in the incidental take of northern long-eared bats in known hibernacula.

(B) Actions that result in the incidental take of northern long-eared bats by altering a known hibernaculum's entrance or interior environment if it impairs an essential behavioral pattern, including sheltering northern long-eared bats.

(C) Tree-removal activities that result in the incidental take of northern long-eared bats when the activity:

(1) Occurs within 0.25 mile (0.4

kilometer) of a known hibernaculum; or

(2) Cuts or destroys known occupied maternity roost trees, or any other trees within a 150-foot (45-meter) radius from the maternity roost tree, during the pup season (June 1 through July 31).

(iii) Possession and other acts with unlawfully taken northern long-eared bats. It is unlawful to possess, sell, deliver, carry, transport, or ship, by any means whatsoever, any northern long-eared bat that was taken in violation of this section or State laws.

(iv) Import and export.

(2) *Exceptions from prohibitions.* (i) Any person may take a northern long-eared bat in defense of his own life or the lives of others, including for public health monitoring purposes.

(ii) Any person may take a northern long-eared bat that results from the removal of hazardous trees for the protection of human life and property.

(iii) Any person may take a northern long-eared bat by removing it from human structures, but only if the actions comply with all applicable State regulations.

(iv) Purposeful take that results from actions relating to capture, handling, and related activities for northern long-eared bats by individuals permitted to

conduct these same activities for other species of bat until May 3, 2016.

(v) All of the provisions of § 17.32 apply to the northern long-eared bat.

(vi) Any employee or agent of the Service, of the National Marine Fisheries Service, or of a State conservation agency that is operating a conservation program pursuant to the terms of a cooperative agreement with

the Service in accordance with section 6(c) of the Act, who is designated by his agency for such purposes, may, when acting in the course of his official duties, take northern long-eared bats covered by an approved cooperative agreement to carry out conservation programs.

* * * * *

Dated: January 7, 2016.

Karen Hyun,

*Acting Principal Deputy Assistant Secretary
for Fish and Wildlife and Parks.*

[FR Doc. 2016-00617 Filed 1-13-16; 8:45 am]

BILLING CODE 4333-15-P

List of Subjects in 48 CFR Parts 601, 606, 608, 615, 616, 623, 627, 633, 651 and 652

Administrative practice and procedure, Government procurement.

For the reasons stated in the preamble, the Department of State amends 48 CFR chapter 6 as follows:

■ 1. The authority citation for 48 CFR parts 601, 606, 608, 615, 616, 623, 627, 633, 651 and 652 continues to read as follows:

Authority: 22 U.S.C. 2651a, 40 U.S.C. 121(c) and 48 CFR chapter 1.

PART 601—DEPARTMENT OF STATE ACQUISITION REGULATION SYSTEM

601.602–1 [Amended]

■ 2. In section 601.602–1, paragraph (b), remove “601.603–70” and add in its place “601.601–70”.

PART 606—COMPETITION REQUIREMENTS

606.304 [Amended]

■ 3. In section 606.304, in paragraph (a)(2), remove “a advocate for competition” and add in its place “an advocate for competition”.

Subpart 606.5—Advocates for Competition

■ 4. Revise the heading for subpart 606.5 to read as set forth above.

■ 5. In section 606.501, in the second sentence of paragraph (b), remove “competition advocate” and add in its place “advocate for competition”.

PART 608—REQUIRED SOURCES OF SUPPLIES AND SERVICES

■ 6. Add subpart 608.4 to read as follows:

Subpart 608.4—Federal Supply Schedules
608.405 Ordering procedures for Federal Supply Schedules.

608.405–3 Blanket Purchase Agreements.

Subpart 608.4—Federal Supply Schedules

608.405 Ordering procedures for Federal Supply Schedules.

608.405–3 Blanket Purchase Agreements.

(a) *Establishment.*

(3)(ii) The Procurement Executive is the head of the agency for the purposes of FAR 8.405–3(a)(3)(ii).

PART 615—CONTRACTING BY NEGOTIATION

615.205–70 [Amended]

■ 7. In section 615.205–70, remove “DOSAR”.

PART 616—TYPES OF CONTRACTS

■ 8. Revise the heading for section 616.103 to read as follows:

616.103 Negotiating contract type.

* * * * *

■ 9. Add section 616.504 to read as follows:

616.504 Indefinite-quantity contracts.

(c) *Multiple award preference—(1) Planning the acquisition.*

(ii)(D)(1) The Procurement Executive is the head of the agency for the purposes of FAR 16.504(c)(1)(ii)(D)(1).

PART 623—ENVIRONMENT, ENERGY AND WATER EFFICIENCY, RENEWABLE ENERGY TECHNOLOGIES, OCCUPATIONAL SAFETY, AND DRUG-FREE WORKPLACE TYPES OF CONTRACTS

623.506 [Amended]

■ 10. The text of section 623.506 is designated as paragraph (e).

PART 627—PATENTS, DATA, AND COPYRIGHTS

627.304–1 [Amended]

■ 11. In the third sentence of section 627.304–1, add “proposed to be” between “Determinations” and “issued”.

PART 633—PROTESTS, DISPUTES, AND APPEALS

Subpart 633.214—Alternative dispute resolution (ADR)

■ 12. Add a subpart 633.214 heading to read as set forth above.

■ 13. Revise the heading for section 633.214–70 to read as follows:

633.214–70 DOS ADR program.

* * * * *

PART 651—USE OF GOVERNMENT SOURCES BY CONTRACTORS

651.701 [Redesignated as 651.7001]

■ 14. Section 651.701 is redesignated as section 651.7001.

PART 652—SOLICITATION PROVISIONS AND CONTRACT CLAUSES

652.100–70 [Amended]

■ 15. In section 652.100–70, revise “Subpart” to read “subpart” in paragraphs (a) and (b).

Subpart 652.2—Text of Provisions and Clauses

■ 16. Revise the subpart 652.2 heading to read as set forth above.

652.232–72 [Amended]

■ 17. In the introductory text of section 652.232–72, remove “632.705–70” and add in its place “632.706–70”.

Corey M. Rindner,

Procurement Executive, Department of State.

[FR Doc. 2016–09570 Filed 4–26–16; 8:45 am]

BILLING CODE 4710–24–P

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

[Docket No. FWS–R3–ES–2016–0052; 4500030113]

RIN 1018–AZ62

Endangered and Threatened Wildlife and Plants; Determination That Designation of Critical Habitat Is Not Prudent for the Northern Long-Eared Bat

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Critical habitat determination.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), have reconsidered whether designating critical habitat for the northern long-eared bat (*Myotis septentrionalis*) is prudent. We have determined that such a designation is not prudent. We listed the northern long-eared bat as a threatened species under the Endangered Species Act of 1973, as amended (Act), on April 2, 2015. At the time the species was listed, we determined that designation of critical habitat was prudent, but not determinable. Since that time, information has come available that demonstrates that designating the wintering habitat as critical habitat for the bat would likely increase the threat from vandalism and disturbance, and could, potentially, increase the spread of white-nose syndrome. In addition, designating the summer habitat as critical habitat would not be beneficial to the species, because there are no areas within the summer habitat that meet the definition of critical habitat. Thus, we have determined that the designation of critical habitat is not prudent for the northern long-eared bat. **DATES:** The determination announced in this document was made on April 27, 2016.

ADDRESSES: This document is available on the Internet at <http://www.regulations.gov> at Docket No. FWS-R3-ES-2016-0052. Supporting documentation we used in preparing this document will be available for public inspection, by appointment, during normal business hours at the Twin Cities Ecological Services Office, U.S. Fish and Wildlife Service, 4101 American Blvd. E., Bloomington, MN 55425.

FOR FURTHER INFORMATION CONTACT: Peter Fasbender, Field Supervisor, 952-252-0092, extension 210. Persons who use a telecommunications device for the deaf (TDD) may call the Federal Information Relay Service (FIRS) at 800-877-8339.

SUPPLEMENTARY INFORMATION:

Background

The northern long-eared bat (*Myotis septentrionalis*) is a wide-ranging species that is found in a variety of forested habitats in summer and hibernates in caves and mines (or habitat with similar conditions to suitable caves or mines) in winter. The fungal disease, white-nose syndrome (WNS), is the main threat to this species and has caused a precipitous decline in bat numbers (in many cases, 90–100 percent) where the disease has occurred. Declines in the numbers of northern long-eared bats are expected to continue as WNS extends across the species' range, provided no cure to the disease is found. For more information on the northern long-eared bat, its habitat, and WNS, please refer to the October 2, 2013, proposed listing (78 FR 61046) and the April 2, 2015, final listing (80 FR 17974) rules.

Summer Habitat

Suitable summer habitat for the northern long-eared bat consists of a wide variety of forested and wooded habitats where they roost, forage, and travel (Foster and Kurta 1999, p. 668), and may also include some adjacent and interspersed non-forested habitats (Yates and Muzika 2006, p. 1,245). This includes forests and woodlots containing potential roosts, as well as linear features such as fence rows, riparian forests, and other wooded corridors. These wooded areas may be dense or loose aggregates of trees with variable amounts of canopy closure (Lacki and Schwierjohann 2001, p. 487; Perry and Thill 2007, p. 223; Sasse and Pekins 1996, p. 95; Timpone *et al.* 2010, p. 118).

After hibernation ends in late March or early April (as late as May in some northern areas), most northern long-

eared bats migrate to summer roosts. The spring migration period typically runs from mid-March to mid-May (Caire *et al.* 1979, p. 405; Easterla 1968, p. 770; Whitaker and Mumford 2009, p. 207). The northern long-eared bat is not considered to be a long-distance migrant (typically 40–50 miles (64–80 kilometers)). Males and non-reproductive females may summer near or in their winter habitat (hibernacula), or migrate to summer habitat some distance from their hibernaculum.

After emerging from hibernacula in the spring, female northern long-eared bats actively form colonies in the summer (Foster and Kurta 1999) and exhibit fission-fusion behavior (Garroway and Broders 2007), where members frequently coalesce to form a group, but composition of the group is in flux (Barclay and Kurta 2007, p. 44). As part of this behavior, northern long-eared bats switch tree roosts often (Sasse and Pekins 1996, p. 95), typically every 2 to 3 days (Foster and Kurta 1999, p. 665; Owen *et al.* 2002, p. 2; Carter and Feldhamer 2005, p. 261; Timpone *et al.* 2010, p. 119). Northern long-eared bat maternity colonies range widely in size (reported range of 7 to 100; Owen *et al.* 2002, p. 2; Whitaker and Mumford 2009, p. 212), although colonies of 30–60 individuals may be most common, at least prior to the onset of WNS (Whitaker and Mumford 2009, p. 212; Caceres and Barclay 2000, p. 3; Service 2014, p. A16).

Northern long-eared bats show interannual fidelity to roost trees and maternity areas. They use networks of roost trees often centered around one or more central-node roost trees (Johnson *et al.* 2011, p. 228) with multiple alternate roost trees. Northern long-eared bats roost in cavities, crevices, hollows, or underneath bark of both live and dead trees and snags (typically ≥ 3 inches (in) (8 centimeters (cm)) in diameter at breast height (dbh)). Northern long-eared bats are known to use a wide variety of roost types, using tree species based on presence of cavities or crevices or presence of peeling bark. Northern long-eared bats have also been found roosting in structures such as buildings, barns, sheds, houses, and bridges (Benedict and Howell 2008, p. 5; Krochmal and Sparks 2007, p. 650; Timpone *et al.* 2010, p. 119; Service 2014, p. 2).

The best available information indicates that northern long-eared bats seem to be flexible in roost selection, using varying roost tree species and types of roosts throughout their range. They do not depend on certain species of trees for roosts; rather, they opportunistically use many tree species

that form suitable cavities or retain bark (Foster and Kurta 1999, p. 668). Additionally, the bats may use either live trees or snags; the use of live trees versus snags may reflect the availability of such structures (Perry and Thill 2007, p. 224) and the presence of sympatric bat species (e.g., Indiana bat (*Myotis sodulis*)) (Timpone *et al.* 2010, p. 120), as opposed to a specific preference of tree or other habitat characteristics. Results from studies have also found that the diameters of roost trees selected by northern long-eared bats vary greatly (Sasse and Pekins 1996, pp. 95–96; Schultes 2002, pp. 49, 51; Perry 2014, pers. comm.; Lerecœur 2013, pp. 52–54; Carter and Feldhamer 2005, p. 263; Foster and Kurta 1999, p. 663; Lacki and Schwierjohann 2001, pp. 484–485; Owens *et al.* 2002, p. 3; Timpone *et al.* 2010, p. 118; Lowe 2012, p. 61; Perry and Thill 2007, p. 223; Lacki *et al.* 2009, p. 1,171) and that northern long-eared bats can forage in a variety of forest types (Brack and Whitaker 2001, p. 207; LaVal *et al.* 1977, p. 594; van Zyll de Jong 1985, p. 94). Northern long-eared bats change roost trees frequently (e.g., Cryan *et al.* 2001, p. 50; Foster and Kurta 1999, p. 665) within their summer home range; this behavior suggests they are adapted to responding quickly to changes in roost availability and ephemeral roosts. For a more detailed discussion on summer habitat, refer to the April 2, 2015, final listing rule (80 FR 17974).

Winter Habitat (Hibernacula)

Northern long-eared bats hibernate during the winter months to conserve energy from increased thermoregulatory demands and reduced food resources (Thomas *et al.* 1990, p. 475; Thomas and Geiser 1997, p. 585; Bouma *et al.* 2010, p. 623). Suitable winter habitat includes caves and cave-like structures (e.g., abandoned or active mines, railroad tunnels) (Service 2015, unpublished data; Goehring 1954, p. 435; Kurta *et al.* 1997, p. 478). Other landscape features may be used by northern long-eared bats during the winter, but they have yet to be documented. Generally, northern long-eared bats hibernate from October to April, depending on the local climate (November/December through March in southern areas, with emergence as late as mid-May in some northern areas) (Caire *et al.* 1979, p. 405; Whitaker and Hamilton 1998, p. 100; Amelon and Burhans 2006, p. 72).

Hibernacula used by northern long-eared bats vary in size (Raesly and Gates 1987, p. 20; Kurta 2013, in litt.), and these hibernacula have relatively constant, cooler temperatures (0 to 9 degrees Celsius (°C) (32 to 48 degrees

Fahrenheit (°F)) (Raesly and Gates 1987, p. 18; Caceres and Pybus 1997, p. 2; Brack 2007, p. 744), with high humidity and minimal air currents (Fitch and Shump 1979, p. 2; van Zyll de Jong 1985, p. 94; Raesly and Gates 1987, p. 118; Caceres and Pybus 1997, p. 2). The sites favored by northern long-eared bats are often in very high humidity areas, to such a large degree that droplets of water are often observed on their fur (Hitchcock 1949, p. 52; Barbour and Davis 1969, p. 77). Within hibernacula, northern long-eared bats are typically found roosting in small crevices or cracks in cave or mine walls or ceilings, sometimes with only the nose and ears visible (Griffin 1940, pp. 181–182; Barbour and Davis 1969, p. 77; Caire *et al.* 1979, p. 405; van Zyll de Jong 1985, p. 9; Caceres and Pybus 1997, p. 2; Whitaker and Mumford 2009, pp. 209–210).

To a lesser extent, northern long-eared bats have also been observed overwintering in other types of habitat that resemble cave or mine hibernacula, including abandoned railroad tunnels (Service 2015, unpublished data). Although similar bat species (*e.g.*, big brown bats (*Eptesicus fuscus*)) have been found using non-cave or non-mine hibernacula, including attics and hollow trees (Neubaum *et al.* 2006, p. 473; Whitaker and Gummer 1992, pp. 313–316), northern long-eared bats have only been observed overwintering in suitable caves, mines, or habitat with the same types of conditions found in suitable caves or mines.

Northern long-eared bats tend to roost singly or in small groups (Service 2013, unpublished data), with hibernating population sizes rarely recorded in concentrations of more than 100 bats in a single hibernaculum (Barbour and Davis 1969, p. 77). Northern long-eared bats display more winter activity than other cave species, with individuals occasionally moving between hibernacula throughout the winter (Griffin 1940, p. 185; Whitaker and Rissler 1992, p. 131; Caceres and Barclay 2000, pp. 2–3). Northern long-eared bats have shown a high degree of philopatry (*i.e.*, using the same site multiple years) to the hibernacula used (Pearson 1962, p. 30).

Northern long-eared bat hibernacula have fairly specific physical and biological requirements that make them suitable for northern long-eared bats. In general, bats select hibernacula because they have characteristics that allow the bats to meet specific life-cycle requirements. Factors influencing a hibernaculum's suitability include its physical structure (*e.g.*, openings, interior space, depth), air circulation,

temperature profile, and location relative to foraging sites (Tuttle and Stevenson 1978, pp. 108–121). For a more detailed discussion on winter habitat, refer to the April 2, 2015, final listing rule (80 FR 17974).

Previous Federal Actions

Refer to the proposed (78 FR 61046; October 2, 2013) and final (80 FR 17974; April 2, 2015) listing rules for the northern long-eared bat for a detailed description of previous Federal actions concerning this species. On April 2, 2015, we published in the *Federal Register* (80 FR 17974) a final rule listing the northern long-eared bat as a threatened species. In the April 2, 2015, rule, we also established an interim rule under section 4(d) of the Act (16 U.S.C. 1531 *et seq.*). The final listing rule and the interim 4(d) rule both became effective on May 4, 2015. On January 14, 2016 (81 FR 1900), we published a final 4(d) rule, which became effective on February 16, 2016.

Critical Habitat

Background

Section 4(a)(3) of the Act, as amended, and implementing regulations (50 CFR 424.12), require that, to the maximum extent prudent and determinable, we designate critical habitat at the time the species is determined to be an endangered or threatened species. Critical habitat is defined in section 3 of the Act as:

(1) The specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the Act, on which are found those physical or biological features

(a) Essential to the conservation of the species, and

(b) Which may require special management considerations or protection; and

(2) Specific areas outside the geographical area occupied by the species at the time it is listed, upon a determination that such areas are essential for the conservation of the species.

Our regulations at 50 CFR 424.02 defines the geographical area occupied by the species as: An area that may generally be delineated around species' occurrences, as determined by the Secretary (*i.e.*, range). Such areas may include those areas used throughout all or part of the species' life cycle, even if not used on a regular basis (*e.g.*, migratory corridors, seasonal habitats, and habitats used periodically, but not solely by vagrant individuals).

Conservation, as defined under section 3 of the Act, means to use, and

the use of, all methods and procedures that are necessary to bring an endangered or threatened species to the point at which the measures provided pursuant to the Act are no longer necessary. Such methods and procedures include, but are not limited to, all activities associated with scientific resources management such as research, census, law enforcement, habitat acquisition and maintenance, propagation, live trapping, and transplantation, and, in the extraordinary case where population pressures within a given ecosystem cannot be otherwise relieved, may include regulated taking.

Critical habitat receives protection under section 7 of the Act through the requirement that Federal agencies ensure, in consultation with the Service, that any action they authorize, fund, or carry out is not likely to result in the destruction or adverse modification of critical habitat. The designation of critical habitat does not affect land ownership or establish a refuge, wilderness, reserve, preserve, or other conservation area. Critical habitat designation does not allow the government or public to access private lands, nor does it require implementation of restoration, recovery, or enhancement measures by non-Federal landowners. Where a landowner requests Federal agency funding or authorization for an action that may affect a listed species or critical habitat, the Federal agency would be required to consult under section 7(a)(2) of the Act, but even if consultation leads to a finding that the action would likely cause destruction or adverse modification of critical habitat, the resulting obligation of the Federal action agency and the landowner is not to restore or recover the species, but rather to implement reasonable and prudent alternatives to avoid destruction or adverse modification of critical habitat.

Under the first prong of the Act's definition of critical habitat, areas within the geographical area occupied by the species at the time it was listed are included in a critical habitat designation if they contain physical or biological features (1) which are essential to the conservation of the species and (2) which may require special management considerations or protection. For these areas, critical habitat designations identify, to the extent known using the best scientific and commercial data available, those physical or biological features that are essential to the conservation of the species (such as space, food, cover, and protected habitat). In identifying those physical or biological features, we focus

on the specific features that support the life-history needs of the species, including but not limited to, water characteristics, soil type, geological features, prey, vegetation, symbiotic species, or other features. A feature may be a single habitat characteristic, or a more complex combination of habitat characteristics. Features may include habitat characteristics that support ephemeral or dynamic habitat conditions. Features may also be expressed in terms relating to principles of conservation biology, such as patch size, distribution distances, and connectivity.

Under the second prong of the Act's definition of critical habitat, we can designate critical habitat in areas outside the geographical area occupied by the species at the time it is listed if we determine that such areas are essential for the conservation of the species. For example, an area that is currently occupied by the species, but was not occupied at the time of listing, may be essential to the conservation of the species and may be included in the critical habitat designation.

Section 4 of the Act requires that we designate critical habitat on the basis of the best scientific data available. Further, our Policy on Information Standards Under the Endangered Species Act (published in the **Federal Register** on July 1, 1994 (59 FR 34271)), the Information Quality Act (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001 (Pub. L. 106-554; H.R. 5658)), and our associated Information Quality Guidelines, provide criteria, establish procedures, and provide guidance to ensure that our decisions are based on the best scientific data available. For example, they require our biologists, to the extent consistent with the Act and with the use of the best scientific data available, to use primary and original sources of information as the basis for recommendations to designate critical habitat.

Critical Habitat Prudency Determination

Section 4(a)(3) of the Act, as amended, and implementing regulations (50 CFR 424.12), require that, to the maximum extent prudent and determinable, we designate critical habitat at the time the species is determined to be an endangered or threatened species. Our regulations (50 CFR 424.12(a)(1)) state that the designation of critical habitat is not prudent when any of the following situations exist: (i) The species is threatened by taking or other human activity, and identification of critical habitat can be expected to increase the

degree of threat to the species, or (ii) such designation of critical habitat would not be beneficial to the species. The regulations also provide that, in determining whether a designation of critical habitat would not be beneficial to the species, the factors the Services may consider include but are not limited to: Whether the present or threatened destruction, modification, or curtailment of a species' habitat or range is not a threat to the species, or whether any areas meet the definition of "critical habitat" (50 CFR 424.12(a)(1)(ii)).

We have determined that both situations when a critical habitat designation would not be prudent apply to the northern long-eared bat. With respect to summer habitat, we have determined that designating critical habitat would not be beneficial to the species. Further, with respect to wintering habitat, we have determined that the species is threatened by taking or human activity and identification of critical habitat could be expected to increase the degree of this threat to the species. An explanation of these determinations follows.

Designating Summer Habitat Would Not Be Beneficial to the Species

The northern long-eared bat is widely distributed throughout much of its range during the summer months and is considered to be flexible with regards to summer habitat requirements.

The best scientific information available on summer habitat suggests that where the northern long-eared bat is found, it is widely distributed in a variety of wooded habitats (ranging from highly fragmented forest habitats to contiguous forest blocks from the southern United States to Canada's Yukon Territory), with generally non-specific habitat elements. There are elements of summer habitat that the northern long-eared bat needs (forests for roosting, raising young, foraging, and commuting between roosting and foraging habitat); however, the best available information indicates that the species' specific needs and preferences for these habitat elements are relatively flexible, plentiful, and widely distributed. Thus, summer habitat for the northern long-eared bat does not have specific physical or biological features that are essential to the conservation of the species and, therefore, does not meet the definition of critical habitat.

Furthermore, as discussed in the final listing rule (80 FR 17974; April 2, 2015), northern long-eared bat summer habitat is not limited or in short supply, and summer habitat loss is not a rangewide threat to the species. Based on a

compilation of the total forested acres for each State in the northern long-eared bat's range (from the U.S. Forest Service's 2015 State and Private Forestry Fact sheets (available at <http://stateforesters.org/regional-state>)), there are an estimated 281,528,709 acres (113,213,960 hectares) of available forested habitat for the northern long-eared bat throughout its range in the United States (Service 2016, p. 28). This is assuming that all forested acres are suitable for the northern long-eared bat, which probably overestimates habitat availability, but such an assumption is not unreasonable given the northern long-eared bat's flexible selection of summer habitat and ability to use very small trees (≥ 3 in (8 cm) in dbh) (Service 2016, p. 18).

As we documented in the final listing rule (80 FR 17974; April 2, 2015), the extent of conversion from forest to other land cover types has been fairly consistent with conversion to forest (cropland reversion/plantings). Further, the recent past and projected future amounts of forest loss to conversion was, and is anticipated to be, only a small percentage of the total amount of forest habitat. For example, the U.S. Forest Service expects only 4 to 8 percent of the forested area found in 2007 across the conterminous United States to be lost by 2060 (U.S. Forest Service 2012, p. 12). Additionally, as discussed above, the northern long-eared bat has been documented to use a wide variety of forest types across its wide range (living in highly fragmented forest habitats to contiguous forest blocks from the southern United States to Canada's Yukon Territory). Because summer habitat for the northern long-eared bat is not limiting, and because the northern long-eared bat is considered to be flexible with regards to summer habitat, the availability of forested habitat does not now, nor will it likely in the future, limit the conservation of the northern long-eared bat.

The critical habitat regulations at 50 CFR 424.12(a)(1)(ii) provide two examples of when designating critical habitat may not be beneficial to the species and, therefore, may be not prudent: Where the present or threatened destruction, modification, or curtailment of a species' habitat or range is not a threat to the species, or where there are no areas that meet the definition of critical habitat for the species. The summer habitat for the northern long-eared bat falls within both examples. First, there are no areas of summer habitat that meet the definition of critical habitat for the northern long-eared bat. Second, the present or

threatened destruction, modification, or curtailment of summer habitat is not a threat to the species; rather, disease is the primary threat to the species within its summer habitat. In the final rule revising the critical habitat regulations (81 FR 7414; February 11, 2016), the Services expressly identified this situation as an example where designating critical habitat may not be beneficial to the species: "In some circumstances, a species may be listed because of factors other than threats to its habitat or range, such as disease, and the species may be a habitat generalist. In such a case, on the basis of the existing and revised regulations, it is permissible to determine that critical habitat is not beneficial and, therefore, not prudent" (see 81 FR 7425; February 11, 2016). Therefore, we conclude that designating the summer habitat of the northern long-eared bat as critical habitat is not prudent.

Increased Threat to the Taxon by Designating Critical Habitat in Their Hibernacula

Disturbance of hibernating bats (as discussed under Factor A of the final listing rule (80 FR 17974, April 2, 2015; see 80 FR 17989–17990)) has long been considered a threat to cave-hibernating bat species, including the northern long-eared bat. Northern long-eared bats hibernate during the winter months to conserve energy from increased thermoregulatory demands and reduced food resources. To increase energy savings, individuals enter a state of torpor, when internal body temperatures approach ambient temperature, metabolic rates are significantly lowered, and immune function declines (Thomas *et al.* 1990, p. 475; Thomas and Geiser 1997, p. 585; Bouma *et al.* 2010, p. 623). Each time a bat arouses from torpor, it uses a significant amount of energy to warm its body and increase its metabolic rate. These arousals during hibernation cause the greatest amount of energy depletion in hibernating bats (Thomas *et al.* 1990, p. 477). The cost and number of arousals are the two key factors that determine energy expenditures of hibernating bats in winter (Thomas *et al.* 1990, p. 475). Human disturbance at hibernacula can cause bats to arouse more frequently, causing premature energy store depletion and starvation (Thomas 1995, p. 944; Speakman *et al.* 1991, p. 1103), leading to marked reductions in bat populations (Tuttle 1979, p. 3) and increased susceptibility to disease.

The primary forms of human disturbance to hibernating bats result from recreational caving, vandalism, cave commercialization (cave tours and

other commercial uses of caves), and research-related activities (Service 2007, p. 80). Fire building is also a common form of disturbance that, in addition to elevating interior temperatures (which is detrimental during hibernation) and accumulating smoke, can deposit soot on ceilings and eventually result in site abandonment by bats (Tigner and Stukel 2003, p. 54). In addition to unintended effects of commercial and recreational caving, intentional killing of bats in caves by shooting, burning, and clubbing has been documented (Tuttle 1979, pp. 4, 8). Intentional killing of northern long-eared bats has been documented at a small percentage of hibernacula (e.g., one case of shooting disturbance in Maryland, and one case of bat torching in Massachusetts where approximately 100 bats (northern long-eared bats and other species) were killed) (Service, unpublished data).

Prior to the outbreak of WNS, Amelon and Burhaus (2006, p. 73) indicated that "the widespread recreational use of caves and indirect or direct disturbance by humans during the hibernation period pose the greatest known threat to this species (northern long-eared bat)." In addition, human disturbance at hibernacula has been identified by many States as the next greatest threat to the bat after WNS. Of 14 States that assessed the possibility of human disturbance at bat hibernacula within the range of the northern long-eared bat, 13 identified at least 1 known hibernacula as having been negatively affected by human disturbance (Service 2012, unpublished data). Eight of these 14 States (Arkansas, Kentucky, Maine, Minnesota, New Hampshire, North Carolina, South Carolina, and Vermont) indicated the potential for human disturbance at over 50 percent of the known hibernacula in that State. Nearly all States without WNS identified human disturbance as the primary threat to hibernating bats, and all others (including WNS-positive States) noted that human disturbance either is of significant concern or is the next greatest threat after WNS (Service 2012, unpublished data).

Since the time of listing (April 2, 2015), additional information has become available that demonstrates that designating critical habitat for the northern long-eared bat would likely increase the threat from vandalism and disturbance, and could, potentially, increase the spread of WNS. In November 2015, we sought information from State fish and wildlife agencies and other public landowners with known bat caves or mines to determine: (1) How prevalent accounts of disturbance to bats and vandalism to

hibernacula are throughout the species' range; and (2) the level and types of concerns that State fish and wildlife agencies and other landowners with known bat caves or mines have regarding the release of known bat hibernacula location information.

Prevalence of Disturbance—State and other agency or organization personnel provided information regarding specific incidents of disturbance of hibernating bats within their State or area of jurisdiction. Incidents were reported throughout the range of the northern long-eared bat. Evidence of vandalism of caves and mines and disturbance of bats included: dead bats, graffiti, trash, evidence of camp fires, bottle rockets, fireworks, digging or excavation, attempts to remove rock or minerals, alteration of cave or mine entrances, and damage to and breach of gates. There were also a few reported incidents of intentional killing of bats, including clubbing, thrown rocks, and burning. In addition, materials found in hibernacula, such as tennis rackets and blow torches, indicate harm inflicted on bats (NJDFW 2015, pers. comm.). There are few law enforcement reports regarding these incidents, either due to a lack of law enforcement actions or because reporting these incidents would publicize mine or cave locations (SCDNR 2015, pers. comm.).

Examples of incidents of vandalism and disturbance to bats at publicly known hibernacula have been found throughout the range of the northern long-eared bat; we received examples of vandalism and disturbance to bats from 20 State fish and wildlife agencies and 9 other public landowners (including Federal, State, and local agencies and organizations) with known northern long-eared bat hibernacula. Due to the large number of specific incidents, a small, representative subset of the examples we received is presented below. For purposes of illustrating that these incidents occur throughout the species' range, the information is organized into four geographic areas: Northeast, southeast, midwest, and west.

Northeast: In northeastern States such as Pennsylvania and New York, vandalism and disturbance to bats within hibernacula occurs frequently. Evidence of human use of caves and mines in Pennsylvania, including digging for new passage, waste, all-terrain-vehicle use, guns being shot, and burning, are common. There are also many examples of people trying to cut, remove, or get around gates to access gated hibernacula (PGFC 2015, pers. comm.). Due to the large numbers of people trespassing in Pennsylvania

caves and mines, especially during winter months while bats are hibernating, the Pennsylvania Game Commission installed cameras at many caves to capture visual proof of those illegally entering caves and send automated messages to alert a wildlife conservation officer of the entry. Since January 2015, conservation officers have confronted at least 50 suspected trespassers, resulting in more than 20 citations (PGFC 2015, pers. comm.). Similarly, in New York, nearly all ungated hibernacula, both on public and private lands, are visited by people, and many gated caves and mines have been compromised. Some sites have signs informing visitors that caves and mines are closed to visitation in the winter; however, this does not stop individuals from accessing those sites (NYDEC 2015, pers. comm.).

Southeast: In southeastern States such as South Carolina, North Carolina, and Kentucky, vandalism and disturbance to bats within hibernacula occurs often. For example, in South Carolina reports exist of bottle rockets being shot into a gated mine, missing locks on bat-friendly gates, litter inside a cave, and individuals barricading an entrance to a cave (SCDNR 2015, pers. comm.). In North Carolina, there are multiple incidents of vandalism to caves and mines. One particular mine in North Carolina has had repeated vandalism issues over several years, and multiple security fences, gates, and locks have been compromised by vandalism (NCWRC 2015, pers. comm.). In Kentucky, 82 of 118 total hibernacula where northern long-eared bats have been observed are exposed to human disturbance; in 2007, two people were convicted of intentionally killing more than 100 federally-listed Indiana bats in a Kentucky cave (USFWS 2010).

Midwest: There are multiple records of vandalism and disturbance of bats in Midwestern States, including Michigan, Indiana, Wisconsin, Missouri, and Minnesota. The first mine to have WNS-associated bat mortality in Michigan had been illegally accessed in 2013, when people used a torch to break the gate. The WNS-associated mortality was “likely as a direct result of this disturbance” (MIDNR 2015, pers. comm.). Winter visitation to caves in Indiana is relatively common, and in one particular incident, hibernating Indiana bats were intentionally burned (INDNR 2015, pers. comm.). In Wisconsin, five State-owned underground sites were sealed for use if there was a need for artificial hibernacula for WNS treatment trials; all five were breached (welded doors were ground off) during the spring of 2015.

Additionally, one private landowner filled in a cave on their property when they learned it was occupied by bats (WDNR 2015, pers. comm.). In Missouri, there has been evidence of digging at cave entrances, parties, fires, fireworks, graffiti, off-highway vehicle use, gate damage, and trash left behind at caves throughout the State. In fact, there is an ongoing investigation and prosecution regarding illegal entry at a Missouri cave (MDC 2016, pers. comm.). Issues with breached gates and broken locks occurred at several Minnesota caves; approximately 4 years ago, surveyors found bat bones and shotgun shells in one cave.

West: In States such as South Dakota, Arkansas, and Oklahoma in the western portion of the northern long-eared bat’s range, there are several records of incidents of vandalism and disturbance to bats as well. The South Dakota Department of Game, Fish, and Parks provided literature with evidence of both historical and ongoing vandalism at their State’s hibernacula. Increasing disturbance of known hibernacula throughout the Black Hills area is noted as one of the greatest threats to bat populations in the area (Tigner and Stukel 2003, p. 11). Some of the more disruptive and damaging activities inside caves and abandoned mines include discharging firearms and fireworks, spray-painting, campfire construction, and intentionally killing bats and other wildlife (Tigner and Stukel 2003, p. 54). At one particular cave, campfires are common during hibernation, and only a small fraction of the bats identified in the cave in the early 1990s still use the cave (Tigner 2002, p. 7). In Arkansas, approximately 200 endangered gray bats (*Myotis grisescens*) were killed at a major gray bat hibernaculum on National Park Service land (AGFC 2015, pers. comm.). In Oklahoma, there have been multiple incidents involving cutting fences around gate entrances, breaching cave gates (by cutting, digging under, or removing structures around gates to gain access), and campfires near cave entrances (Service 2015, pers. comm.).

Summary: As illustrated by the examples above, which are only a small subset of the reported incidents, we have extensive rangewide evidence that indicates known northern long-eared bat hibernacula have been, and are likely to continue to be, disturbed and vandalized. These acts not only lead to increases in disturbance during the northern long-eared bat’s sensitive hibernation period, which, in turn, leads to decreased survival, but also may lead to direct mortality of northern long-eared bats.

Concerns over Release of Location Information—Northern long-eared bats that are infected with WNS are believed to be less resilient to disturbance and resulting arousal, and the northern long-eared bat is one of the most highly susceptible bat species to WNS (Langwig *et al.* 2014). As discussed in the final listing rule (80 FR 17974, April 2, 2015; see 80 FR 17993–17998), WNS-causing fungal spores can be transmitted not only by bat-to-bat transmission, but also by human actions (USGS National Wildlife Health Center, Wildlife Health Bulletin 2011–05), and decontamination remains one of the only management options available to reduce the risk of human-assisted transmission. State, Federal, and local agencies and organizations are especially concerned with the spread of WNS if cave and mine locations are made public, especially in sites where WNS has not been found or in areas that have not yet been inundated with the disease. Several agency and organization personnel expressed concern regarding those visiting caves and mines and not properly decontaminating after leaving hibernacula, which may result in these visitors spreading WNS fungal spores by using contaminated gear in uninfected caves or mines (ANHC 2015, pers. comm.; CDEEP 2015, pers. comm.; KDFWR 2015, pers. comm.; NBSRP 2015, pers. comm.; NJDVR 2015, pers. comm.; WDNR 2015, pers. comm.; WGFD 2015, pers. comm.). It is possible that the spread of WNS was enhanced by human transfer of fungal spores in some States, such as Connecticut (CDEEP 2015, pers. comm.).

State, Federal, and local agencies that gather specific location information exercise extra efforts to protect hibernacula location information from becoming readily available to the public. In fact, many States reported that they are concerned that release of location information could significantly increase human visitation, thereby increasing disturbance to bats, and, therefore, they do not share hibernacula location information with the public. For example, the Wisconsin Department of Natural Resources stated, “we have not shared locational information as to maternity sites and hibernacula. Under state law, locations deemed critical to the survival of the species may be withheld from the public. All data in the WI Natural Heritage Inventory are exempt from State open records laws” (WDNR 2015, pers. comm.). Some agencies and organizations state that when location information is disclosed, an agreement typically must be in place with those requesting the location

information to protect the data, and point data are buffered to conceal the specific locations. Similarly, in Missouri, the Missouri Department of Conservation (MDC) does not release hibernacula locations to the general public, and location information for caves not owned by MDC cannot be disclosed by the State (MDC 2016, pers. comm.).

In addition to protecting location information, State, Federal, and local agencies and organizations use other means to protect bat hibernacula, such as installation of bat-friendly gates. Direct protection of caves and mines can be accomplished through installation of bat-friendly gates that allow passage of bats while reducing disturbance from human entry as well as reducing changes to the cave microclimate from air restrictions. Bat-friendly gates are generally thought to be effective in preventing disturbance of hibernating bats and vandalism of hibernacula (AGFC 2015, pers. comm.; ANF 2015, pers. comm.; ANHC 2015, pers. comm.; BNR 2015, pers. comm.; CDEEP 2015, pers. comm.; DMCC 2015, pers. comm.; IADNR 2015, pers. comm.; ILDNR 2015, pers. comm.; INDNR 2015, pers. comm.; KDFWR 2015, pers. comm.; MANG 2015, pers. comm.; MDC 2016, pers. comm.; MIDNR 2015, pers. comm.; NBSRP 2015, pers. comm.; NGDFW 2015, pers. comm.; NYDEC 2015, pers. comm.; ONF 2015, pers. comm.; ONSR 2015, pers. comm.; OSFNF 2015, pers. comm.; PGC 2015, pers. comm.; SCDNR 2015, pers. comm.; SDGFP 2015, pers. comm.; SMP 2015, pers. comm.; WDNR 2015, pers. comm.), although attempts to protect hibernacula from disturbance have varying degrees of effectiveness. In most States for which we have information, a small percentage of caves and mines are gated, and a majority of State agencies indicated that there is a need to gate additional caves and mines used by bats. For example, in Missouri, less than approximately 2 percent of known hibernacula have bat-friendly gates Statewide (MDC 2015, pers. comm.). Attempts to remove gates at hibernacula are numerous and pervasive throughout the northern long-eared bat's range, although the success of removal attempts varies. Some State and Federal agencies and other organizations state that attempts to remove gates are rarely successful; others, such as the Kentucky Department of Fish and Wildlife Resources, state that removal attempts are almost always successful: "When parties wish to gain access, they are very resourceful and come prepared to cut, dig, pry, or use any other means necessary to enter. The remote nature of

some sites does not seem to deter vandalism either" (KDFWR 2015, pers. comm.). See *Prevalence of Disturbance*, above, for more examples of attempts to remove gates.

The process of designating critical habitat would increase human threats to the northern long-eared bat by increasing the vulnerability of this species to disturbance during its sensitive hibernation period and by increasing the likelihood of vandalism to its winter hibernacula by publicly disclosing the locations of those hibernacula. Northern long-eared bats are particularly sensitive to disturbance while hibernating, and such disturbance further reduces survival chances of already compromised, WNS-infected bats. Additionally, increased human access to hibernacula may facilitate or accelerate the spread of WNS to uninfected sites, as people may carry the fungal spores from site to site. Designation of critical habitat requires the publication of maps and a specific narrative description of critical habitat in the *Federal Register*. The degree of detail in those maps and boundary descriptions is far greater than the general location information provided in the final listing rule (80 FR 17974; April 2, 2015). Furthermore, a critical habitat designation normally results in the news media publishing articles in local newspapers and on special interest Web sites, usually with maps of the critical habitat. We have determined that the publication of maps and descriptions outlining the locations of this species' wintering areas would increase awareness and visitation of hibernacula, and thus disturbance of bats, as those interested in accessing caves and mines would then have detailed location information for these hibernacula. As expressed by many State bat biologists and land managers with hibernacula within their area of jurisdiction, there is a strong concern regarding publicizing cave and mine location information due to the increased threat of disturbance to the northern long-eared bat, and bats in general. Furthermore, human disturbance may exacerbate the effect of WNS on northern long-eared bats; providing a literal map of bat hibernacula in the form of critical habitat will likely facilitate human disturbance and may further compound threats to the species. We, therefore, conclude that the northern long-eared bat is threatened by taking and other human activity, and identification of critical habitat can be expected to increase the degree of threat to the species. Designating critical habitat is

therefore not prudent under the regulations at 50 CFR 424.12(a)(1)(i). As discussed earlier, the risk of increased threats from publishing hibernacula locations is significant. The northern long-eared bat, and bats in general, are very sensitive to disturbance while hibernating, and there are numerous known incidents of vandalism, targeted killing, and disturbance of hibernating northern long-eared bats throughout the species' range. The public has great interest in visiting caves and mines for recreational purposes, and human-caused disturbance has clear effects on hibernating bats. Thus, any action that publicly discloses the location of northern long-eared bat hibernacula (such as a critical habitat designation) puts the species in further peril. One of the basic measures to protect northern long-eared bats from vandalism and disturbance while hibernating is restricting access to information pertaining to the location of the species' hibernacula. Publishing maps and narrative descriptions of northern long-eared bat critical habitat would significantly affect our ability to reduce the threat of vandalism and disturbance of hibernacula and hibernating bats and may facilitate or intensify the spread of WNS by humans.

Summary of Prudency Determination

We have determined that designating critical habitat for the northern long-eared bat is not prudent. Designating summer habitat as critical habitat is not beneficial to the species, because there are no areas within the summer habitat of the species that meet the definition of critical habitat. Further, the primary threat to the species is the disease WNS; the destruction, modification, or curtailment of summer habitat is not a threat to the species as suitable summer habitat continues to exist and is not limited throughout the species' range. Therefore, designating critical habitat in the summer habitat areas would not be beneficial. Moreover, designating winter habitat as critical habitat would disclose hibernacula location information, and thereby increase the threat to the northern long-eared bat from vandalism and disturbance at hibernacula and could, potentially, increase the spread of WNS. Disturbance of hibernating bats has long been considered a threat to cave-hibernating bat species, and has been identified as the next greatest threat to this taxon after WNS. Human disturbance at hibernacula causes bats to arouse more frequently, leading to premature energy store depletion and, possibly, starvation. Further compounding the effects of disturbance, northern long-eared bats that are

infected with WNS are believed to be less resilient to disturbance and resulting arousal. Furthermore, increased human visitation of hibernacula could intensify the spread of WNS from infected to uninfected sites. We have, therefore, determined in accordance with 50 CFR 424.12(a)(1) that it is not prudent to designate critical habitat for the northern long-eared bat.

References Cited

A complete list of references cited in this document is available on the Internet at <http://www.regulations.gov> and upon request from the Twin Cities Ecological Services Office (see ADDRESSES and FOR FURTHER INFORMATION CONTACT).

Authors

The primary authors of this document are the staff members of the Twin Cities Ecological Services Office.

Authority

The authority for this action is the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*).

Dated: April 12, 2016.

Michael J. Bean,
Principal Deputy Assistant Secretary for Fish
and Wildlife and Parks.

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DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

50 CFR Part 648

[Docket No. 150903814-5999-02]

RIN 0648-XE564

Fisheries of the Northeastern United States; Summer Flounder Fishery; Quota Transfer

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Temporary rule; quota transfer.

SUMMARY: NMFS announces that the Commonwealth of Virginia is transferring a portion of its 2016 commercial summer flounder quota to the Commonwealth of Massachusetts. These quota adjustments are necessary to comply with the Summer Flounder, Scup and Black Sea Bass Fishery Management Plan quota transfer provision. This announcement informs

the public of the revised commercial quotas for Virginia and Massachusetts.

DATES: Effective April 26, 2016, through December 31, 2016.

FOR FURTHER INFORMATION CONTACT: Elizabeth Scheimer, Fishery Management Specialist, (978) 281-9236.

SUPPLEMENTARY INFORMATION:

Regulations governing the summer flounder fishery are found in 50 CFR 648.100 through 648.110. The regulations require annual specification of a commercial quota that is apportioned among the coastal states from Maine through North Carolina. The process to set the annual commercial quota and the percent allocated to each state are described in § 648.102.

The final rule implementing Amendment 5 to the Summer Flounder Fishery Management Plan, as published in the *Federal Register* on December 17, 1993 (58 FR 65936), provided a mechanism for transferring summer flounder commercial quota from one state to another. Two or more states, under mutual agreement and with the concurrence of the NMFS Greater Atlantic Regional Administrator, can transfer or combine summer flounder commercial quota under § 648.102(c)(2). The Regional Administrator is required to consider the criteria in § 648.102(c)(2)(i)(A) through (C) in the evaluation of requests for quota transfers or combinations.

Virginia is transferring 6,525 lb (2,959 kg) of summer flounder commercial quota to Massachusetts. This transfer was requested by Virginia to repay landings by a Virginia-permitted vessel that landed in Massachusetts under a safe harbor agreement.

The revised summer flounder quotas for calendar year 2016 are now: Virginia, 1,755,829 lb (796,430 kg); and Massachusetts, 577,777 lb (262,075 kg) based on the initial quotas published in the 2016–2018 Summer Flounder, Scup and Black Sea Bass Specifications, (December 28, 2015, 80 FR 80689) and previous 2016 quota transfers (March 8, 2016, 81 FR 12030 and April 14, 2016, 81 FR 22032).

Classification

This action is taken under 50 CFR part 648 and is exempt from review under Executive Order 12866.

Authority: 16 U.S.C. 1801 *et seq.*

Dated: April 21, 2016.

Emily H. Menashes,
Acting Director, Office of Sustainable
Fisheries, National Marine Fisheries Service.
[FR Doc. 2016-09726 Filed 4-26-16; 8:45 am]

BILLING CODE 3510-22-P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

50 CFR Part 679

[Docket No. 150817730-6320-02]

RIN 0648-BF29

Fisheries of the Exclusive Economic Zone Off Alaska; Bering Sea and Aleutian Islands Management Area; American Fisheries Act; Amendment 111

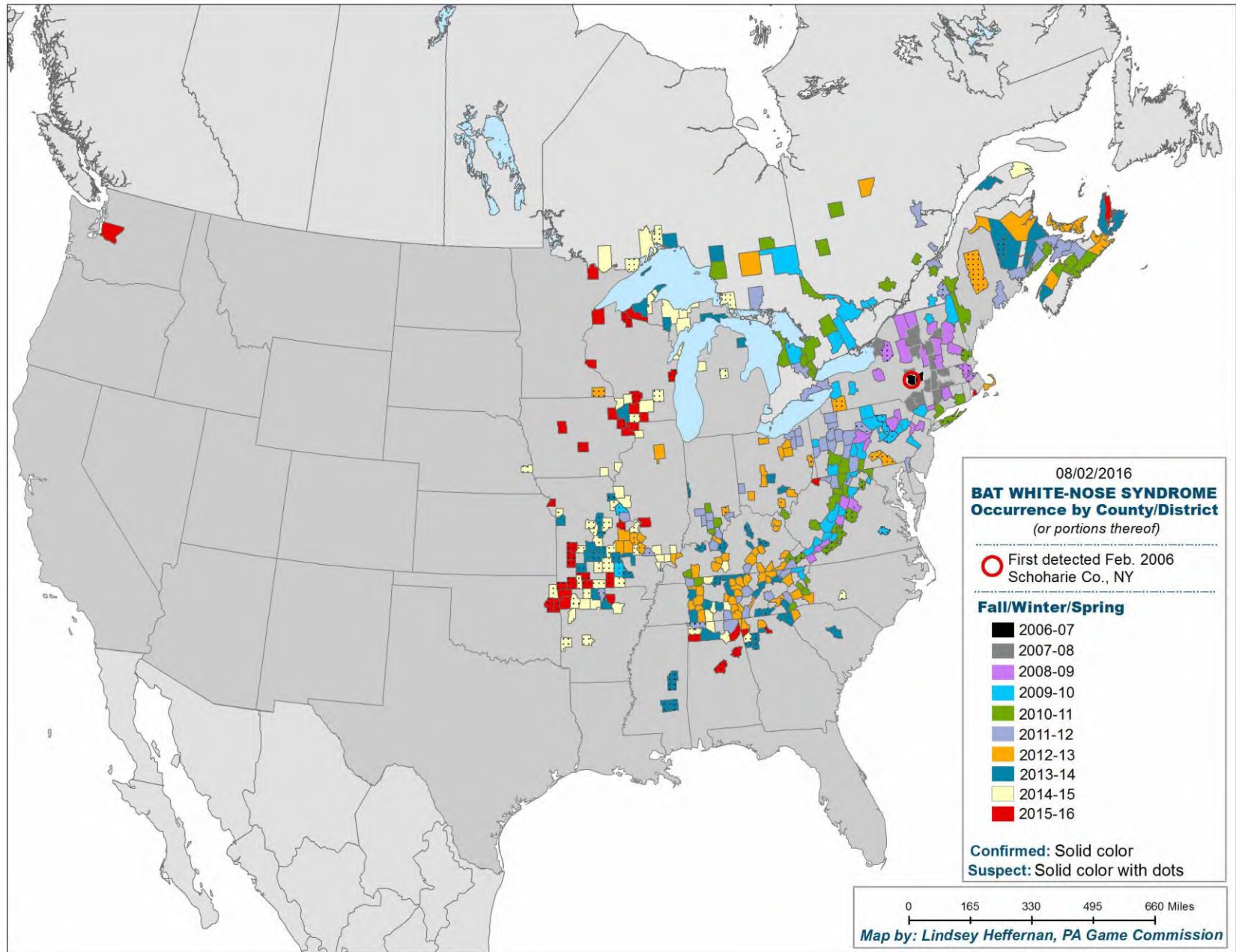
AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Final rule.

SUMMARY: NMFS issues this final rule to implement Amendment 111 to the Fishery Management Plan for Groundfish of the Bering Sea and Aleutian Islands Management Area (FMP). This final rule reduces bycatch limits, also known as prohibited species catch (PSC) limits, for Pacific halibut in the Bering Sea and Aleutian Islands (BSAI) groundfish fisheries by specific amounts in four groundfish sectors: The Amendment 80 sector (non-pollock trawl catcher/processors); the BSAI trawl limited access sector (all non-Amendment 80 trawl fishery participants); the non-trawl sector (primarily hook-and-line catcher/processors); and the Western Alaska Community Development Quota Program (CDQ Program). This final rule establishes the following halibut PSC limits: 1,745 mt for the Amendment 80 sector; 745 mt for the BSAI trawl limited access sector; 710 mt for the BSAI non-trawl sector; and 315 mt for the CDQ Program. This results in an overall BSAI halibut PSC limit of 3,515 mt. This action is necessary to minimize halibut bycatch in the BSAI groundfish fisheries to the extent practicable and to achieve, on a continuing basis, optimum yield from the BSAI groundfish fisheries. This action is intended to promote the goals and objectives of the Magnuson-Stevens Fishery Conservation and Management Act, the FMP, and other applicable laws.

DATES: Effective May 27, 2016.

ADDRESSES: Electronic copies of the Environmental Assessment (EA), Regulatory Impact Review (RIR), and Finding of No Significant Impact (FONSI) prepared for this action, collectively “the Analysis,” the FMP; and the proposed rule are available from <http://www.regulations.gov> or from the





Northern Long-Eared Bat

Myotis septentrionalis

The northern long-eared bat is federally listed as a threatened species under the Endangered Species Act. **Endangered** species are animals and plants that are in danger of becoming extinct. **Threatened** species are animals and plants that are likely to become endangered in the foreseeable future. Identifying, protecting and restoring endangered and threatened species is the primary objective of the U.S. Fish and Wildlife Service's Endangered Species Program.

What is the northern long-eared bat?

Appearance: The northern long-eared bat is a medium-sized bat with a body length of 3 to 3.7 inches and a wingspan of 9 to 10 inches. Their fur color can be medium to dark brown on the back and tawny to pale-brown on the underside. As its name suggests, this bat is distinguished by its long ears, particularly as compared to other bats in its genus, *Myotis*.

Winter Habitat: Northern long-eared bats spend winter hibernating in caves and mines, called hibernacula. They use areas in various sized caves or mines with constant temperatures, high humidity, and no air currents. Within hibernacula, surveyors find them hibernating most often in small crevices or cracks, often with only the nose and ears visible.

Summer Habitat: During the summer, northern long-eared bats roost singly or in colonies underneath bark, in cavities or in crevices of both live trees and snags (dead trees). Males and non-reproductive females may also roost in cooler places, like caves and mines. Northern long-eared bats seem to be flexible in selecting roosts, choosing roost trees based on suitability to retain bark or provide cavities or crevices. They rarely roost in human structures like barns and sheds.

Reproduction: Breeding begins in late summer or early fall when males begin to swarm near hibernacula. After



This northern long-eared bat, observed during an Illinois mine survey, shows visible symptoms of white-nose syndrome.

Photo by Steve Taylor; University of Illinois

copulation, females store sperm during hibernation until spring. In spring, females emerge from their hibernacula, ovulate and the stored sperm fertilizes an egg. This strategy is called delayed fertilization.

After fertilization, pregnant bats migrate to summer areas where they roost in small colonies and give birth to a single pup. Maternity colonies of females and young generally have 30 to 60 bats at the beginning of the summer, although larger maternity colonies have also been observed. Numbers of bats in roosts typically decrease from the time of pregnancy to post-lactation. Most bats within a maternity colony give birth around the same time, which may occur from late May or early June to late July, depending where the colony is located within the species' range. Young bats start flying by 18 to 21 days after birth. Maximum lifespan for the northern long-eared bat is estimated to be up to 18.5 years.

Feeding Habits: Like most bats, northern long-eared bats emerge at dusk to feed. They primarily fly through the

understory of forested areas feeding on moths, flies, leafhoppers, caddisflies, and beetles, which they catch while in flight using echolocation or by gleaning motionless insects from vegetation.

Range: The northern long-eared bat's range includes much of the eastern and north central United States, and all Canadian provinces from the Atlantic Ocean west to the southern Yukon Territory and eastern British Columbia. The species' range includes 37 States and the District of Columbia: Alabama, Arkansas, Connecticut, Delaware, Georgia, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, New Hampshire, New Jersey, New York, North Carolina, North Dakota, Ohio, Oklahoma, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Vermont, Virginia, West Virginia, Wisconsin, and Wyoming.

Why is the northern long-eared bat in trouble?

White-nose Syndrome: No other threat is as severe and immediate as

this. If this disease had not emerged, it is unlikely that northern long-eared bat populations would be experiencing such dramatic declines. Since symptoms were first observed in New York in 2006, white-nose syndrome has spread rapidly from the Northeast to the Midwest and Southeast; an area that includes the core of the northern long-eared bat's range, where it was most common before this disease. Numbers of northern long-eared bats (from hibernacula counts) have declined by up to 99 percent in the Northeast. Although there is uncertainty about the rate that white-nose syndrome will spread throughout the species' range, it is expected to continue to spread throughout the United States in the foreseeable future.

Other Sources of Mortality:

Although no significant population declines have been observed due to the sources of mortality listed below, they may now be important factors affecting this bat's viability until we find ways to address WNS.

Impacts to Hibernacula: Gates or other structures intended to exclude people from caves and mines not only restrict bat flight and movement, but also change airflow and microclimates. A change of even a few degrees can make a cave unsuitable for hibernating bats. Also, cave-dwelling bats are vulnerable to human disturbance while hibernating. Arousal during hibernation causes bats to use up their energy stores, which may lead to bats not surviving through winter.

Loss or Degradation of Summer

Habitat: Highway construction, commercial development, surface mining, and wind facility construction permanently remove habitat and are activities prevalent in many areas of this bat's range. Many forest management activities benefit bats by keeping areas forested rather than converted to other uses. But, depending on type and timing, some forest management activities can cause mortality and temporarily remove or degrade roosting and foraging habitat.

Wind Farm Operation: Wind turbines kill bats, and, depending on the species, in very large numbers. Mortality from windmills has been documented for northern long-eared bats, although a

small number have been found to date. However, there are many wind projects within a large portion of the bat's range and many more are planned.

What Is Being Done to Help the Northern Long-Eared Bat?

Disease Management: Actions have been taken to try to reduce or slow the spread of white-nose syndrome through human transmission of the fungus into caves (e.g. cave and mine closures and advisories; national decontamination protocols). A national plan was prepared by the Service and other state and federal agencies that details actions needed to investigate and manage white-nose syndrome. Many state and federal agencies, universities and non-governmental organizations are researching this disease to try to control its spread and address its affect. See www.whitenosesyndrome.org/ for more.

Addressing Wind Turbine

Mortality: The Service and others are working to minimize bat mortality from wind turbines on several fronts. We fund and conduct research to determine why bats are susceptible to turbines, how to operate turbines to minimize mortality and where important bird and bat migration routes are located. The Service, state natural resource agencies, and the wind energy industry are developing a Midwest Wind Energy Habitat Conservation Plan, which will provide wind farms a mechanism to continue operating legally while minimizing and mitigating listed bat mortality.

Listing: The northern long-eared bat is listed as a threatened species under the federal Endangered Species Act. Listing a species affords it the protections of the Act and also increases the priority of the species for funds, grants, and recovery opportunities.

Hibernacula Protection: Many federal and state natural resource agencies and conservation organizations have protected caves and mines that are important hibernacula for cave-dwelling bats.

What Can I Do?

Do Not Disturb Hibernating Bats:

To protect bats and their habitats, comply with all cave and mine closures, advisories, and regulations. In areas without a cave and mine closure policy, follow approved decontamination protocols (see <http://whitenosesyndrome.org/topics/decontamination>). Under no circumstances should clothing, footwear, or equipment that was used in a white-nose syndrome affected state or region be used in unaffected states or regions.

Leave Dead and Dying Trees

Standing: Like most eastern bats, the northern long-eared bat roosts in trees during summer. Where possible and not a safety hazard, leave dead or dying trees on your property. Northern long-eared bats and many other animals use these trees.

Install a Bat Box: Dead and dying trees are usually not left standing, so trees suitable for roosting may be in short supply and bat boxes may provide additional roost sites. Bat boxes are especially needed from April to August when females look for safe and quiet places to give birth and raise their pups.

Support Sustainability: Support efforts in your community, county and state to ensure that sustainability is a development goal. Only through sustainable living will we provide rare and declining species, like the northern long-eared bat, the habitat and resources they need to survive alongside us.

Spread the Word: Understanding the important ecological role that bats play is a key to conserving the northern long-eared and other bats. Helping people learn more about the northern long-eared bat and other endangered species can lead to more effective recovery efforts. For more information, visit www.fws.gov/midwest/nleb and www.whitenosesyndrome.org

Join and Volunteer: Join a conservation group; many have local chapters. Volunteer at a local nature center, zoo, or national wildlife refuge. Many state natural resource agencies benefit greatly from citizen involvement in monitoring wildlife. Check your state agency websites and get involved in citizen science efforts in your area.

Northern Long-eared Bat

Myotis septentrionalis

State Status: **Endangered**

Federal Status: **Threatened**

Description: The Northern Long-eared Bat is a small bat with large ears, which when pushed forward extend at least 4 mm past its nose. Its fur and wing membranes are light brown, giving it an overall somewhat uniform brown appearance. The hairs on its back are bicolored, with a dark base and lighter tip. The Northern Long-eared Bat averages 50-95 mm in total length, with a tail of 35-42 mm. In weight, it averages 5-8 g. This bat is typically found roosting in trees and feeding in forested habitats, but may occasionally be found in human habitations.

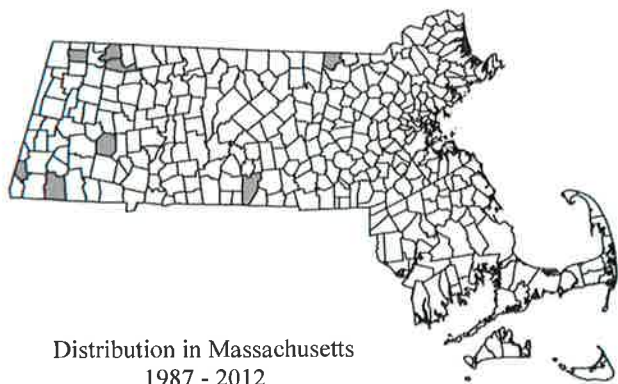
Similar Species: The best diagnostic character to distinguish the Long-eared Bat from other species in Massachusetts is its long ears. The Little Brown Myotis and rare Indiana Myotis are similar in appearance, but have shorter ears which typically do not extend beyond their nose when pushed forward. The Little Brown Myotis also has glossier fur and a shorter tail relative to its body length. The Indiana Myotis has a keeled calcar (a ridge of cartilage between the foot and the tail), which the Northern Long-eared Bat lacks. Other features of interest in identification include the bat's hairless interfemoral membrane (the skin stretching between the legs and tail) and lack of a black face mask (which is characteristic of Small-footed Myotis).



Photo: Tammy Ciesla, MassWildlife

Habitat in Massachusetts: In the warmer months, colonies of Northern Long-eared Bats may be found roosting and foraging in forested areas. Preferred roosts are in clustered stands of large trees, especially in live or dead hardwoods with large, tall cavities. These bats are found in other tree roosts as well, and occasionally in human-made structures. Northern Long-eared Bats forage under the forest canopy in structurally complex habitats, often above small ponds, vernal pools or streams, along gravel paths or roads, and at the forest edge. The bats are widespread in Massachusetts, and have been found in 11 of 14 counties. In winter, Northern Long-eared Bats hibernates in natural caves and abandoned mines, preferring habitats where the humidity is so high that water droplets sometimes cover their fur. Winter hibernacula (hibernation sites) have been reported in Berkshire, Franklin, Hampden, Middlesex, and Worcester counties.

Range: The Northern Long-eared Bat is found across forested parts of the eastern United States and Canada, west to British Columbia, Wyoming, and Montana, and south into Florida. It was historically common in New England, the Canadian Maritimes, Quebec and Ontario, and uncommon in the western extremes of its range.



Distribution in Massachusetts
1987 - 2012

Based on records in the
Natural Heritage Database

Life Cycle/Behavior: In the summer months, Northern Long-eared Bats emerge at dusk from daytime roosts for the first in a series of feeding flights. Their long tails and large wing membranes allow the bats to fly slowly and navigate through cluttered environments. These special adaptations also enable them to glean prey from foliage, in addition to catching insects on the fly. These bats locate resting insects through a combination of passive listening and the emission of high frequency echolocation calls.

Between August and October, the body weight of Northern Long-eared Bats increases by up to 45%, as they store fat for winter. In late summer, the bats begin to “swarm” around the entrances of caves, and are thought to be testing the air of possible hibernacula. This is the time when mating occurs, with females storing the sperm within their bodies until spring. By early November, the bats enter hibernation sites. Their metabolisms slow and they enter torpor, but will rouse occasionally throughout the winter to drink water. Northern Long-eared Bats share caves with a number of other species, but tend to hibernate singly or in small groups in deep cracks or crevices. They return to the same hibernacula in multiple years, but may not hibernate in the same location every year. Little data are available on migration, but the bats are known to travel up to 56 km from foraging sites to winter hibernacula.

Females bear and rear single young from mid-May through July. The longevity record for the Northern Long-eared Bat is 18 years.

Population status in Massachusetts, including

Threats: The Northern Long-eared Bat is listed as Endangered under the Massachusetts Endangered Species Act. All listed species are protected from killing, collecting, possessing, or sale and from activities that would destroy habitat and thus directly or indirectly cause mortality or disrupt critical behaviors. In addition, listed animals are specifically protected from activities that disrupt nesting, breeding, feeding, or migration.

Once a common species in the northern United States, populations of the Northern Long-eared Bat have been devastated by the spread of White-nose Syndrome. Populations in infected hibernacula in the Northeast have suffered catastrophic losses of 90-100%. White-nose Syndrome is caused by *Geomyces destructans*, a species new to science, but closely related to fungi that naturally grow in caves. The fungus grows over bats while they hibernate, causing them to rouse from dormancy frequently, lose valuable stored fat, and fail to survive the winter. The fungus is believed to be passed from cave to cave primarily by the movements of breeding male bats, but human transport is also thought to be responsible for the infection of some hibernacula.

Management Recommendations: The U.S. Fish & Wildlife Service is working in concert with government and non-profit groups to understand the spread of the fungus and potential for stopping its spread, as well as exploring opportunities for captive breeding of the most vulnerable species. Access to suitable, undisturbed hibernacula is essential to the survival of the Northern Long-eared Bat, and protection of known sites is paramount. Human disturbance of hibernacula can be discouraged or prevented with the use of gated entrances, in order to avoid arousal of hibernating bats and the spread of fungal spores.

References:

- Caceres, M.C., and R.M. Barclay. 2000. *Myotis septentrionalis*. *Mammalian Species* 634: 1-4.
- French, T.W., J.E. Cardoza, and G.S. Jones. *Homeowner's Guide to Bats*. Massachusetts Department of Fisheries & Wildlife: Westborough, MA.
- Hamilton, Jr., W.J., and J.O. Whitaker, Jr. 1979. *Mammals of the Eastern United States*, Second Edition. Cornell University Press: Ithaca, NY.
- U.S. Fish & Wildlife Service. 2012. “White-nose Syndrome.” <http://whitenosesyndrome.org/>

Updated 2012
Map Updated 2012



Appendix H - Supplemental Documentation for Cultural Resource Protection



December 15, 2009 **The Commonwealth of Massachusetts**
William Francis Galvin, Secretary of the Commonwealth
Massachusetts Historical Commission

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

RE: Byron Weston No. 2 Crane & Company Hydroelectric Projects, Dalton, MA.
FERC No. 13583. MHC #RC.47433. *EFEB 09-HZ.*

Dear Secretary Bose:

Staff of the Massachusetts Historical Commission, the office of the Massachusetts State Historic Preservation Officer, have received the preliminary information submitted for the project referenced above.

Because the project requires approval and permitting by FERC, the MHC will coordinate the state historical review under MGL c. 9, ss. 26-27C (950 CMR 71) with the Section 106 review (see 950 CMR 71.04(2)).

The project planners are welcome to visit the MHC's offices to conduct research to identify the historic properties within their project area to assist FERC in its determinations.

The MHC recommends that FERC contact the Dalton Historical Commission to seek their views on the project and to determine if the Dalton Historical Commission wishes to be a consulting party during the Section 106 review in accordance with 36 CFR 800.

These comments are offered to assist in compliance with Section 106 of the National Historic Preservation Act of 1966, as amended (36 CFR 800). Please contact me if you have any immediate questions.

Sincerely,

A handwritten signature in dark ink, appearing to read "Edward L. Bell".

Edward L. Bell
Technical Services Division
Massachusetts Historical Commission

xc:
Crane & Company
GZA Environmental Inc.
Mass. Energy Facilities Siting Board
Dalton Historical Commission

220 Morrissey Boulevard, Boston, Massachusetts 02125
(617) 727-8470 • Fax: (617) 727-5128
www.sec.state.ma.us/mhc

Dalton Historical Commission
462 Main Street
Dalton, Mass. 01226

July 20, 2010

GZA
GeoEnvoiremental, inc.
1 Edgewater Drive
Norwood, Mass. 02062

Attention, Chad Cox
Associate Principal

Dear Sir:

First I must say how remiss I have been in sending off this letter to you regarding Crane@Co. only a personal matter could have kept me from answering sooner.

I want to inform you and your company that the Dalton Historical Commission are in full compliance with the Hydro-electric Project that Crane@Co. proposes.

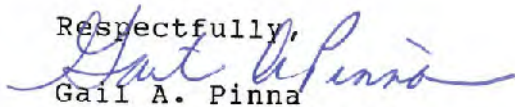
This project will not only be good for the Town of Dalton but the area of Berkshire County as a whole.

The Housatonic River that once gave so much energy to all the mills, will once again be a vital energy source, it is a win-win situation.

As for the Weston Mill being on the Register of Historic Places, it most assuredly should! The Dalton Historical Commission will try to help Crane@Co. in this matter if they so desire.

Again, I will say that the Dalton Historical Commission is in full agreement that the Hydroelectric Project should come to complete fruition,

Respectfully,


Gail A. Pinna
Vice Chair/Secretary
Dalton Historical Commission

c.c. James Noel
Crane and Company

GZA
GeoEnvironmental, Inc.

*Engineers and
Scientists*

August 28, 2012
File No: 19349.50

Ms. Kimberly Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, N. E.
Washington, D.C. 20426



Re: Byron Weston Hydroelectric Project
FERC Project No. 13583-001
Wheel Relocation Plan

Ms. Bose:

On behalf of the project exemptee, Crane & Company (Crane), GZA GeoEnvironmental, Inc. (GZA) is hereby formally filing (via e-file) the Wheel Relocation Plan for the Byron Weston Hydroelectric Project. A Wheel Relocation Plan is required under Article 27 of the Exemption from Licensing. The Wheel Relocation Plan includes comment letters provided by the Massachusetts Historic Commission and the Dalton Historic Commission.

Thank you in advance for your assistance with the Byron Weston Hydroelectric Project.

Yours very truly,

GZA GEOENVIRONMENTAL, INC.

A handwritten signature in blue ink, reading "Kristina Ekholm".

Kristina Ekholm, P.E.
Assistant Project Manager

A handwritten signature in blue ink, reading "Chad Cox".

Chad Cox, P.E.
Associate Principal

Attachment: Wheel Relocation Plan

cc: FERC Washington (via e-file)
James Noel (Crane)

J:\19,000-20,999\19349\19349-50.KDE\Wheel Relocation Plan\Cover Letter.DOCX

Copyright© 2012 GZA GeoEnvironmental, Inc.

Byron Weston Hydroelectric Project
Crane & Company
FERC No. 13583-001

WHEEL TURBINE RELOCATION PLAN

FINAL



Existing Decommissioned Hydropower Turbine

Owner:	Crane & Co.
Location:	Dalton, MA

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Appendix A: Turbine Drawing

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Appendix D: Location of Crane Museum of Papermaking

Appendix E: Proof of Service and Comments

I. INTRODUCTION

A. PURPOSE

The Byron Weston Dam No. 2 is an existing dam located on the East Branch of the Housatonic River in Dalton, MA. The dam and the adjacent mill structure on the right bank are owned by Crane and Co. (Crane). Crane has been granted a Small Hydroelectric Power Project Exemption from the Federal Energy Regulatory Commission (FERC, FERC No. 13583-001) and now intends to proceed with the construction of the project.

Article 27 of the terms of the exemption requires the development of a Wheel Turbine Relocation Plan. Article 27 reads as follows:

Within six months of the issuance date of the exemption, the exemptee shall file with the Commission, for approval, a Wheel Turbine Relocation Plan that describes the refurbishment and relocation of one of the McCormick Hercules wheel turbines being removed from the Byron Weston Defiance Mill building. The plan shall:

- (1) describe the procedures for removing and handling the turbine, including photo-documentation of the turbine prior to removal from its existing location;
- (2) describe the methods for refurbishing the turbine;
- (3) identify where the turbine will be relocated and describe the interpretive information that will be provided with the public display; and
- (4) provide an implementation schedule.

The plan shall be developed in consultation with the Massachusetts Historical Commission and the Dalton Historical Commission. The exemptee shall allow a minimum of 30 days for the agencies to comment and to make recommendations before filing the plan with the Commission. If the exemptee does not adopt a recommendation, the filing shall include the exemptee's reasons, based on project-specific information. The Commission reserves the right to make changes to the plan. Removal of the McCormick Hercules wheel turbines from the Byron Weston Defiance Mill building shall not begin until the exemptee is notified by the Commission that the plan is approved. Upon Commission approval, the exemptee shall implement the plan, including any changes required by the Commission.

B. SITE DESCRIPTION

The Byron Weston Project will use the water power potential of the existing 30- foot-high, 90-foot-long, stone-masonry Byron Weston Dam No. 2 equipped with a 23- foot-high, 75-foot-long spillway. The dam creates a 0.94-acre impoundment with a normal water surface elevation of 1,116.7 feet North Atlantic Vertical Datum (NAVD 1988). In addition to the dam and impoundment, the project will include an existing intake structure equipped with existing trashracks and an existing headgate. The water will pass through the headgate to an existing 6.5-foot-long, 6-foot-diameter penstock connected to an existing 50-foot-long, 9.5-foot-wide headrace canal. The headrace canal will convey flow to a new 15-foot-long, 4.4-foot-diameter penstock leading to a new 250- kilowatt turbine-generating unit within the existing Byron

Weston Defiance Mill building. Water will then be discharged into the East Branch of the Housatonic River through a new draft tube within the existing tailrace approximately 35 feet downstream of the dam.

C. SITE HISTORY

The Byron Weston Dam No. 2 was constructed, in its present form, in 1887. The river at this site was originally harnessed to generate hydro-mechanical power for use in papermaking in the adjacent Defiance Mill. In the early 20th century, the hydropower works at the Byron Weston Dam No. 2 were converted to electrical generation, which continued until sometime after 1942. Most of the original equipment in the powerhouse area was removed after hydropower generation ceased sometime after 1942, however, the two original McCormick Hercules turbines are still present in their original locations at the bottom level of the powerhouse. Both turbines have been exposed to the river since their original installation, are inoperable, and in poor condition.

Mr. Byron Weston entered the field of paper manufacturing in Dalton in 1863 when he bought the Defiance Mill (Byron Weston Mill No.1). The mill was enlarged and improved and for years it was run to produce linen record and ledger. In 1875 the Mill located just downstream of the Defiance Mill was burned. In 1876, Mr. Byron Weston purchased the site and erected the Centennial Mill. With the two mills in operation, Mr. Byron Weston developed a large business thenceforth known under his name. Both facilities were purchased by Crane & Co., which owned downstream mills, in the 1950's.

A drawing dated April 1896 and attached in **Appendix A** shows details of the Hercules wheels that had been installed at the Defiance Mill. Currently available information does not indicate which company manufactured the turbines. Possible manufactures include Holyoke Machine Company, McCormick Turbine, or J&W Jolly McCormick. The turbines appear to be vertical McCormick slide (cylinder) gate controlled machines with 33-inch diameter runners.

Photos 1 and 2 in **Appendix B** show the pressure cases for the turbines that remain in place at the Defiance Mill. Photos 3 and 4 depict one of the actual turbines which are inside the pressure cases. The equipment configuration shown in the photos taken at the Defiance Mill appears to be nearly identical to the configuration shown in the drawing of the Defiance Mill equipment. It is believed that the equipment initially was used to produce hydro-mechanical power but was later converted to electrical generation. While it is unclear exactly when the generators were installed, it is believed that electricity from hydropower system may have been used to power the private electric light system installed in 1886. A 1942 internal letter on the methods of providing power generation capacity to the mill indicates that the maximum power output was 200 KW of AC electrical power. The letter also stated that "the water power at the Defiance Mill is of special value in that it provides at all times a small source of AC current for driving the power house auxiliaries...". A copy of the letter and its transcript is included in **Appendix C**. It is believed that hydropower generation (either hydromechanical or hydroelectrical) has occurred intermittently at the facility since the late 1880's, ceasing completely sometime after 1942.

D. PROPOSED PROJECT

To construct the proposed new hydroelectric project in the location of the existing powerhouse, most of the existing structure (floors, columns, etc.) and equipment must be removed. This includes the two original McCormick Hercules turbines. The exterior building envelop (brick and stone masonry) of the powerhouse will remain in place and all new construction will occur inside its footprint. Following clearing of the powerhouse area, the interior of the powerhouse will be refurbished and altered to accommodate the proposed modern generation equipment. The new powerhouse configuration will be constructed to include a lower turbine level floor, an intermediate, generator level floor, and an upper workroom level floor. Primary structures (floors and columns) will be constructed of reinforced concrete. No changes are expected to be visible from the exterior of the building, excepting repairs to the existing windows, and the change of one window to a door to access the right dam abutment and provide egress from the workroom. No changes will be made to the Byron Weston Dam No. 2 .

The two existing hydropower turbines (including the pressure cases) will be removed as part of Phase I project construction activities. Crane and Company desires to preserve a portion of the history of the site through the salvage and display of one of the turbines.

II. TURBINE REMOVAL, HANDLING, AND DOCUMENTATION

A. TURBINE REMOVAL AND HANDLING

The two existing hydropower turbines will be removed from the powerhouse as part of Phase I of the Project. The Contractor shall be required to remove one of the turbines substantially intact, including the runner and cylinder gate. The Contractor shall be allowed to cut the pressure case in half and remove the top and bottom plates to permit access to the turbine and removal of the heavy equipment from the powerhouse pit area (and to facilitate future display).

The Contractor shall be directed to exercise appropriate care in handling the turbine which is to be displayed.

B. TEMPORARY STORAGE

Once removed from the powerhouse area, the turbine to be displayed will be stored in the mill until such time as it is ready for cleaning and display. The turbine shall not be removed from the mill building until Crane has been notified by the Commission that this plan has been approved.

C. DOCUMENTATION

The location and configuration of the two existing turbines shall be photodocumented by Crane during all stages of Phase I work until removal is complete. Photos will be taken at the beginning of the work, again after adjacent structures have been removed, again after the pressure cases have been removed, and finally after the turbine runners are removed. Photos will be taken from various angles to document the configuration of the machines. Ancillary

equipment (shaft bearings, etc.) which is still present will also be photographed. Color photographs will be taken with a digital camera at high resolution (2 Meg or greater). A photodocumentation book with annotated photos printed on acid-free paper will be made, with one copy delivered to the Massachusetts Historical Commission (MHC) and one to the Dalton Historical Commission. A copy of this Final Wheel Relocation plan will be provided to MHC at the time that the photo documentation is provided (to address MHC comments on the plan provided during the comment period for the draft). Compact discs with electronic versions (.pdf format) will also be provided.

III. TURBINE REFURBISHING

The turbine to be displayed will be first cleaned with water. The cylinder gate will be removed. The half pressure case, cylinder gate, and runner wheel will be sandblasted. The cylinder gate will be remounted on the turbine wheel.

IV. TURBINE DISPLAY

A. TURBINE DISPLAY

After cleaning, the turbine will be relocated and positioned for display. In consideration of the terms of Article 27 of the Order Granting Exemption, the Licensee does not believe the powerhouse to be an appropriate location for display of the turbine. The Powerhouse is within an operational industrial building and not accessible to the public. Therefore the turbine will be displayed outside the Crane Museum of Papermaking in Dalton.

The Crane Museum of Papermaking is approximately one mile west of the powerhouse and is located at 40 Pioneer Street in Dalton. The museum is housed in what was the Rag Room of Crane's 1844 Old Stone Mill. The museum, first opened in the autumn of 1930, is on the National Register of Historic Places. The one-story building is situated on the banks of the Housatonic River downstream of the Byron Weston Hydroelectric Project site. A map showing the location of the museum in relation to the Project site is included in **Appendix D**.

The turbine will be displayed inside half of its pressure case. The actual turbine would not be visible within a fully enclosed pressure case. The cylinder gate will be set in a half open position to display its operation and allow for viewing of the runner.

B. INTERPRETIVE DISPLAY

An interpretive display will be provided adjacent to the turbine at the Crane Museum of Papermaking. It will consist of a plaque which describes the kind of turbine, date of installation, location of installation, date of removal, and reason for removal.

V. IMPLEMENTATION SCHEDULE

The turbine to be displayed will be removed from the powerhouse during Phase I of the project and it is anticipated this will be completed prior to the end of December 2012. Cleaning and refurbishing of the turbines is anticipated to be complete within 90 days of the Licensee providing notification of the commencement of project operation. Installation for display of the turbine outside the Crane Museum of Papermaking will be completed within 180 days of the Licensee providing notification of the commencement of project operation.

Appendix A

Turbine Drawing

Appendix B

Photos



Photo 1. Top of Pressure Casing for Turbine No. 1



Photo 2. Top of Pressure Casing for Turbine No. 2



Photo 3 Turbine Within Pressure Case



Photo 4 Turbine Within Pressure Case

Appendix C

Power Generation Documentation

1000 EA 20 7895

January 20, 1942

Byron Weston Company
 Dalton, Massachusetts

Gentlemen;

The purpose of this study is to determine methods and costs of providing power generating capacity to insure full mill operation should a breakdown occur to any of our present generator units.

The present generators have the following capacities:

1. Main unit Develops 1400 KW AC
2. House unit Develops 200 KW AC and 75 KW DC
3. Allis unit Develops 750 KW AC

Total 2350 KW AC and 75 KW DC

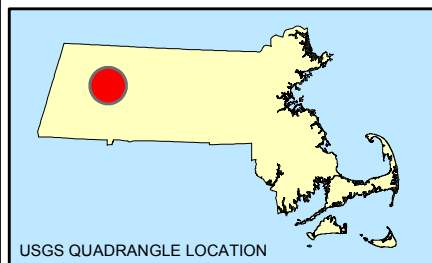
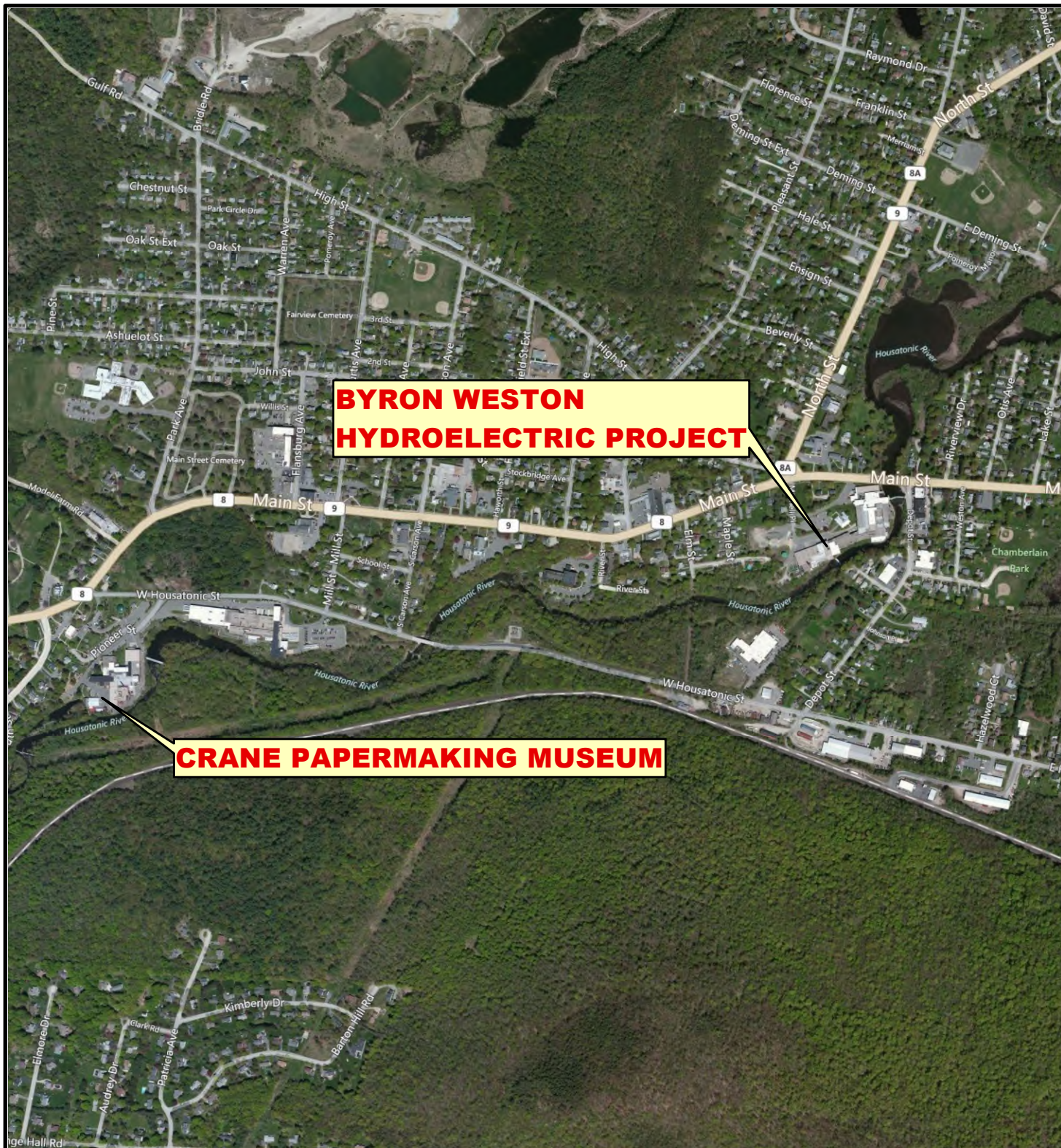
The Main and House units have been installed since 1833, and are both designed for steam at 400 lbs. pressure and 150° superheat. These two high pressure units have a combined capacity of 1600 KW AC and 75 KW DC. The average load which is safely carried on these two machines is 1500 KW AC and 75 KW DC. With this average load, fluctuations in the mill load result in peak demands of over 1600 KW AC. When the average mill load exceeds 1500 KW AC it is necessary to run the Allis.

The Allis machine was installed in 1910, and was operated continuously for 10 years. Since that time it has been used as a stand by unit. It is designed for 150 lbs. steam. Its steam consumption per KW is 70% higher than the 400 lb. units, and it is used only when the mill power load exceeds the capacity of the 400 lb. machines. Steam for the Allis has to be reduced in pressure and temperature in a reducing valve from the boiler pressure of 415 lbs. to 150 lbs.

Water power is not considered in this report, as it is available only a few months per year. In recent years we have obtained water power not more than three months in a year—partly in the Spring, partly in the Fall. We estimate the water power produced to be 200 KW for 12 weeks which replaces 200 tons of coal, saving about \$1300 per year. The water power at the Defiance Mill, is of especial value in that it provides at all times a small source of AC current for driving the power house auxiliaries, which are necessary to start the boilers.

Appendix D

Location of Crane Museum of Papermaking

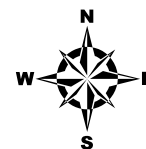


SOURCE : SCANNED USGS TOPOGRAPHIC QUADRANGLES
SCANNED BY THE MASSACHUSETTS EXECUTIVE OFFICE OF
ENVIRONMENTAL AFFAIRS, MASSGIS. DISTRIBUTED JUNE, 2001.

Data Supplied by :



0 500 1,000 2,000 3,000
Feet



PROJ. MGR.: KDE
DESIGNED BY: KDE
REVIEWED BY: CWC
OPERATOR: KDE

DATE: 07-27-2012

LOCUS

CRANE & COMPANY
DALTON, MASSACHUSETTS

JOB NO.
19349.50

FIGURE NO.
D-1

Appendix E

Proof of Service and Comments

GZA
GeoEnvironmental, Inc.

Engineers and
Scientists

July 27, 2012
File No. 19349.50

Dalton Historical Commission
462 Main Street
Dalton, MA 01226



Re: Request for Comments
Wheel Turbine Relocation Plan
Byron Weston Hydroelectric Project (FERC P-13583-001)

Dear Sir/Madam:

The purpose of this letter is to request comments regarding Crane & Company's (Crane's) Wheel Turbine Relocation Plan from the Dalton Historic Commission (Commission). Crane has been issued an Exemption from Licensing from the Federal Energy Regulatory Commission (FERC) for the Byron Weston Hydroelectric Project. The Article 27 of the terms of the exemption requires the development of a Wheel Turbine Relocation Plan. The plan describes the refurbishment and relocation of one of the McCormick Hercules wheel turbines being removed from the Byron Weston Defiance Mill building.

GZA has provided a copy of the Wheel Turbine Relocation Plan for the Commission's review. We would appreciate your comments regarding the Wheel Turbine Relocation Plan within 30 days (by August 27, 2012).

We would be happy to further discuss the project, if necessary. Should the need arise, please contact Chad Cox at (781) 278-5787.

Very truly yours,

GZA GEOENVIRONMENTAL, INC

A handwritten signature in blue ink that reads "Kristina Ekholm".

Kristina Ekholm, PE
Assistant Project Manager

A handwritten signature in blue ink that reads "Chad Cox".

Chad W. Cox, PE
Principal

cc: James Noel (Crane and Company)
FERC (via e-file)

J:\19,000-20,999\19349\19349-50.KDE\Wheel Relocation Plan\DHC Letter.docx

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One Edgewater Drive
Norwood,
Massachusetts 02062
Phone: 781-278-3700
Fax: 781-278-5701
<http://www.gza.com>

Kristina Ekholm

From: Patricia Brady
Sent: Monday, July 30, 2012 9:49 AM
To: Kristina Ekholm
Subject: FW: UPS Delivery Notification, Tracking Number 1Z0492850197675618

From: UPS Quantum View [<mailto:auto-notify@ups.com>]
Sent: Monday, July 30, 2012 9:42 AM
To: Patricia Brady
Subject: UPS Delivery Notification, Tracking Number 1Z0492850197675618



Discover more about
UPS:
[Visit www.ups.com](http://www.ups.com)
[Sign Up For Additional
E-Mail From UPS](#)
[Read Compass Online](#)

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GEOENVIRONMENTAL will not receive your reply.

**At the request of GZA GEOENVIRONMENTAL,
this notice is to confirm that the following shipment
has been delivered.**

Important Delivery Information

Message from GZA GEOENVIRONMENTAL:
19349.50_kde

Tracking Number: [1Z0492850197675618](#)

Delivery Date / Time: 30-July-2012 / 9:16 AM

Delivery Location: OFFICE
Signed by: HOLLINGWORTH

Shipment Detail

Ship To:
Dalton Historical Commission
462 MAIN ST
DALTON
MA
01226
US



Number of Packages: 1

UPS Service: NEXT DAY AIR

Shipment Type: Letter

Reference Number 1: 19349.50

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Tristram Dalton

Dalton Historical Commission

Town Hall
462 Main Street
Dalton, Massachusetts 01226

Gail A. Pinna
462 Main St.
Dalton, Mass. 01226

GZA GeoEnvironmental, Inc
One Edgewater Drive
Norwood, Mass. 02062

Attention:
Chad W. Cox PE
Principal

Dear Sir,

In regards to the latest draft frpm GZA this one being
WHEEL TURBINE RELOCATION PLAN. The Historical Commission
agree that the Crane Museum is the most suitable site.

The Crane Museum is on the National Historic Register
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addition in this part of the history of Dalton

Respectfully,


Gail A. Pinna
vice Chair/Secretary

c.c. James Noel
Crane & Co..

GZA
GeoEnvironmental, Inc.

Engineers and
Scientists

July 27, 2012
File No. 19349.50

Massachusetts Historical Commission
220 Morrissey Boulevard
Boston, Massachusetts 02125



Re: Request for Comments
Wheel Turbine Relocation Plan
Byron Weston Hydroelectric Project (FERC P-13583-001)

Dear Sir/Madam:

The purpose of this letter is to request comments regarding Crane & Company's (Crane's) Wheel Turbine Relocation Plan from the Massachusetts Historic Commission (Commission). Crane has been issued an Exemption from Licensing from the Federal Energy Regulatory Commission (FERC) for the Byron Weston Hydroelectric Project. The Article 27 of the terms of the exemption requires the development of a Wheel Turbine Relocation Plan. The plan describes the refurbishment and relocation of one of the McCormick Hercules wheel turbines being removed from the Byron Weston Defiance Mill building.

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Very truly yours,

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Assistant Project Manager

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Principal

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FERC (via e-file)

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Phone: 781-278-3700
Fax: 781-278-5701
<http://www.gza.com>

GZA
GeoEnvironmental, Inc.

Engineers and
Scientists

RECEIVED

July 27, 2012
File No. 19349.50

JUL 27 2012

Massachusetts Historical Commission
220 Morrissey Boulevard
Boston, Massachusetts 02125

MASS. HIST. COMM



Re: Request for Comments
Wheel Turbine Relocation Plan
Byron Weston Hydroelectric Project (FERC P-13583-001)

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Norwood,
Massachusetts 02062
Phone: 781-278-3700
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The Commonwealth of Massachusetts
William Francis Galvin, Secretary of the Commonwealth
Massachusetts Historical Commission

August 27, 2012

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

RE: Byron Weston No. 2 Crane & Company Hydroelectric Projects, Wheel Turbine Relocation Plan, Dalton, MA. GZA #19349.5. MHC #RC.47433. **FERC No. 13583-001.**

Dear Secretary Bose:

Staff of the Massachusetts Historical Commission, the office of the Massachusetts State Historic Preservation Officer, have received draft Wheel Turbine Relocation Plan submitted for the project referenced above, received by the MHC on July 27, 2012, and a copy of the comments of the Dalton Historical Commission received by the MHC on August 20, 2012.

The MHC requests that a paper copy of the final relocation plan be provided with the photodocumentation (described on page 4).

These comments are offered to assist in compliance with Section 106 of the National Historic Preservation Act of 1966, as amended (36 CFR 800). Please contact me if you have any immediate questions.

Sincerely,

A handwritten signature in dark ink, appearing to be "E. Bell", written over a horizontal line.

Edward L. Bell
Deputy State Historic Preservation Officer
Massachusetts Historical Commission

xc:
Crane & Company
Chad W. Cox, GZA Environmental Inc.-Norwood
Dalton Historical Commission

220 Morrissey Boulevard, Boston, Massachusetts 02125
(617) 727-8470 • Fax: (617) 727-5128
www.sec.state.ma.us/mhc



Tristram Dalton

Dalton Historical Commission

Town Hall
462 Main Street
Dalton, Massachusetts 01226

Gail A. Pinna
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Dalton, Mass. 01226

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Respectfully,


Gail A. Pinna
vice Chair/Secretary

c.c. James Noel
Crane & Co..



Appendix I - Supplemental Documentation for Recreation

Byron Weston Hydropower Project
Crane & Company
FERC No. 13583-001

PUBLIC SAFETY PLAN



August 2012

Owner:	Crane & Co.
Engineer:	GZA GeoEnvironmental, Inc.
Location:	Dalton, MA

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APPENDICES:

Figure 1: Aerial Photo of Project Limits

Figure 2: Site Safety Device Location Plan

APPENDICES:

Appendix A: Limitations

Appendix B: Site Photos

Appendix C: Safety Signs

I. INTRODUCTION

A. PURPOSE

The Byron Weston Dam No. 2 is an existing dam located on the East Branch of the Housatonic River in Dalton, MA. The dam and the adjacent mill structure on the right bank are owned by Crane and Co. (Crane). Crane has been granted a Small Hydroelectric Power Project Exemption from the Federal Energy Regulatory Commission (FERC, FERC No. 13583-001) and now intends to proceed with the construction of the project.

As required under Article 24 of the terms of the exemption, this Public Safety Plan provides information regarding potential public safety concerns at the project and means of mitigating such issues. Article 24 reads as follows:

Public Safety Plan. Within 60 days from the issuance of this order, the exemptee shall submit one copy to the Commission's Division of Dam Safety and Inspections (D2S1) – New York Regional Engineer and two copies to the Commission (one of these copies shall be a courtesy copy to the Director, D2SI) of a Public Safety Plan. The plan shall include an evaluation of public safety concerns at the project site, including any designated recreation areas, and assess the need for the installation of safety devices or other safety measures. The submitted plan shall include a description of all public safety devices and signage, as well as a map showing the location of all public safety measures.

This Public Safety Plan has been prepared by GZA GeoEnvironmental, Inc. on behalf of the Owner and exemptee, Crane & Co. (Crane). Crane has reviewed the plan with respect to its more than 100 year history of owning and operating the Byron Weston Dam No. 2. The Plan was prepared based on guidance contained in the FERC "Guidelines for Public Safety at Hydropower Projects."

B. SITE DESCRIPTION

The Byron Weston Project will use the water power potential of the existing 30- foot-high, 90-foot-long, stone-masonry Byron Weston Dam No. 2 equipped with a 23- foot-high, 75-foot-long spillway. The dam creates a 0.94-acre impoundment with a normal water surface elevation of 1,116.7 feet North Atlantic Vertical Datum (NAVD 1988). In addition to the dam and impoundment, the project will include an existing intake structure equipped with existing trashracks and an existing headgate. The water will pass through the headgate to an existing 6.5-foot-long, 6-foot-diameter penstock connected to an existing 50-foot-long, 9.5-foot-wide headrace canal. The headrace canal will convey flow to a new 15-foot-long, 4.4-foot-diameter penstock leading to a new 250- kilowatt turbine-generating unit within the existing Byron Weston Defiance Mill building. Water will then be discharged into the East Branch of the Housatonic River through a new draft tube within the existing tailrace approximately 35 feet downstream of the dam.

The upstream impoundment of the Byron Weston Dam No. 2 extends approximately 700 feet upstream to the toe of the Byron Weston Dam No. 1. Byron Weston Dam No. 1 is a run-of-the-river masonry dam which is more than 20 feet high and fully extends across the channel and is also owned by Crane. The Dam No. 2 impoundment is fully owned by Crane. The impoundment banks on river right are formed by the vertical masonry walls of Crane mill buildings. There is no public access to the impoundment between Dam No. 1 and Dam No. 2. The impoundment banks on river left are heavily wooded, steep slopes, also owned by Crane. There are no means of access for the public down the slopes.

An aerial photo showing the dam site and impoundment is presented as **Figure 1**.

II. EVALUATION OF PUBLIC SAFETY CONCERNS

Potentially hazardous project features have been evaluated below. Selected photos of project features are contained in **Appendix B**.

A. SPILLWAY

The Byron Weston Dam No. 2 is a run-of-the-river dam which spans the entire channel. All river flow from bank to bank (other than that withdrawn for hydropower production) passes over the spillway and drops vertically approximately 20-23 feet. The area at the toe of the dam consists of a shallow pool over bedrock and exposed bedrock. Swimmers or boaters falling over the spillway would be expected to be seriously injured or killed. However, Crane owns the entire impoundment. No public access is allowed to the impoundment nor are there any public access points. The 700 foot channel is not suitable for navigation and boaters on the river portage fully around the impoundment. The only access for Crane personnel is to the project intake area on the right bank immediately upstream of the dam. This area includes safety rails and there is no formal means of entering the impoundment. This area is not accessible to the public.

B. POWERHOUSE INTAKE

The Powerhouse intake is located on river right immediately upstream of the spillway. As discussed above, there is no public access to the impoundment nor is there public access to the intake. The walkway above the intake area has a safety railing. The intake itself is protected by a trash rack with 1-inch bar spacing below water and a solid plate above. The bar screen portion of the trash rack is 7.5 feet wide by 20.8 feet deep. Maximum estimated approach velocity is less than 1.1 foot per second (fps).

C. POWERHOUSE TAILRACE AREA

Flows through the single hydropower unit will discharge through an existing stone masonry arched opening at the base of the Defiance Mill building immediately downstream of the dam. There is no public access to the area, which is near the tailwater of the spillway. Water in the tailrace area is expected to be generally a minimum of four feet deep, with deeper water during

periods of higher flow. Some deeper areas may also exist in pools in the river channel beyond the tailrace. Entrance into the tailrace arch would be hazardous.

D. SPILLWAY TAILRACE

The spillway tailrace is the river channel at the base of the dam. Similar to upstream, the downstream area is bordered by the walls of Crane buildings on river right and very steep wooded and/or bedrock slopes on river left. There is no public access to this area. Water (and potentially debris) falling from the spillway into the tailrace area is a safety hazard.

E. CANAL

The headrace canal for the project is located exclusively within Crane's Defiance Mill building. It is downstream of the trash rack and head gate. It cannot be accessed except through a hatch in the building. There is no public access to the building.

F. INTAKE AREAS

See Powerhouse Intake above.

G. BOAT RAMPS

There are no existing or planned boat ramps in the impoundment.

H. NATURAL CHANNELS

The river channel is generally inaccessible to the public. One potential area where the public could potentially have access to the top of the river channel slope is at the end of Centennial Ave. just upstream of the left dam abutment.

I. SUBSTATIONS AND POWERLINES

The project will be interconnected inside the existing mill building. There will be no external substations or powerlines.

J. PROJECT STRUCTURES

All project structures, other than the intake, are inside the existing Crane Defiance Mill. There is no public access to the mill.

K. NATURAL OR OTHER HAZARDS

There are no known natural or other hazards.

L. RECREATION AREAS

There are no known or planned recreation areas within the project boundaries.

M. WINTER CONDITIONS

The impoundment does not typically freeze due to the continuous current through the channel. However, extreme conditions can result in partial freezing. Additionally, floating ice can flow downstream over the Dam No. 1 and/or over Dam No. 2. While ice conditions could be hazardous, there is no public access to the impoundment or area at the base of the spillway.

III. SAFETY DEVICES AND MEASURES

Safety devices and measures to address potential safety concerns are described below. A site plan showing the locations of the safety measures is presented as **Figure 2**.

A. SAFETY SIGNAGE

Safety signage at the Project shall be as described below. Mock ups of the signs, corresponding to the numbers below, are presented in **Appendix C**.

1. Warning Sign at Intake Structure attached to railing
2. Warning Sign at Spillway attached to corner of building
3. Warning Sign at Tailrace over discharge arch
4. No Trespassing sign at Crane property line adjacent to Centennial Ave.

B. RESTRAINING DEVICES

1. Fall protection safety railings (yellow) have been provided at the right abutment area above the spillway and along the access stairs and deck above the trash rack.
2. A trash rack with 1-inch bar spacing and a low in present in front of the project. The approach velocity in front of the rack is a maximum of 1.1 fps.

C. ESCAPE DEVICES

1. A US Coast Guard-approved throwable rescue device (Life Ring or similar) with an attached line shall be mounted at the intake.
2. A 12-foot safety pole with a hook loop shall be kept at the intake area to assist in the recovery of persons in the water. Exit from the water at the intake area shall be via the walkway above the trashrack which is approximately 3 feet above normal water surface.

D. OPERATION AND MAINTENANCE

Crane personnel, as part of their normal maintenance routine, will inspect all safety devices for wear, damage, or vandalism and will repair or replace safety devices as needed.



GZA GeoEnvironmental, Inc.